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Psychological interventions to foster resilience in healthcare professionals (Review)

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[Intervention Review]

Psychological interventions to foster resilience in healthcare professionals

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ABSTRACT

Background

Resilience can be defined as the maintenance or quick recovery of mental health during or after periods of stressor exposure, which may result from a potentially traumatising event, challenging life circumstances, a critical life transition phase, or physical illness. Healthcare professionals, such as nurses, physicians, psychologists and social workers, are exposed to various work-related stressors (e.g. patient care, time pressure, administration) and are at increased risk of developing mental disorders. This population may benefit from resilience-promoting training programmes.

Objectives

To assess the effects of interventions to foster resilience in healthcare professionals, that is, healthcare staff delivering direct medical care (e.g. nurses, physicians, hospital personnel) and allied healthcare staff (e.g. social workers, psychologists).

Search methods

We searched CENTRAL, MEDLINE, Embase, 11 other databases and three trial registries from 1990 to June 2019. We checked reference lists and contacted researchers in the field. We updated this search in four key databases in June 2020, but we have not yet incorporated these results.

Selection criteria

Randomised controlled trials (RCTs) in adults aged 18 years and older who are employed as healthcare professionals, comparing any form of psychological intervention to foster resilience, hardiness or post-traumatic growth versus no intervention, wait-list, usual care, active or attention control. Primary outcomes were resilience, anxiety, depression, stress or stress perception and well-being or quality of life. Secondary outcomes were resilience factors.

Data collection and analysis

Two review authors independently selected studies, extracted data, assessed risks of bias, and rated the certainty of the evidence using the GRADE approach (at post-test only).

Main results

We included 44 RCTs (high-income countries: 36). Thirty-nine studies solely focused on healthcare professionals (6892 participants), including both healthcare staff delivering direct medical care and allied healthcare staff. Four studies investigated mixed samples (1000 participants) with healthcare professionals and participants working outside of the healthcare sector, and one study evaluated training for emergency personnel in general population volunteers (82 participants). The included studies were mainly conducted in a hospital setting and included physicians, nurses and different hospital personnel (37/44 studies).

Participants mainly included women (68%) from young to middle adulthood (mean age range: 27 to 52.4 years). Most studies investigated group interventions (30 studies) of high training intensity (18 studies; > 12 hours/sessions), that were delivered face-to-face (29 studies). Of the included studies, 19 compared a resilience training based on combined theoretical foundation (e.g. mindfulness and cognitive-behavioural therapy) versus unspecific comparators (e.g. wait-list). The studies were funded by different sources (e.g. hospitals, universities), or a combination of different sources. Fifteen studies did not specify the source of their funding, and one study received no funding support.

Risk of bias was high or unclear for most studies in performance, detection, and attrition bias domains.

At post-intervention, very-low certainty evidence indicated that, compared to controls, healthcare professionals receiving resilience training may report higher levels of resilience (standardised mean difference (SMD) 0.45, 95% confidence interval (CI) 0.25 to 0.65; 12 studies, 690 participants), lower levels of depression (SMD −0.29, 95% CI −0.50 to −0.09; 14 studies, 788 participants), and lower levels of stress or stress perception (SMD −0.61, 95% CI −1.07 to −0.15; 17 studies, 997 participants). There was little or no evidence of any effect of resilience training on anxiety (SMD −0.06, 95% CI −0.35 to 0.23; 5 studies, 231 participants; very-low certainty evidence) or well-being or quality of life (SMD 0.14, 95% CI −0.01 to 0.30; 13 studies, 1494 participants; very-low certainty evidence). Effect sizes were small except for resilience and stress reduction (moderate). Data on adverse effects were available for three studies, with none reporting any adverse effects occurring during the study (very-low certainty evidence).

Authors' conclusions

For healthcare professionals, there is very-low certainty evidence that, compared to control, resilience training may result in higher levels of resilience, lower levels of depression, stress or stress perception, and higher levels of certain resilience factors at post-intervention.

The paucity of medium- or long-term data, heterogeneous interventions and restricted geographical distribution limit the generalisability of our results. Conclusions should therefore be drawn cautiously. The findings suggest positive effects of resilience training for healthcare professionals, but the evidence is very uncertain. There is a clear need for high-quality replications and improved study designs.

PLAIN LANGUAGE SUMMARY

Psychological interventions to foster resilience in healthcare professionals

Background
The work of healthcare professionals (e.g. nurses, physicians, psychologists, social workers) can be very stressful. They often carry a lot of responsibility and are required to work under pressure. This can adversely affect their physical and mental health. Interventions to protect them against such stresses are known as resilience interventions. Previous systematic reviews suggest that resilience interventions can help workers cope with stress and protect them against adverse consequences for their physical and mental health.

Review question
Do psychological interventions designed to foster resilience improve resilience, mental health and other factors associated with resilience in healthcare professionals?

Search dates
The evidence is current to June 2019. The results of an updated search of four key databases in June 2020 have not yet been included in the review.

Study characteristics
We found 44 randomised controlled trials (studies in which participants are assigned to either an intervention or a control group by a procedure similar to tossing a coin). The studies tested a range of resilience interventions in participants aged on average between 27 and 52.4 years.

Healthcare professionals were the focus of 39 studies, with a total of 6892 participants. Four studies included mixed samples (1000 participants) of healthcare professionals and non-healthcare participants. One study of resilience training for emergency workers examined 82 volunteers.

Of the included studies, 19 compared a combined resilience intervention (e.g. mindfulness and cognitive-behavioural therapy) versus unspecific comparators (e.g. a wait-list control receiving the training after a waiting period). Most interventions (30/44) were performed in

groups, with high training intensity of more than 12 hours or sessions (18/44), and were delivered face-to-face (i.e. with direct contact and face-to-face meetings between the intervention provider and the participants; 29/44).

The included studies were funded by different sources (e.g. hospitals, universities), or a combination of different sources. Fifteen studies did not specify the source of their funding, and one study received no funding support.

Certainty of the evidence
A number of things reduce the certainty about whether or not resilience interventions are effective. These include limitations in the methods of the studies, different results across studies, the small number of participants in most studies, and the fact that the findings are limited to certain participants, interventions and comparators.

Key results
For healthcare professionals, resilience training may improve resilience, and may reduce symptoms of depression and stress immediately after the end of treatment. Resilience interventions do not appear to reduce anxiety symptoms or improve well-being. However, the evidence found in this review is limited and very uncertain. This means that, at present, we have very little confidence that resilience interventions make a difference to these outcomes. Further research is very likely to change the findings.

Very few studies reported on the longer-term impact of resilience interventions. Studies used a variety of different outcome measures and intervention designs, making it difficult to draw general conclusions from the findings. Potential adverse events were only examined in three studies, showing no undesired effects. More research is needed of high methodological quality and with improved study designs.

SUMMARY OF FINDINGS

Summary of findings 1. Resilience interventions compared to control condition for healthcare professionals

Resilience interventions compared to control condition for healthcare professionals

Patient or population: healthcare professionals including healthcare staff delivering direct medical care (e.g. nurses, physicians, hospital personnel) and allied healthcare staff (e.g. social workers, psychologists); aged 18 years and older, irrespective of health status

Setting: Any healthcare sectors (e.g. psychiatric departments, intensive care unit, surgery, family medicine, internal medicine)
Intervention: Any psychological resilience intervention focused on fostering resilience or the related concepts of hardiness or post-traumatic growth by strengthening well-evidenced resilience factors that are thought to be modifiable by training (see Appendix 3), irrespective of content, duration, setting or delivery mode

Comparison: no intervention, wait-list control, treatment as usual (TAU), active control, attention control

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with control	Risk with resilience interventions				
Resilience **Measured by**: investigators measured resilience using different instruments; higher scores mean higher resilience **Timing of outcome assessment:** post-intervention	See comment	The mean resilience score in the intervention groups was, on average, **0.45 standard deviations higher** (0.25 higher to 0.65 higher)	-	690 (12 RCTs)	⊕⊖⊖⊖ **Very low** [a]	SMD of 0.45 represents a moderate effect size (Cohen 1988b).
Mental health and well-being: anxiety **Measured by:** investigators measured anxiety using different instruments; lower scores mean lower anxiety **Timing of outcome assessment:** post-intervention	See comment	The mean anxiety score in the intervention groups was, on average, **0.06 standard deviations lower** (0.35 lower to 0.23 higher)	-	231 (5 RCTs)	⊕⊖⊖⊖ **Very low** [b]	SMD of 0.06 represents a small effect size (Cohen 1988b).
Mental health and well-being: depression **Measured by:** investigators measured depression using different instruments; lower scores mean lower depression	See comment	The mean depression score in the intervention groups was, on average, **0.29 standard deviations lower** (0.50 lower to 0.09 lower)	-	788 (14 RCTs)	⊕⊖⊖⊖ **Very low** [c]	SMD of 0.29 represents a small effect size (Cochrane 1988b).

Timing of outcome assessment: post-intervention						
Mental health and well-being: stress or stress perception **Measured by:** investigators measured stress or stress perception using different instruments; lower scores mean lower stress or stress perception **Timing of outcome assessment:** post-intervention	See comment	The mean stress or stress perception score in the intervention groups was, on average, **0.61 standard deviations** lower (1.07 lower to 0.15 lower)	-	997 (17 RCTs)	⊕⊖⊖⊖ **Very low** [d]	SMD of 0.61 represents a moderate effect size (Cohen 1988b).
Mental health and well-being: well-being or quality of life **Measured by:** investigators measured well-being or quality of life using different instruments; higher scores mean higher well-being or quality of life **Timing of outcome assessment:** post-intervention	See comment	The mean well-being or quality of life score in the intervention groups was, on average, **0.14 standard deviations higher** (0.01 lower to 0.30 higher)	-	1494 (13 RCTs)	⊕⊖⊖⊖ **Very low** [e]	SMD of 0.14 represents a small effect size (Cohen 1988b).
Adverse events	There were no adverse events reported in association with study participation in three studies.		-	784 (3 RCTs)	⊕⊖⊖⊖ **Very low** [f]	-

***The risk in the intervention group** (and its 95% CI) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RCT:** Randomised controlled trial; **SD:** standard deviation;**SMD:** standardised mean difference.

GRADE Working Group grades of evidence
High certainty: we are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: we are moderately confident in the effect estimate; the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: our confidence in the effect estimate is limited; the true effect may be substantially different from the estimate of the effect
Very low certainty: we have very little confidence in the effect estimate; the true effect is likely to be substantially different from the estimate of effect

[a]Downgraded two levels due to study limitations (unclear risk of selection and detection bias, high and unclear risk of attrition bias, high risk of performance bias), one level due to unexplained inconsistency (I^2 = 41%), and one level due to indirectness (studies limited to certain participants (young and middle-aged adults), interventions (e.g. group setting, face-to-face delivery, moderate and high intensity, mindfulness-based training and combination) and comparators (no intervention, wait-list)).
[b]Downgraded two levels due to study limitations (unclear risk of selection and detection bias, unclear and high risk of performance bias, high risk of attrition bias), one level due to indirectness (studies limited to certain participants (middle-aged adults)), and two levels due to imprecision (< 400 participants; 95% CI wide and inconsistent).
[c]Downgraded two levels due to study limitations (unclear risk of selection and detection bias, unclear and high risk of performance bias, high risk of attrition bias), one level due to unexplained inconsistency (I^2 = 42%), one level due to indirectness (studies limited to certain participants (middle-aged adults), interventions (e.g. group setting, face-

to-face delivery, moderate and high intensity, mindfulness-based training and combination) and comparators (no intervention)), and one level due to imprecision (95% CI wide and inconsistent).

[d]Downgraded two levels due to study limitations (unclear risk of selection and detection bias, high and unclear risk of attrition bias, high risk of performance bias), one level due to unexplained inconsistency (I^2 = 90%), and one level due to indirectness (studies limited to certain participants (young and middle-aged adults), interventions (e.g. group setting, face-to-face delivery, moderate and high intensity, mindfulness-based training and combination) and comparators (no intervention, wait-list)).

[e]Downgraded two levels due to study limitations (unclear risk of selection and detection bias, unclear and high risk of attrition bias, high risk of performance bias), one level due to unexplained inconsistency (I^2 = 31%), one level due to indirectness (studies limited to certain participants (young and middle-aged adults), interventions (e.g. group setting, face-to-face delivery, moderate and high intensity, mindfulness-based trainings and combination) and comparators (no intervention, wait-list)), and one level due to imprecision (95% CI wide and inconsistent).

[f]Downgraded two levels due to study limitations (unclear risk of selection and detection bias, high and unclear risk of attrition and other bias (no or unclear systematic and validated assessment of adverse events), high risk of performance bias), and one level due to indirectness (studies limited to certain interventions (e.g. combined setting, face-to-face delivery, high intensity, mindfulness-based training)).

BACKGROUND

For a description of abbreviations used in this review, please see Appendix 1.

Description of the condition

Since the introduction of Antonovsky's salutogenesis as a basis for health promotion (Antonovsky 1979), and the Ottawa Charter for Health Promotion (WHO 1986), the concept of resilience has stimulated extensive research. Resilience describes the phenomenon in which an individual does not, or only temporarily experiences mental health problems despite being subjected to psychological or physical stressors of short (acute) or long (chronic) duration (Kalisch 2015; Kalisch 2017). By definition, resilience presupposes the exposure to substantial risk or adversity (Earvolino-Ramirez 2007; Jackson 2007; Luthar 2000a; Masten 2001).

Stressor exposure in healthcare professionals and its consequences

Healthcare professionals are exposed to a large number of environmental and psychosocial stressors (Aiken 2001; Hannigan 2004; Jennings 2008; Kumar 2016; Lambert 2004). Substantial patient-related stressors include, for example, physical or verbal aggression from patients or relatives or both, (daily) exposure to diseases, suffering, and death or even patient suicides (Jackson 2007; McAllister 2009; McCann 2013). Work-related stressors may include time pressure, the responsibility of medical decision-making, as well as social expectations of health professionals (Lateef 2011; McAllister 2009; McCann 2013). Healthcare staff moreover can be exposed to many organisational adversities such as interdisciplinary teamwork, inflexible hierarchies, staff downsizing, increasing administrative effort and technological changes such as new diagnostic tools (Jackson 2007; McAllister 2009; McCann 2013; Zander 2013). Especially in the nursing professions, high job demands are linked to low financial rewards.

Chronic stressor exposure has a potential impact on mental health. Some of the above-mentioned factors were shown to be associated with employees' mental health problems in general (Gray 2019; Harvey 2017; Marchand 2015). For the healthcare sector in particular, for example, high workload (e.g. long working hours; Adriaenssens 2015; Anderson 2017; Van Ham 2006; Shanafelt 2009; Shanafelt 2016), demanding work situations (e.g. in emergency ward; Adriaenssens 2011; Adriaenssens 2015), workplace violence (Pekurinen 2017; Shi 2017), lack of recognition (Adriaenssens 2015; Van Ham 2006) and administrative burdens (Anderson 2017; Van Ham 2006) have been shown to be associated with burnout symptoms and mental health problems. Physicians and other employees in the healthcare industry have been shown to report debilitating sleep disorders (Kim 2018b; Schlafer 2014). Healthcare professionals are at increased risk of developing burnout symptoms (e.g. high emotional exhaustion; Aiken 2001; Hannigan 2004) and stress-related mental disorders (Gracino 2016; Harvey 2009; Robertson 2010; Weinberg 2000; Wieclaw 2006), such as depression (Frank 1999; Gong 2014; Tomioka 2011) and post-traumatic stress disorder (Jonsson 2003; Mealer 2009; Ong 2016). They also have higher rates of substance misuse (Horsfall 2014) and have been shown to report increased perceived stress (Leonelli 2017). Due to emotional stressors, such as working with traumatised patients, healthcare workers also commonly report compassion fatigue and secondary traumatic stress (Adams 2006). Furthermore, compared to other disciplines, higher suicide rates for healthcare staff (e.g. physicians) have been demonstrated (Horsfall 2014; Meltzer 2008). In the face of chronic stressors and the resulting impact on physical and mental health, healthcare workers have higher numbers of days absent due to illness (Moberly 2018; Michie 2003) and report reduced job satisfaction (Kuburović 2016; Lu 2016), which is often associated with job termination and understaffing, especially in the nursing sector. For example, based on a cross-sectional observational study in 10 European countries, Heinen 2013 found that 5% to 17% of nurses from participating medical and surgical hospital wards intended to leave the profession. For new nursing-school graduates, high first-year turnover rates (i.e. the percentage of employees leaving in the first year after training) have been reported (35% to 61%; Pine 2007).

Overall, based on these findings, the concept of resilience has become increasingly important in healthcare professionals in recent years (Hart 2014; Jackson 2007; McAllister 2009; McCann 2013).

Definition of resilience

Three different approaches have been discussed for a definition of resilience (Hu 2015; Kalisch 2015). Trait resilience is defined as personal resources or static, positive personality characteristics that enhance individual adaptation (Block 1996; Nowack 1989; Wagnild 1993). This approach has largely been superceded by a view of resilience as an outcome rather than a static personality trait (Kalisch 2015; Mancini 2009); that is, mental health despite significant stress or trauma. According to this outcome-oriented definition, resilience is partially determined by several resilience factors (Kalisch 2015). To date, a large range of genetic, psychological, social and environmental factors have been discussed that often overlap and may interact (Bengel 2012; Bonanno 2013; Carver 2010; Connor 2006; Earvolino-Ramirez 2007; Feder 2011; Forgeard 2012; Haglund 2007; Iacoviello 2014; Kuiper 2012; Mancini 2009; Michael 2003; Ozbay 2007; Rutten 2013; Sapienza 2011; Sarkar 2014; Southwick 2005; Southwick 2012; Stewart 2011; Wu 2013; Zauszniewski 2010). Psychosocial resilience factors that are well-evidenced according to the current state of knowledge and are thought to be modifiable include: meaning or purpose in life, a sense of coherence, positive emotions, hardiness, self-esteem, active coping, self-efficacy, optimism, social support, cognitive flexibility (including positive reappraisal and acceptance), and religiosity or spirituality or religious coping (see Appendix 2: level 1). Most recently, resilience has been conceptualised as a multidimensional and dynamic process (Johnston 2015; Kalisch 2015; Kent 2014; Mancini 2009; Norris 2009; Rutten 2013; Sapienza 2011; Southwick 2012). This resilient process is characterised either by a trajectory of undisturbed mental health during or after adversities, or by temporary dysfunctions followed by successful recovery (Kalisch 2015). In general, resilience is viewed as the outcome of an interaction between individuals and their environment (Cicchetti 2012; Rutten 2013), which may be influenced through personal (e.g. optimism) as well as environmental (e.g. social support) resources (Haglund 2007; Iacoviello 2014; Kalisch 2015; Southwick 2005; Wu 2013). As such, resilience is modifiable and can be improved by interventions (Bengel 2012; Connor 2006; Southwick 2011).

Interventions to foster resilience

Interventions to foster resilience have been developed for and conducted in a variety of clinical and non-clinical populations using various formats, such as multimedia programmes or face-to-face settings, and have been delivered in a group or individual context (see Bengel 2012 and Southwick 2011 for an overview). To date, several training programmes that focus specifically on fostering resilience in healthcare professionals have also been tested (e.g. Mealer 2014; Sood 2011). However, the empirical evidence about the efficacy of these interventions is still unclear and requires further research.

Description of the intervention

There is little consensus so far about when to consider a programme as 'resilience training', or what components are needed for effective programmes (Leppin 2014). The diversity across resilience-training programmes in their theoretical assumptions, the operationalisation of the construct, and the inclusion of core components reflect the current state of knowledge (Joyce 2018; Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016), with leading guidelines still under discussion (compare Kalisch 2015; Robertson 2015).

Most training programmes, whether individual or group-based, are implemented face-to-face. Alternative formats include online interventions or combinations of different formats. Resilience-training programmes often use methods such as discussions, role plays, practical exercises and homework to reinforce training content. Moreover, they mostly contain a psycho-educative element to provide information on the concept of resilience or specific training elements (e.g. cognitive restructuring).

In general, resilience interventions are based on different psychotherapeutic approaches: cognitive-behavioural therapy (CBT; Abbott 2009); acceptance and commitment therapy (ACT; Ryan 2014); mindfulness-based therapy (Geschwind 2011); attention and interpretation therapy (AIT; Sood 2014); problem-solving therapy (Bekki 2013); and stress inoculation (Farchi 2010). A number of training programmes focus on fostering single or multiple psychosocial resilience factors, without being assignable to a certain approach. Few interventions base their work on a defined resilience model (Schachman 2004; Steinhardt 2008).

How the intervention might work

Depending on the underlying resilience concept, resilience interventions target different resources and skills. The theoretical foundations of training programmes and the hypotheses on how they might maintain or regain mental health are as diverse as their content. Currently, no empirically-validated theoretical framework exists that outlines the mode of action of resilience interventions (Bengel 2012; Leppin 2014).

As resilience as an outcome is determined by several potentially modifiable resilience factors (see Description of the condition), resilience interventions might work by strengthening these factors (see Appendix 3 for examples of possible training methods). However, depending on the underlying theoretical foundation, there are different theories of change on how certain factors and hence resilience might be affected.

From the 'cognitive-behavioural perspective', stress-related mental dysfunctions (e.g. depression) are considered to be the result of dysfunctional thinking (Beck 2011; Benjamin 2011). When confronted with adversity, people show maladaptive behavioural responses or experience negative mood states, or both, due to irrational cognitions (Beck 1976; Ellis 1975). This is in line with other stress and resilience theories, assuming that not the stressor itself but its cognitive appraisal may lead to stress reactions (e.g. Kalisch 2015; Lazarus 1987). Modifying cognitive processes into more adaptive patterns of thought will therefore probably produce more adaptive responses to stress (Beck 1964). By challenging an individual's maladaptive thoughts and by teaching coping strategies, CBT-based resilience interventions might be beneficial in promoting the resilience factors of cognitive flexibility and active coping.

As one form of CBT, 'stress inoculation therapy' is based on the assumption that exposing individuals to milder forms of stress can strengthen coping strategies and the individual's confidence in using his/her coping repertoire (Meichenbaum 2007). Resilience-training programmes grounded in stress inoculation therapy might therefore foster resilience by enhancing factors such as self-efficacy.

Problem-solving therapy is closely related to CBT and is based on problem-solving theory. According to the 'problem-solving' model of stress and adaptation, effective problem-solving can attenuate the negative effects of stress and adversity on well-being by moderating or mediating the effects of stressors on emotional distress (Nezu 2013). Resilience interventions based on problem-solving that enhance an individual's positive problem orientation and resourceful problem-solving might foster the participants' psychological adaptation to stress by increasing the resilience factor of active coping.

According to 'acceptance and commitment therapy' (ACT) (Hayes 2004; Hayes 2006), psychopathology is primarily the consequence of psychological inflexibility (Hayes 2006), which is also relevant when an individual is confronted with stressors. By teaching acceptance and mindfulness skills (e.g. being in contact with the present moment), and also commitment and behaviour-change skills (e.g. values, committed action), several resilience factors might be fostered in ACT-based resilience interventions (e.g. cognitive flexibility, purpose in life). In particular, the acceptance of a full range of emotions taught in ACT might result in a better adjustment to stressful conditions.

In 'mindfulness-based therapy' (e.g. mindfulness-based stress reduction (MBSR; Stahl 2010); attention and interpretation therapy (AIT; Sood 2010)), mindfulness is characterised by the non-judgmental awareness of the present moment and its accompanying mental phenomena (e.g. body sensations, thoughts, emotions). Since practitioners learn to accept whatever occurs in the present moment, they are thought to adapt more efficiently to stressors (Grossman 2004; Shapiro 2005). As being more aware of the 'here and now' possibly enhances the sensitivity for positive aspects in life, mindfulness-based resilience interventions might also help participants to gain a brighter outlook for the future (i.e. optimism) or to experience positive emotions more regularly. Teaching mindfulness might also increase participants' cognitive flexibility by learning to accept negative situations and emotions.

Independent of the underlying theory, resilience training might work differently depending on the respective 'delivery format' and 'intervention setting' (Robertson 2015; Vanhove 2016). For example, interventions implemented face-to-face could work better than online formats in increasing resilience, due to the more direct contact between trainers and participants (Vanhove 2016), which might also increase compliance. Resilience training in an individual setting could be more efficient than group-based interventions as trainers might be better able to attend to participants' individual needs and provide feedback more easily (Vanhove 2016). On the other hand, group-based interventions could enhance the participants' social resources. No previous review has examined the role of training duration on effect sizes of resilience interventions. As participants have the opportunity to apply the taught skills in daily life, high-intensity resilience interventions that include weekly sessions over several weeks (e.g. combined with homework assignments or daily practice) could be more efficient than low-intensity training (e.g. single session). Joyce 2018, who examined the role of the theoretical foundation of resilience interventions for the first time, found positive effect sizes on resilience for CBT-based, mindfulness-based and mixed interventions (e.g. CBT and mindfulness) compared to control. However, differences in the effects of resilience training based on other theoretical foundations have not been considered so far.

Why it is important to do this review

To date, a large number of systematic reviews and meta-analyses have investigated various forms of intervention to foster healthcare professionals' mental health (see Appendix 4). Although some of these reviews also identified interventions to foster resilience (e.g. Lamothe 2016; Ruotsalainen 2015), the primary review question did not specifically refer to identifying such programmes.

A considerable number of systematic reviews and meta-analyses of interventions to foster resilience (see Appendix 4) have synthesised the efficacy of resilience-training programmes in clinical and non-clinical adult populations (Bauer 2018; Joyce 2018; Leppin 2014; Macedo 2014; Massey 2019; Milne 2016; Pallavicini 2016; Pesantes 2015; Petriwskyj 2016; Reyes 2018; Robertson 2015; Skeffington 2013; Townshend 2016; Vanhove 2016; Van Kessel 2014; Wainwright 2019) or at least searched for 'resilience' and related constructs (Deady 2017; Tams 2016). Thus far, there are only three relevant meta-analyses (Joyce 2018; Leppin 2014; Vanhove 2016). Overall, previous reviews agree in their conclusion that resilience interventions can generally improve resilience, mental health and (job) performance. Nevertheless, there are some methodological and quality differences between the reviews, which complicate statements about the efficacy of resilience training or result in a variety of effect sizes (see Appendix 4). These include, for example, heterogeneous eligibility criteria and definitions of resilience training, rather simple and limited search strategies, the lack of a review protocol or PROSPERO registration for most reviews, and different guidelines for the conduct and reporting of the review.

With respect to healthcare professionals (see Appendix 4), 11 systematic reviews (Cleary 2018; Concilio 2019; Delgado 2017; Elliott 2012; Foster 2019; Fox 2018; Gillman 2015; Gilmartin 2017; Robertson 2016; Rogers 2016; Wright 2017) and one meta-analysis (Lavin Venegas 2019) have synthesised evidence on the efficacy of resilience-training programmes in this target group, with two other reviews also searching for 'resilience' (Hunter 2016; Pezaro 2017). The 14 publications either investigated healthcare staff in general, in primary or in dementia care (Cleary 2018); specific groups of healthcare workers (e.g. physicians, Fox 2018); or combinations of healthcare professionals and healthcare students (Gilmartin 2017). Overall, they found mixed results for the efficacy of resilience-training programmes. On the one hand, they found some benefits to healthcare professionals; for example, in improving resilience or mental health outcomes (e.g. anxiety, perceived stress; Cleary 2018; Gilmartin 2017; Pezaro 2017; Rogers 2016; Wright 2017). On the other hand, as pointed out by many authors of previous publications (Fox 2018; Lavin Venegas 2019), the reviews' conclusions are also restricted by current limitations of resilience intervention research (e.g. heterogeneous definitions of resilience, low methodological rigour of studies). Comparable to reviews in other populations, the publications also suffer from methodological weaknesses that limit the robustness of their findings (see Appendix 4). Most importantly, the number of RCTs included in previous reviews is rather limited (0 to 9 RCTs among 5 to 33 included studies in the 14 reviews), and the search period covered by the reviews is up to June 2018 (Foster 2019), thus precluding any conclusions about the efficacy of resilience interventions in healthcare professionals that have been developed since then.

In our review, which seeks to address the methodological weaknesses of previous reviews, we were particularly interested in psychological resilience interventions offered to this target group. The interventions had to be scientifically founded, that is, they had to address one or more of the resilience factors stated above that are known to be associated with resilience in adults according to the current state of research (compare Appendix 2: levels 1a to 1c). They also had to state the intention of promoting resilience or a related construct (hardiness, post-traumatic growth). Lastly, the trained population had to fulfil the condition of potential stress or trauma exposure (the concept implicated for resilience); that is, being employed as a healthcare professional (see Description of the condition), in order to clearly distinguish genuine resilience interventions from other interventions focused on fostering associated constructs such as mental health (Windle 2011a).

Resilience as a concept of prevention is highly current, and there is increasing interest worldwide in promoting mental health and preventing disease (WHO 1986; WHO 2004). Due to chronic stressor exposure in health professions, and the potential negative consequences for the employees' health, patient care and economic consequences (see Description of the condition), healthcare workers are viewed as one of the most important target groups for resilience interventions (McCann 2013). This review therefore aims to provide further and more detailed evidence about which interventions are most likely to foster resilience and prevent stress-related mental health problems in healthcare professionals. The evidence base for this review might contribute to improving existing interventions and to facilitating the future development of training programmes. In this way, researchers, practitioners and policy-makers could benefit from our work.

OBJECTIVES

To assess the effects of interventions to foster resilience in healthcare professionals, that is, healthcare staff delivering direct medical care (e.g. nurses, physicians, hospital personnel) and allied

healthcare staff (e.g. social workers, psychologists) (see Differences between protocol and review).

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials (RCTs), including cluster-RCTs.

Types of participants

Adults aged 18 years and older, who are employed as healthcare professionals, i.e. healthcare staff delivering direct medical care such as physicians, nurses, hospital personnel, and allied healthcare staff working in health professions, as distinct from medical care (e.g. psychologists, social workers, counsellors, physical therapists, occupational therapists, speech therapists, medical assistants, medical technicians) (see Differences between protocol and review).

Participants were included irrespective of health status.

At the time of the intervention, individuals had to be exposed to potential risk or stressors, which was ensured by focusing on healthcare staff in this review (see Description of the condition; Differences between protocol and review).

We included studies involving mixed samples (e.g. ambulance personnel and firefighters) in the review. These studies were also considered in meta-analysis (see Data synthesis) if data for healthcare professionals were reported separately or could be obtained by contacting the study authors.

Types of interventions

Any psychological resilience intervention, irrespective of content, duration, setting or delivery mode.

For the purpose of this review, we define psychological resilience interventions as follows: interventions focused on fostering resilience or the related concepts of hardiness or post-traumatic growth by strengthening well-evidenced resilience factors that are thought to be modifiable by training (see above and Appendix 2; level 1). In order to use highly objective inclusion criteria, we considered only interventions that explicitly defined the objective of fostering resilience, hardiness, or post-traumatic growth by using one or more of these terms in the publication (see Differences between protocol and review).

Studies of pharmacological (e.g. treatment with antidepressants) and physical (e.g. exercise) interventions, as well as relaxation techniques (e.g. progressive muscle relaxation), were only considered if these interventions were part of psychological resilience training. We did not include studies that merely examined the efficacy of disorder-specific psychotherapy (e.g. CBT for depression).

The comparators we considered in this review include no intervention, wait-list control, treatment as usual (TAU), active control, and attention control. We use the term 'attention control' for alternative treatments that mimicked the amount of time and attention received (e.g. by trainer) in the treatment group. We also considered active controls to involve an alternative treatment (no TAU; for example, treatment developed specifically for the study), but that did not control for the amount of time and attention in the intervention group and was not attention control in a narrow sense.

Types of outcome measures

Due to the different ways in which resilience has been operationalised in previous research, resilience as an intervention outcome could not always be guaranteed in studies. We therefore also defined assessments of psychological adaptation (e.g. mental health) as primary outcomes.

Secondary outcomes included a range of psychological factors associated with resilience, according to the current state of knowledge, and were selected based on conceptual clarity and measurability (level 1a and 1b; see Appendix 2).

Measures for the assessment of psychological resilience and psychological adaptation, as well as resilience factors, are specified on the basis of previous reviews of resilience interventions (Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016) and reviews of resilience measurements (Pangallo 2015; Windle 2011b); see Helmreich 2017 and Appendix 5, Appendix 6, Appendix 7 in this review, respectively.

We considered self-rated and observer- or clinician-rated measures, as well as study outcomes, at all time points. The absence of the primary or secondary outcomes described above was not an exclusion criterion for this review.

Primary outcomes

- Resilience*, measured by improvements in specific resilience scales (Bengel 2012; Earvolino-Ramirez 2007; Pangallo 2015; Windle 2011b), such as the Resilience Scale for Adults (Friborg 2003).
- Mental health and well-being, subsumed into the categories below, and measured by improvements in the respective assessment scales, such as the Depression Anxiety and Stress Scale (DASS-21; Lovibond 1995). See Appendix 6 for further examples.
  - Anxiety*
  - Depression*
  - Stress or stress perception*
  - Well-being or quality of life* (e.g. well-being, life satisfaction, (health-related) quality of life, vitality, vigour)
- Adverse events*

Secondary outcomes

- Resilience factors (Bengel 2012; Haglund 2007; Iacoviello 2014; Southwick 2005; Southwick 2012; Wu 2013), whenever they were available as outcomes, assessed by an increase in the respective instruments (e.g. Life Orientation Test - Revised (LOT-R); Scheier 1994). For further examples see Appendix 7.
  - Social support
  - Optimism
  - Self-efficacy
  - Active coping
  - Self-esteem
  - Hardiness (although hardiness is often used as a synonym for resilience in the literature, we conceptualised it as a resilience factor in this review. See Appendix 2)

- Positive emotions

We extracted and report data on secondary outcomes whenever they were assessed. If possible, we calculated and reported effect sizes.

Where data were available, we used outcomes marked by an asterisk (*) to generate the 'Summary of findings' table. In case of insufficient information, we provide a narrative description of the evidence.

Search methods for identification of studies

We ran the first searches for this review in October 2016, based on the MEDLINE search strategy in the protocol (Helmreich 2017) before changing the inclusion criteria of the review to focus on healthcare professionals (see Differences between protocol and review). For the top-up searches in June 2019, we added a new section to the original search strategy, using search terms to limit the search to healthcare sector workers and students.

Electronic searches

We searched the electronic sources listed below.

- Cochrane Central Register of Controlled Trials (CENTRAL; 2019, Issue 6) in the Cochrane Library, which includes the Cochrane Developmental, Psychosocial and Learning Problems Specialised Register (searched 26 June 2019).
- MEDLINE Ovid (1946 to 21 June 2019).
- Embase Ovid (1974 to 2019 Week 25).
- PsycINFO Ovid (1806 to June Week 3 2019).
- CINAHL EBSCOhost (Cumulative Index to Nursing and Allied Health Literature; 1981 to 24 June 2019).
- PSYNDEX EBSCOhost (1977 to 24 June 2019).
- Web of Science Core Collection Clarivate (Science Citation Index; Social Science Citation Index; Conference Proceedings Citation Index - Social Science & Humanities; Conference Proceedings Citation Index - Science; 1970 to 26 June 2019).
- International Bibliography of the Social Sciences ProQuest (IBSS; 1951 to 25 June 2019).
- Applied Social Sciences Index & Abstracts ProQuest (ASSIA; 1987 to 24 June 2019).
- ProQuest Dissertations & Theses (PQDT; 1743 to 24 June 2019).
- *Cochrane Database of Systematic Reviews* (CDSR; 2019, Issue 6) in the Cochrane Library (searched 26 June 2019).
- Database of Abstracts of Reviews of Effects (DARE; 2015, Issue 4) in the Cochrane Library (final issue; searched 27 October 2016)
- Epistemonikos (epistemonikos.org; all available years).
- ERIC EBSCOhost (Education Resources Information Center Institute of Education Sciences; 1966 to 26 June 2019).
- Current Controlled Trials (controlled-trials.com; 1 January 1990 to 24 June 2019).
- ClinicalTrials.gov (clinicaltrials.gov; 1 January 1990 to 24 June 2019).
- World Health Organization International Clinical Trials Registry Platform (WHO ICTRP; who.int/trialsearch; 1 January 1990 to 24 June 2019).

The search strategies for each database are reported in Appendix 8 (up to 2016) and for the revised inclusion criteria Appendix 9 (2016 onwards). We used the Cochrane Highly Sensitive Search Strategy to identify RCTs in Medline (Lefebvre 2019). We adapted the search terms and syntax for other databases. The searches were not restricted by language, publication status or publication format. Our search was limited to the period January 1990 onwards. We applied this restriction to account for the fact that the resilience concept and its operationalisation have developed significantly over the past decades (Fletcher 2013; Hu 2015; Kalisch 2015; Pangallo 2015). Because of the lack of homogeneity for the period 1990 to 2014 (Robertson 2015), it is likely that using a broader time frame would have made it even more difficult to detect resilience-training studies with similar resilience concepts and assessments. Moreover, it appeared plausible to concentrate on the period 1990 to the present, since the idea of resilience as an outcome and as a modifiable process has only emerged in recent years, and paved the way for the development of resilience-promoting interventions (Bengel 2009; Southwick 2011). The idea of fostering resilience by specific training was therefore relatively new (Leppin 2014). This can also be seen in the review by Macedo 2014, who searched for studies on resilience interventions every year until 2013 but only found RCTs published after 1990.

As resilience-training programmes should be adapted to scientific findings on a regular basis, and with the current research focusing on the detection of general resilience mechanisms (Kalisch 2015; Luthar 2000a), the last five years seemed especially important in synthesising the evidence on newly-developed resilience training.

We performed a further scoping search of four key databases (CENTRAL, CINAHL EBSCOhost, PsycINFO Ovid, ClinicalTrials.gov) in June 2020 prior to the publication of this review. The results are awaiting classification and will be incorporated into the review at the next update.

Searching other resources

In addition to the electronic search, we inspected the reference lists of all included RCTs and relevant reviews, and contacted researchers in the field as well as the authors of selected studies, to check if there are any unpublished or ongoing studies. If data were missing or unclear, we contacted the study author.

Data collection and analysis

In successive sections, we report only the methods we used in this review. Preplanned but unused methods are reported in Table 1.

Selection of studies

Two review authors (AK, IH) independently screened titles and abstracts in order to determine eligible studies. Clearly irrelevant papers were excluded immediately. At full text level, two review authors (AK, IH), working independently, checked eligibility in duplicate. We calculated inter-rater reliability at both stages (title and abstract screening and full text screening), resolving any disagreements in study selection by discussion. Where we could not reach a consensus, a third review author (AC or KL) arbitrated. If necessary, we contacted the study authors to seek additional information. We recorded all decisions in a PRISMA flow diagram (Moher 2009).

We assessed the feasibility of the selection criteria a priori, by screening 500 studies in order to attain acceptable inter-rater reliability (see Differences between protocol and review). There

was a good agreement between the review authors (kappa = 0.72), and thus no need to refine or clarify the criteria. For scientific reasons, however, we adapted the eligibility criteria during review development (see Differences between protocol and review).

Data extraction and management

We developed a data extraction sheet (see Appendix 10), based on Cochrane guidelines (Li 2019), and tested it on 10 randomly-selected included studies. This initial test resulted in sufficient agreement between the review authors. For each included study, two review authors (AK, IH) independently extracted the data in duplicate. The extraction sheet contained the following aspects:

- source and eligibility;
- study methods (e.g. design);
- allocation process;
- participant characteristics;
- interventions and comparators;
- outcomes and assessment instruments (means and standard deviations in any standardised scale);
- results;
- miscellaneous aspects.

We resolved any disagreements in data collection by discussion. Where we could not reach a consensus, a third review author (AC or KL) arbitrated. If necessary, we contacted the study authors to seek additional information.

Assessment of risk of bias in included studies

Two review authors (AK, IH) independently assessed the risks of bias of the included studies. We checked the risk of bias for each study using the criteria presented in the *Cochrane Handbook for Systematic Reviews of Interventions*, hereafter referred to as the *Cochrane Handbook* (Higgins 2011b), and set out in Appendix 11. We resolved any disagreements by discussion or by consulting a third review author (AC or KL). In accordance with Cochrane's tool for assessing risk of bias (Higgins 2011a), we critically assessed the following domains:

- sequence generation and allocation concealment (selection bias);
- blinding of participants and personnel (performance bias);
- blinding of outcome assessment (detection bias);
- incomplete outcome data (attrition bias); and
- selective outcome reporting (reporting bias).

We also considered the baseline comparability between study conditions as part of selection bias (random-sequence generation), which is not defined in the *Cochrane Handbook*. In the first part of the assessment, we describe what was reported to have happened in the study for each domain, before assigning a judgement about the risk of bias (low, high or unclear) for the entry.

Measures of treatment effect

Dichotomous data

We did not need to use our preplanned methods for analysing dichotomous outcomes (Helmreich 2017), as only two studies reported dichotomous data and both studies also provided continuous data that we were able to combine in a meta-analysis.

Continuous data

Because the included resilience-training studies used different measurement scales to assess resilience and related constructs (see Table 2, Table 3), we used the standardised mean difference (SMD) effect sizes (Cohen's d) and their 95% confidence intervals (CIs) for continuous data in the pair-wise meta-analyses. We calculated effect sizes on the basis of means, standard deviations and sample sizes for each study condition. Where data were not provided, we computed Cohen's d from alternative statistics (e.g. t test, change scores). We assessed the magnitude of effect for continuous outcomes using the criteria for interpreting SMDs suggested in the *Cochrane Handbook*: a value of 0.2 indicates a small effect; a moderate effect is represented by 0.5; and 0.8 indicates a large effect (Schünemann 2019a).

Unit of analysis issues

Cluster-randomised trials

As allocation of individuals to different conditions in resilience intervention studies partly occurs by groups (e.g. work sites, hospitals), we intended to include cluster-randomised trials along with individually-randomised trials. Since we identified no cluster-randomised trial, we have only included individually-randomised trials in meta-analyses.

Repeated observations on participants

If there were longitudinal designs with repeated observations of participants, we defined several outcomes based on different periods of follow-up and conducted separate analyses, as recommended in the *Cochrane Handbook* (Higgins 2019a). One analysis included all studies with measurement at the end of intervention (post-test), other analyses were based on the period of follow-up (short-term: three months or less; medium-term: more than three to six months; and long-term: more than six months). We rated assessments as post-intervention if performed within one week after the intervention. We counted assessments at more than one week after the intervention as short-term follow-up.

Studies with multiple treatment groups

If selected studies contained two or more intervention groups, two review authors (AK, IH) determined which group was relevant to the review and the particular meta-analysis, based on the inclusion criteria for interventions (see Types of interventions). For all studies that included several intervention groups, we considered only one intervention group relevant for the review (see Types of interventions).

Dealing with missing data

In the case of studies where there were missing data, such as missing standard deviations (SDs), or where healthcare professionals had been combined with other participants, we contacted the study authors to inquire if the missing data or subgroup (summary outcome) data were available. Following the recommendations in the *Cochrane Handbook* (Higgins 2019a), we computed missing SDs of continuous outcomes on the basis of other statistical information (e.g. t values, P values).

To obtain missing summary outcome data for studies solely conducted in healthcare professionals, we contacted the study authors (at least twice) to request the respective data (i.e. means, SDs and sample sizes for the relevant study conditions

or alternative information to calculate the SMDs; see Measures of treatment effect).

In the case of missing outcome data due to attrition, we did not ask for individual-level missing data and performed no re-analysis using imputation methods. We rated studies with high levels of missing data (≥ 10%), that used no imputation methods at high risk of attrition bias (see Assessment of risk of bias in included studies). If the study authors had reported a complete-case analysis as well as imputed data, we used the summary outcome data based on the imputed data set (e.g. baseline observation carried forward (BOCF) or ideally expectation maximization or multiple imputation).

We describe in detail those studies in which authors provided additional data not originally reported (e.g. number of participants analysed) in the Characteristics of included studies tables. We recorded missing data and attrition levels for each included study in the 'Risk of bias' tables (beneath the Characteristics of included studies tables). We also conducted a sensitivity analysis to examine the consequences of excluding studies with high levels of missing data (≥ 10% missing data in the respective outcome) on the results and subsequent conclusions of the review (see Sensitivity analysis).

Assessment of heterogeneity

We assessed the presence of clinical heterogeneity by comparing the study and study population characteristics across all eligible studies (e.g. by generating descriptive statistics). In accordance with the *Cochrane Handbook* (Deeks 2019), we explored if studies were sufficiently homogeneous in participant characteristics, interventions and outcomes.

We assessed methodological diversity by inspecting the included studies for variability in study design and risks of bias (e.g. method of randomisation). In accordance with previous reviews, which already described great heterogeneity in resilience intervention studies (Joyce 2018; Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016), we discussed similarities and differences between included studies in terms of these study characteristics in the Results and Discussion sections.

To assess statistical heterogeneity between included studies within each pair-wise meta-analysis (i.e. heterogeneity in observed treatment effects that exceeds sampling error alone), we relied on forest plots, Chi^2 test, the tau^2 statistic and the I^2 statistic, as suggested by Deeks 2019. We also considered G^2 to take small-study effects into account (Rücker 2011). G^2 indicates the proportion of unexplained variance, after having allowed for possible small-study effects. No statistical heterogeneity is indicated by a G^2 near zero. Significant statistical heterogeneity is indicated by a P value on the Chi^2 test lower than 0.10. Since resilience-training studies are often conducted with relatively small sample sizes (e.g. Loprinzi 2011; Sood 2014), we acknowledge that the Chi^2 test has only limited power in such cases. Tau^2 also provides an estimate of the between-study variance in a random-effects meta-analysis. The I^2 is a descriptive statistic, which equally reflects the percentage of total variation across studies that is due to heterogeneity rather than chance. In accordance with guidelines (Deeks 2019), we supposed non-important heterogeneity for I^2 values of 0% to 40%, moderate heterogeneity for I^2 values of 30% to 60%, substantial heterogeneity for I^2 values of 50% to 90%, and considerable heterogeneity for I^2 values between 75% and 100%. We also calculated the 95% prediction intervals from random-effects meta-analyses (see Data synthesis; pooled analyses with more than two studies) to present the extent of between-study variation (Deeks 2019).

Where we observed heterogeneity (e.g. I^2 greater than 50%, with consideration of the direction of effects and strength of evidence for heterogeneity (P value)), we conducted several subgroup analyses to investigate potential explanations (see Subgroup analysis and investigation of heterogeneity).

Assessment of reporting biases

We only performed analyses for reporting bias if there were at least 10 studies for an outcome. We assessed potential publication bias by inspecting (contour-enhanced) funnel plots (plotting the effect estimates of trials against their standard errors on reversed scales) (Page 2019; Peters 2008). We considered the fact that funnel plot asymmetry does not necessarily reflect publication bias, but can stem from a number of reasons (Page 2019). To differentiate between real asymmetry and chance, we followed the recommendations in Page 2019, and also used Egger's test (regression test; Egger 1997) to check for funnel plot asymmetry.

Data synthesis

We synthesised the results, in narrative and tabular form, by describing the resilience interventions, their theoretical concept (when possible), as well as the populations and outcomes studied (see Results). We performed the statistical analyses either in Review Manager 5 (RevMan 5; Review Manager 2014) or R (R 2019; libraries used: meta (Balduzzi 2019), metafor (Viechtbauer 2010) and metasens (Schwarzer 2019)), when appropriate.

We combined outcome measures of included studies through pair-wise meta-analyses (any resilience training versus control), in order to determine summary (pooled) intervention effects of resilience-training programmes in healthcare professionals. The decision to summarise numerical results of RCTs in pair-wise meta-analyses depended on the number of studies found (at least two studies for a specific outcome and time point) as well as the homogeneity of the included studies by population (for age, sex), resilience interventions (i.e. comparable content and modalities), comparisons, outcomes measured (i.e. same prespecified outcome albeit with different assessment tools), and the methodological quality (risk of bias) of selected studies. We conducted meta-analyses if intervention studies did not differ excessively in their content, if outcomes (measures) were not too diverse, and if there were no individual studies predominantly at high risk of bias.

For summary statistics for continuous data, we reported SMDs using an inverse-variance random-effects model. We used random-effects pair-wise meta-analyses since we anticipated a certain degree of heterogeneity between studies, as indicated by the results of previous reviews (Joyce 2018; Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016), and given the nature of the interventions. We calculated the 95% prediction intervals from random-effects meta-analyses (see Assessment of heterogeneity). As part of our sensitivity analyses, we also performed fixed-effect analyses (see Sensitivity analysis). We analysed separately continuous data reported as means and standard deviations in some studies and outcomes where standardised mean differences and the respective standard error were obtained from different data (e.g. independent t test). We subsequently combined these values

using the generic invariance method in Review Manager 5 (Review Manager 2014).

We also included studies with mixed samples (i.e. healthcare professionals and non-healthcare professionals) in meta-analyses if the subgroup data for healthcare professionals were reported separately or could be obtained from the study authors. If subgroup data were not available, we provide a narrative report of the findings of these studies in a separate section (see Effects of interventions > Studies with mixed samples) for each outcome.

All studies measuring resilience used only one resilience scale. If a study reported more than one instrument for mental health and well-being outcomes or for a specific resilience factor, we used the measure most often used among the included studies for effect size calculation. For the outcome of depression, we preferred depression scales over burnout scales if both measures were reported. For studies reporting both general measures of well-being or quality of life and work-related assessments (e.g. job satisfaction, work-related vitality), we preferred general measures.

Once we had produced a summary of the evidence to date, and only if a pair-wise meta-analysis (any resilience training versus control) was possible, we checked whether the data were also suitable for a network meta-analysis (NMA). There was not enough evidence to perform a NMA.

See Differences between protocol and review.

Subgroup analysis and investigation of heterogeneity

As we detected substantial heterogeneity for several outcomes (see Effects of interventions), we examined the characteristics of studies that may be associated with this diversity (Deeks 2019). The selection of potential effect modifiers is based on experience with previous reviews (Joyce 2018; Leppin 2014; Robertson 2015; Vanhove 2016). Where we could extract the necessary data, we performed the following subgroup analyses, classifying the RCTs as follows.

- Setting of resilience interventions (group setting vs individual setting vs combined setting vs setting not specified).
- Delivery format of resilience interventions (face-to-face vs online or mobile-based vs telephone vs bibliotherapy vs laboratory vs multimodal delivery vs delivery not specified).
- Intensity of resilience interventions (low intensity vs moderate intensity vs high intensity). Low-intensity training includes interventions with a total duration of up to five hours or up to three sessions, respectively, if no duration in hours or minutes was indicated. Moderate intensity refers to training programmes including more than five hours to 12 hours, or more than three to 12 or fewer sessions. We categorised resilience interventions with more than 12 hours or more than 12 sessions, respectively, as high-intensity training.
- Theoretical foundation of resilience-training programmes (CBT vs stress inoculation vs problem-solving training vs ACT vs mindfulness-based therapy vs AIT vs coaching vs positive psychology vs combination vs unspecific resilience training). 'Combination' refers to resilience interventions that were based on two or more explicit theoretical foundations, such as CBT and ACT or CBT and mindfulness. Unspecific training programmes include resilience interventions fostering one or several resilience factors but without specifying any explicit theoretical foundation, or where the underlying framework could not be assigned to a specific theoretical foundation.
- Comparator group in intervention studies (attention control vs active control vs wait-list control vs TAU vs no intervention vs control group not further specified). Attention control groups refer to an alternative treatment that mimicked the amount of time and attention received (e.g. by the trainer) in the intervention group. In this review, we use the term 'active control' for alternative treatment (no standard care; for example, treatment developed specifically for the treatment study) but that did not control for the amount of time and attention in the intervention group, and was not attention control in a narrow sense.

We calculated pooled effect sizes for each subgroup. Subgroup analyses were restricted to primary outcomes with at least 10 studies included in a meta-analysis (Deeks 2019). Except for training intensity (post hoc addition), we prespecified all subgroup analyses in the protocol (Helmreich 2017). For delivery format, theoretical foundation and comparator, we added some subgroups based on the evidence we found.

Sensitivity analysis

We also restricted sensitivity analyses to primary outcomes with at least 10 trials in the meta-analysis.

We performed sensitivity analyses:

- based on the underlying concept of resilience, by limiting pooled analyses to scales assessing resilience as a state-like outcome;
- excluding studies at high risk of attrition and reporting bias (see Risk of bias in included studies), respectively; we conducted subgroup analyses to test if studies judged at low and unclear risk of bias could be pooled in analysis;
- limiting the analyses to registered studies, as intended (Helmreich 2017), with registration identified depending on whether we found a trial registration or whether the authors claimed to have registered a study (see Characteristics of included studies);
- limiting the analyses to those studies with low levels of missing data (less than 10% in the relevant primary outcome);
- restricting the analyses to studies with less than 10% missing primary outcome data and where missing data had been imputed or accounted for by fitting a model for longitudinal data;
- using a fixed-effect pair-wise meta-analyses, to test the robustness of the findings.

Summary of findings and assessment of the certainty of the evidence

In this review, we used the software developed by the GRADE Working Group: GRADEpro: Guideline Development Tool (GRADEpro GDT) to create a 'Summary of findings' table for the comparison: resilience interventions versus control conditions for healthcare professionals.

We included all primary outcomes at post-test in the 'Summary of findings' table. For each outcome, we assessed the certainty of the body of evidence using the GRADE approach proposed by the GRADE working group (Schünemann 2013; Schünemann 2019b), across the following five GRADE considerations:

- limitations in the design and implementation of available studies (i.e. unclear or high risk of bias of studies contributing to the respective outcome; Guyatt 2011a);
- indirectness of evidence (i.e. included studies limited to certain participants, intervention types, or comparators; Guyatt 2011b);
- unexplained heterogeneity or inconsistency of results (i.e. heterogeneity based on variation of effect estimates, CIs, the statistical test of heterogeneity and I^2, but the subgroup analyses fail to identify a plausible explanation; Guyatt 2011c);
- imprecision of results (i.e. small number of participants included in an outcome and wide CIs; Guyatt 2011d); and
- high probability of publication bias (i.e. high risk of selective outcome reporting bias for studies contributing to the outcome based on funnel plot asymmetry, Egger's test, different results of published vs unpublished studies, and whether the evidence consisted of many small studies with potential conflicts of interest) (Guyatt 2011e).

According to the GRADE system, for sufficient statistical precision, meta-analyses of continuous outcomes should include sample sizes of at least 400 participants. Where there was both substantial inconsistency ($I^2 \geq 60\%$) for an outcome and imprecision, we did not downgrade for imprecision, as the heterogeneity might have influenced the CI (i.e. precision), and we did not wish to double-downgrade for the same problem.

Two review authors (AK, IH), working independently, assessed the certainty of the evidence, resolving any disagreements by discussion or by consulting a third review author (AC, KL). We interpreted the magnitude of effect for continuous outcomes according to the criteria suggested in the *Cochrane Handbook* (Schünemann 2019a) (i.e. 0.2 as small effect, 0.5 as moderate effect, 0.8 as large effect).

We rated the certainty of evidence as high, moderate, low or very low (Schünemann 2013). High-certainty evidence indicates high confidence that the true effect lies close to that of the estimate of effect. Very-low certainty evidence indicates that we have very little confidence in the effect estimate and that the true effect is likely to be substantially different from the estimate of effect.

RESULTS

Description of studies

Results of the search

We ran the first searches for this review in October 2016 according to the protocol (Helmreich 2017). We used the strategies in Appendix 8 to find studies in which the participants included any adults aged 18 years and older. Due to the large number of potentially eligible studies, we decided to split the review and changed the inclusion criteria to focus on healthcare sector workers and students (see Differences between protocol and review). Before running the top-up searches in June 2019, we revised the original search strategy by limiting the population to healthcare sector workers and students (Appendix 9). Following these searches, we further revised the inclusion criteria to healthcare professionals only, which is the focus of this review.

In total, the database searches retrieved 37,737 records. We found an additional 663 records by searching other resources. Following de-duplication, we screened the remaining 24,703 records by title and abstract. We deemed 21,629 records to be irrelevant and sought the full texts of the remaining 3074 records for further assessment. At the level of title/abstract screening, we achieved a good agreement (kappa = 0.70) between review authors for the original search, and an excellent agreement for the top-up searches (kappa = 0.99). The full text screening resulted in excellent inter-rater reliability for both the original search (kappa = 0.95) and the top-up searches (kappa = 1).

After revising the eligibility criteria to focus broadly on the healthcare sector (including healthcare professionals; see Differences between protocol and review), we identified 80 studies that were performed in any of these groups. We also identified nine ongoing studies and 29 studies awaiting classification. We found six additional reports of studies during the top-up searches.

Finally, after revising the eligibility criteria to focus on **healthcare professionals**, we reassessed these 118 studies (from 144 reports). In total, for healthcare professionals, we included 44 studies (from 59 reports). We excluded a total of 3000 full text reports (see Figure 1). This total includes the 16 reports (13 excluded studies), which we needed to examine in detail to determine eligibility, and which are described in the Characteristics of excluded studies tables. We identified eight studies awaiting classification (see Studies awaiting classification) and five ongoing studies (see Ongoing studies). For further details of our screening process, see the study flow diagram (Figure 1). We present the results of both searches in more detail in Appendix 12.

Figure 1. Study flow diagram combining all searches. [a]Duchemin 2015; Mistretta 2018; Schroeder 2016. [b]Van Berkel 2014.

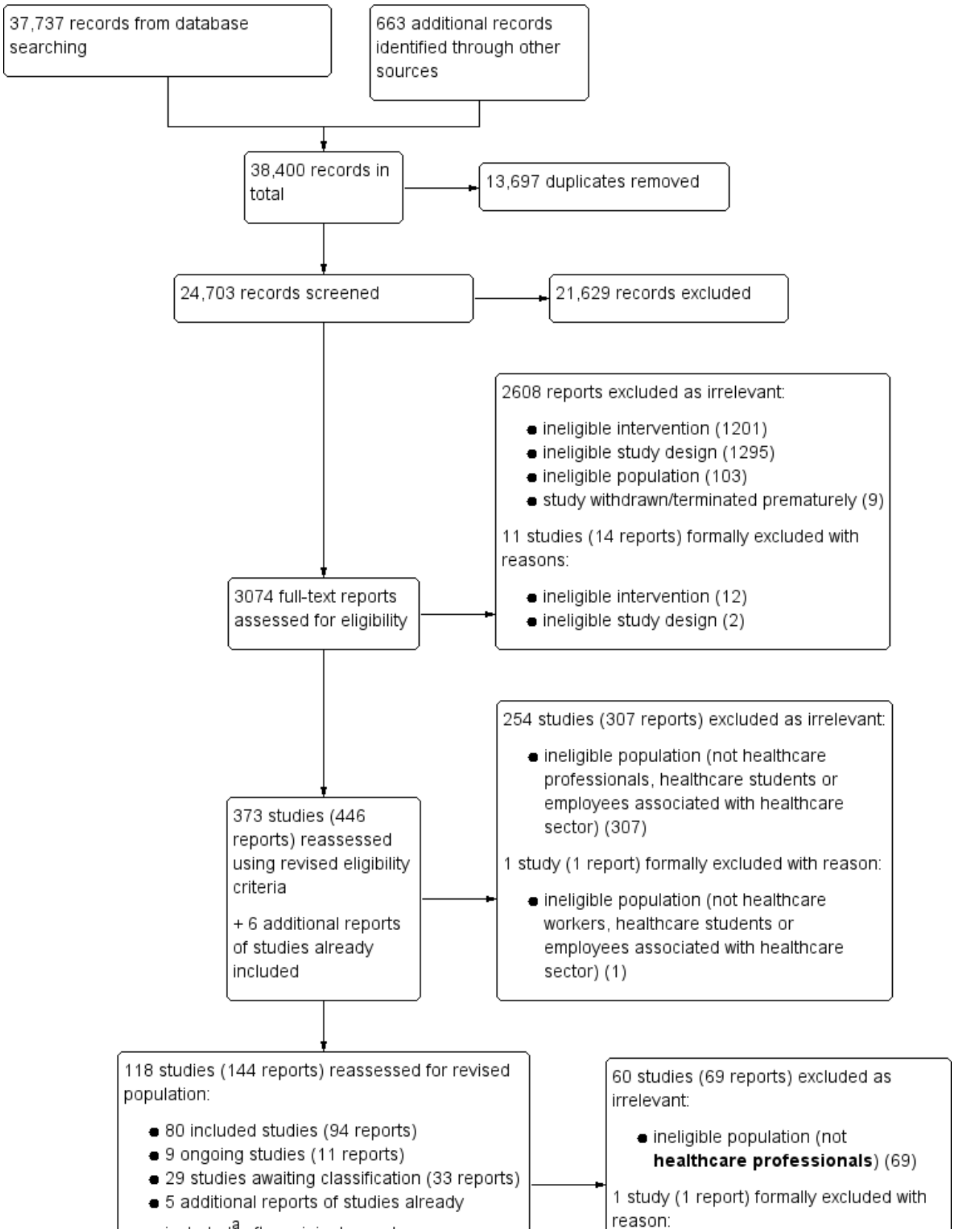
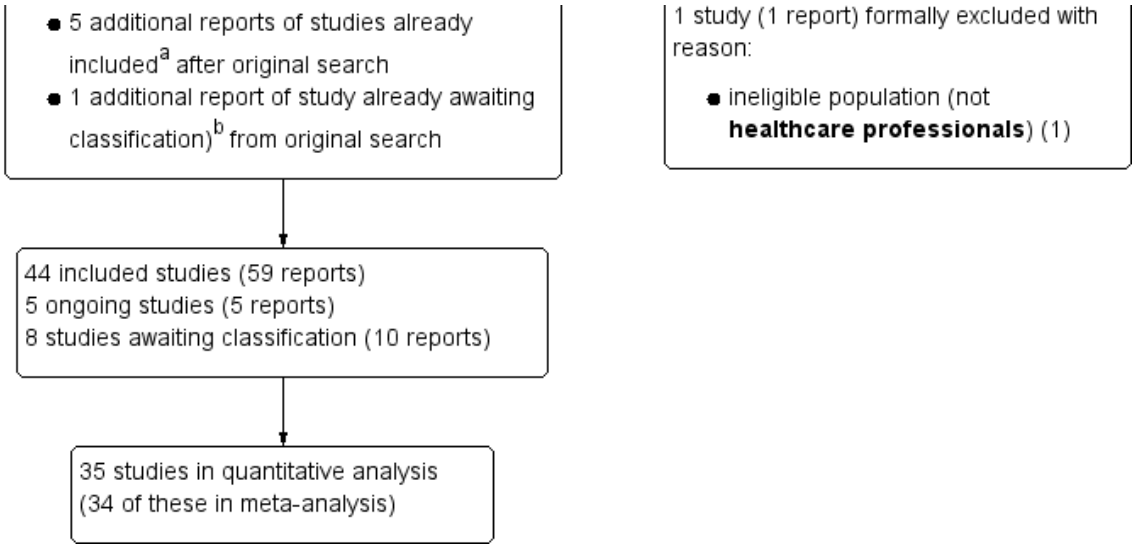


Figure 1. (Continued)



From an updated (pre-publication) search of four key databases in June 2020, we have added 12 studies (from 12 reports) to the Characteristics of studies awaiting classification tables. The results of these studies are not yet included in this review and will be incorporated at the next update.

Included studies

We present the corresponding references for the description of included studies in Appendix 13.

Study design

All but one (NCT02603133) of the 44 included studies were parallel-group designs, and were published between 1997 and 2019; the exceptions are three completed but unpublished trials (ISRCTN69644721, NCT02603133, NCT03645798). One study was termed a cluster-RCT in the report (Mistretta 2018), but according to additional information received from the study authors, there were no groups or clusters for each of the three conditions. After discussion with the statistician (JK), we judged the study to be individually randomised with stratification for the participants' schedule availability.

Location

Nineteen studies were conducted in the USA, six took place in Germany, four in China, and three in Australia, Iran and the UK, respectively. One study was performed in Canada (Smith 2019) and the Netherlands (Strijk 2011), while the remaining studies took place in Israel (Berger 2011), Italy (Villani 2013), Poland (Cieslak 2016), and Sri Lanka (Gelkopf 2008).

Settings

Training programmes were performed in clinics or specific hospital departments (e.g. Department of Radiology) in 24 studies. For 11 studies, the intervention site was not further specified. As four studies included online or mobile resilience interventions, there was no concrete venue and participants could participate regardless of location. One intervention took place in the laboratory (Stetz 2007). Two resilience training programmes were conducted in mixed settings (e.g. online training plus face-to-face sessions with implementation site not further specified). Other intervention sites included the Chinese Auxiliary Medical Service (Cheung 2014) and a non-governmental organisation (Gelkopf 2008).

Participants

Participants were mainly women of young to middle age. Studies rarely examined healthcare professionals between the ages of 50 and 65 years. Most studies evaluated a resilience-training programme in nurses. The total number of adults working as healthcare professionals (see Types of participants) randomised across 39 of the 44 included studies was 6892 (original search: 5552, top-up searches: 1340; including two completed but unpublished studies: NCT02603133; NCT03645798).

For four studies with mixed samples (Cieslak 2016; Gelkopf 2008; ISRCTN69644721; Wild 2016), the total number of participants randomised or planned to be randomised (ISRCTN69644721) was 1000 participants. The original number of healthcare workers randomised in these mixed studies was unclear and could not be confirmed by the study authors. Varker 2012 randomised 82 volunteers from the general population to evaluate a resilience intervention developed for emergency personnel. Overall, 11 studies randomised 100 or more participants and five studies randomised 30 participants or fewer.

Where data on age were available, the mean age across 25 studies (no mixed studies) ranged from 27 to 52.4 years (standard deviation (SD) ranging from 2.1 to 12.6 years), with an average of 37.74 years (mean SD 6.70 years). In one study of volunteers in the general population (Varker 2012), it was 28.4 (SD 10.4) years. For mean age, three of the four mixed studies reported a range of 37.49 to 48.65 years (SD ranging from 9.78 to 12.77 years) for the total samples (including healthcare professionals), with an average of 42.52 years (mean SD 10.98 years). Sood 2011 indicated a mean age in the intervention group of 46.8 (SD 8.3) years and of 50.2 (SD 5.7) years in the control group. Three studies did not report mean age, but only the age range of participants (Calder

Calisi 2017; Hosseinnejad 2018; Khoshnazary 2016), three studies reported alternative information on age (e.g. the percentage below a specific age; Mirzaeirad 2019; Poulsen 2015; Stetz 2007). For eight studies, the age of the sample was not further specified or is unclear (ISRCTN69644721; Klatt 2015; Mealer 2014; NCT02603133; NCT03645798; Tierney 1997; West 2014; West 2015).

Women outnumbered men in 23 studies. Women were also in the majority in one study evaluating a resilience-training programme in volunteers in the general population (Varker 2012). By contrast, men dominated in five studies and four studies included only women. In one study (Sood 2011), the gender distribution was comparable across the two arms. For six studies, the sex of participants was unclear. For example, Fei 2019 investigated nurses but did not indicate whether or not male nurses were also considered. The same applied to Tierney 1997. For 32 studies presenting the total numbers of men and women investigated, the proportion of women was 68.6%. Women outnumbered men in three of the four mixed studies, and for one study, the sex of participants was unclear (ISRCTN69644721). The proportion of women in three mixed studies reporting total numbers for gender was approximately 64.9%.

Fifteen studies included solely nurses, and 14 were conducted among physicians. Eight studies were conducted with hospital personnel (e.g. physicians and other hospital personnel). The remaining studies included general medical personnel, such as military medical personnel (Cheung 2014; Stetz 2007). Four of the 44 studies were performed with mixed samples, i.e. healthcare professionals combined with other individuals such as ambulance personnel and other emergency services, including the police. Relevant subgroups within these studies included: health service professionals (Cieslak 2016), mental health workers (Gelkopf 2008), and ambulance service personnel (Wild 2016; ISRCTN69644721). Although Varker 2012 was performed in the general population as a proof-of-concept study, we have included it in this review, as the resilience intervention was developed for emergency services personnel.

Twenty-nine of the 44 studies assessed mental health at baseline. All studies measuring mental health used self-report (screening) measures covering one or a small number of mental dysfunctions (e.g. Beck Depression Inventory (BDI), Luthar 2017). None of the studies conducted comprehensive baseline diagnostics by the use of a structured interview (e.g. Mini-International Neuropsychiatric Interview; (MINI)). Fifteen studies provided no data about the mental health status of the sample. For three unpublished trials (ISRCTN69644721; NCT02603133; NCT03645798) and one study published as a conference abstract (Smith 2019), the baseline mental health status was unclear, although all of them assessed mental health at pretest. Five studies included only mentally-healthy participants (Chesak 2015; Cheung 2014; Sood 2011; Sood 2014) or participants showing symptoms below a cut-off on a screening instrument (Stetz 2007). Lin 2019 did not include participants taking mood-modulating drugs. For Mirzaeirad 2019, the lack of mental stress was an inclusion criterion.

Interventions

All 44 studies examined the effects of a psychological intervention to foster resilience, hardiness, or post-traumatic growth compared to a control condition in healthcare professionals. Most studies evaluated group interventions (30/44) of high training intensity (18/44), that were delivered face-to-face (29/44) and were based on a combination of theoretical foundations (19/44).

Multiple treatment arms

Six studies had multiple intervention arms. Due to high dropout in the social support-enhancing module in Cieslak 2016, only the self-efficacy-enhancing module was analysed. As the fourth intervention group (IG) in Medisauskaite 2019 completed all modules of IG1 to IG3, including how to manage distress and develop resilience, we considered it relevant for this review. From the mindfulness-based resilience training (MBRT) and a smartphone resilience training in Mistretta 2018, we accepted the MBRT since it focused more on resilience factors and less on general issues such as sleep and productivity. From three interventions in Stetz 2007 we chose the combination of virtual reality-stress inoculation training (VR-SIT) and coping training (CT; e.g. relaxation) as relevant, since this intervention content was compatible with another included study (Villani 2013), which also considered SIT and relaxation techniques. In Tierney 1997, we preferred the hardiness class (IG1) over a time-management class (IG2) for this review. From a new resilience intervention (e.g. dealing with difficult emotions; IG1) and four weeks of reading material about mental health and well-being (IG2) in ISRCTN69644721, we chose IG1. For one unpublished study (NCT02603133) it was unclear whether it only included one intervention arm (sequential *and* non-sequential rollout of resilience tools in cohort 1) or whether these should be considered as separate IGs.

Intervention setting

Thirty interventions were performed in groups. Eight studies were conducted in a variety of training settings, and four were individual-setting interventions. For two studies, the setting was not specified (Medisauskaite 2019; NCT02603133).

Delivery format

Twenty-nine of the 44 studies delivered resilience interventions face-to-face. Ten studies used a multimodal delivery of interventions (e.g. web-based intervention and daily diary). Three studies examined online or mobile-based resilience-training programmes, and one study tested an intervention that was conducted in a laboratory setting and unlikely to be a face-to-face contact (Stetz 2007). For one study (Medisauskaite 2019) the delivery format was unclear.

Training intensity

Treatment duration varied between a single 40-minute intervention session (Varker 2012) and, depending on whether the number of hours or sessions were reported, 87 hours (i.e. 12-weekly six-hour sessions and three five-hour supervision sessions; Berger 2011) or approximately 77 sessions in total (Strijk 2011). Three interventions were provided over a six-month period or even longer (NCT03645798; Strijk 2011; West 2015). Overall, 18 studies included high-intensity training (i.e. > 12 hours or > 12 sessions). Fifteen RCTs investigated moderate-intensity interventions (i.e. > 5 to ≤ 12 hours or > 3 to ≤ 12 sessions), whereas seven studies evaluated low-intensity training (i.e. ≤ 5 hours or ≤ 3 sessions in total). Training intensity was unclear for four studies (Alexander 2015; Khoshnazary 2016; Medisauskaite 2019; Mirzaeirad 2019).

Theoretical foundations

We categorised the interventions into eight groups, based on their content and the descriptions provided by the study authors. We present a synthesis of the characteristics of studies within a specific theoretical foundation and the respective intervention content in Appendix 14.

Nineteen studies included interventions based on a combination of two or more explicit theoretical foundations (e.g. CBT and mindfulness). Of these, two studies were based on mindfulness (e.g. MBSR) and CBT or cognitive therapy (Mealer 2014; Wild 2016); in addition, Mealer 2014 also included written exposure therapy based on Pennebaker 1986. Two studies (Ireland 2017; Lin 2019) combined MBSR (e.g. Kabat-Zinn 1990) with mindfulness-based cognitive therapy (MBCT; e.g. Teasdale 2000), with Ireland 2017 also including elements of ACT. Similarly, Mistretta 2018 incorporated aspects of mindfulness and ACT. Two studies (Berger 2011; Gelkopf 2008) investigated a programme based on resiliency manuals for elementary school children (e.g. ERASE (Enhancing Resiliency Among Students Experiencing Stress) Stress; Berger 2007; Gelkopf 2009) that included cognitive-behavioural components, art therapy, body-oriented strategies, narrative therapy and meditative practices. Six studies, all conducted in Germany, were designed on principles of CBT and solution-focused group work, with some studies (Bernburg 2016; Bernburg 2019; Mache 2016) also including mindfulness (and acceptance training; Bernburg 2019). Six combined interventions could not be clustered any further (Calder Calisi 2017; Fei 2019; Smith 2019; Tierney 1997; Varker 2012; West 2014). In 11 RCTs, unspecific resilience-training programmes were conducted. All of these studies aimed at fostering one or several prespecified resilience factors (see Appendix 2; level 1; e.g. social support, active coping, self-esteem, optimism), but indicated no concrete theoretical foundation of training. Five studies evaluated mindfulness-based resilience interventions, with most training programmes based on MBSR (Lebares 2018) or used a modified version of MBSR (e.g. MBSR combined with elements of compassion skills training). Three interventions used AIT, with a focus on strengthening the attention for novel aspects of the world and to delay judgements. Stress inoculation was represented in two studies, with both also teaching coping strategies for stressful situations. Two programmes only included elements of CBT (Cieslak 2016; Clemow 2018); one intervention was based on positive psychology (NCT03645798) and focused on positive experiences (e.g. 'three good things'). A resilience-training programme based on a coaching approach was tested in one study (Strijk 2011).

Comparators

Forty-three studies involved only one comparator. For one unpublished study (NCT02603133), the number of control groups was not clear, based on the trial registration. Below, we describe in more detail the control groups used in the included studies.

Most studies included **no intervention comparators** (14/44), **wait-list control** groups (13/44), followed by active control (6/44), attention control (4/44), and TAU (4/44). Two studies did not further specify the control group (Khoshnazary 2016; Mirzaeirad 2019). Two studies used a design where a control group plus resilience intervention was compared to the control group alone (Poulsen 2015; Strijk 2011). For NCT02603133, we were unsure about the number of control groups, and whether the study included only a wait-list control or also an active control (see lecture on safety culture). We were not able to resolve this uncertainty by contacting the study authors.

In six studies, **active control groups** included a lecture covering topics related to stress (Chesak 2015); a befriending seminar that gave tools for emotional support to disaster volunteer workers (Gelkopf 2008); an extra hour break-time over 10 weeks (Ireland 2017); written educational material about recovery and self-care practices (Poulsen 2015); written information about a healthy lifestyle in general (e.g. diet, physical activity, relaxation) (Strijk 2011); and an online intervention with tailored information on mental health for emergency personnel (e.g. sleep, stress, mindfulness) (Wild 2016).

Of the four studies contrasting a resilience intervention with an **attention control group**, two used a web-based educational intervention on coping with stress at work and indirect exposure to trauma (Cieslak 2016) and a face-to-face group intervention on topics such as perseverance, complications, self-care and the ethos of surgery, along with daily home practice requirements and a retreat hike focusing on the relaxing properties of nature (Lebares 2018). Other attention control comparators included accident management training to learn tips and strategies on how to react when involved in a traffic accident (Varker 2012), and video clips representing natural environments delivered by mobile phones (Villani 2013).

In two studies, treatment as usual (**TAU)** referred to minimally-enhanced usual care by self-help materials (brochure) for blood pressure reduction and physician referrals (Clemow 2018) or usual psychological instruction from the hospital (NCT03645798). For two studies, the content of the TAU group was not further specified (Alexander 2015; Hosseinnejad 2018).

Outcome measures

The included RCTs used a diversity of outcome measures. However, some studies measuring the same outcome (e.g. perceived stress) used the same instrument (e.g. Perceived Stress Scale; Cohen 1988a). All outcomes were based on self-reported assessments and most studies used validated scales.

Primary outcomes

We defined treatment efficacy as an improvement in resilience, assessed with specific resilience scales, or an improvement in four categories of mental health and well-being (i.e. anxiety, depression, stress or stress perception, well-being or quality of life). For each outcome, the studies used heterogeneous scales (see details in Table 2). Among the 44 included studies, most (24 studies) assessed depression (e.g. depressive symptoms), followed by stress or stress perception (22 studies), resilience using a resilience scale (21 studies), well-being or quality of life (20 studies) and anxiety (12 studies).

Secondary outcomes

The authors of the included studies also used a heterogeneous group of instruments to assess the secondary outcomes (see details in Table 3). For each secondary outcome, most included studies assessed self-efficacy (11 studies), followed by active coping in five studies. Social support, optimism and positive emotions were assessed by three studies, respectively, while both self-esteem and hardiness were outcome measures in only one study.

Funding sources

Funding sources for the included studies were various: in five studies respectively, they included different hospitals or hospital grants (e.g. Mayo Clinic), and universities (e.g. certain faculties) and university research funds. In two studies apiece, further funding was provided by the National Institutes of Health (NIH), ministries, different foundations, and state/regional and city initiatives for health care. Single studies were supported by the US army (Stetz 2007), research grants (e.g. for student research; Cheung 2014) and research programmes (e.g. specifically for resilience; Duchemin 2015). Seven studies reported a combination of funding sources (e.g. university and national institute, hospital grant and gift, university and charity, hospital funds and EU grant Horizon 2020, NIH and foundations, hospital and university). For 15 studies, funding sources were not specified or could not be retrieved from the available information (e.g. conference abstract) (West 2015). One study received no funding support (Bernburg 2016).

Excluded studies

We excluded 3000 irrelevant full text reports.

We excluded 13 studies (from 16 reports) that seemed to merit inclusion but on closer inspection did not (see Characteristics of excluded studies). We excluded nine of these studies because they did not explicitly state the aim of fostering resilience, hardiness or post-traumatic growth through the intervention, or we were advised by the study authors that resilience was not the primary focus of the study, or both (Chang 2008; Dyrbye 2016; Imamura 2019; NCT03753360; NCT03914898; Rowe 1999; Speckens 2019; Strauss 2018; Watanabe 2019). Two studies were excluded due to ineligible study design Lahn 2014; Maunder 2010). Two studies were excluded for ineligible population, since they did not examine healthcare professionals (Bian 2011; NCT02417051). The reasons for excluding these studies are presented in detail in Appendix 15.

Studies awaiting classification

We identified eight studies (from 10 reports) awaiting classification.

For four studies, resilience was only rarely mentioned in the reports, i.e. the focus of the intervention on fostering resilience, hardiness or post-traumatic growth was unclear and could not be obtained from the study authors (Aranda Auserón 2018; NCT03613441; NCT03781336; Ruehl 2013). For example, Ruehl 2013 measured post-traumatic growth as an exploratory measure following a written emotional expression intervention in a diverse group of nursing staff, but it was unclear whether the study primarily focused on fostering this construct. Similarly, Aranda Auserón 2018 examined a mindfulness and self-compassion programme in primary-care health professionals to reduce stress and prevent burnout, but it was unclear if resilience was the primary focus of the study (resilience was mentioned only once).

We could not clearly determine the study design of Ouyang 2017, since the full text was not available and we received no response from the investigators. The same applied to Mainwaring 2018 (available as a conference abstract), for which we obtained no response from the authors. For two studies, it was unclear whether the sample also included healthcare workers (Kim 2018a; Van Berkel 2014).

Details of these studies can be found in the Characteristics of studies awaiting classification tables.

The 12 studies from the updated search in June 2020 were also added to the Characteristics of studies awaiting classification tables. They will be incorporated into this review at the update stage.

Ongoing studies

We also found five ongoing studies (from five reports) that are likely to meet our inclusion criteria (ACTRN12617000290392; JPRN UMIN000031435; NCT03518359; NCT03645512; NCT03759795). These studies were all RCTs with parallel assignment. ACTRN12617000290392 compared the six-week online programme 'Doctors Working Well' (e.g. modules on stress management, emotion monitoring and regulation) to an active control (protected individual study time) in junior medical doctors. In a Japanese trial (JPRN UMIN000031435), medical professionals working in the field of oncology or palliative care (or both) were randomised to either the MHALO programme (mindfulness for health professionals building resilience and compassion) or a no-intervention control. NCT03518359 compared the mindfulness-based enhanced stress resilience training (ESRT: six-weekly classes plus daily homework and retreat; e.g. sustained attention, emotional regulation, meta-cognition) with active control (stress management) in medical interns from different departments. NCT03645512 included critical care nurses at Florida Hospital to determine whether the Corporate Athlete® Resilience (CAR) training programme (a holistic approach focusing on moving between stress and strategic recovery) had a significant impact on the nurses' resilience and stress mindset compared to a wait-list control. The Bournemouth University resilience training for surgeons (BURTS), based on acceptance and commitment training (ACTr; Flaxman 2013) was contrasted with a wait-list control in a sample of trainee and consultant surgeons (NCT03759795). In contrast to other ongoing studies, the intervention group did not receive only one treatment, but followed a maximum of three intervention periods (e.g. mindfulness training) of eight weeks each.

Further details of these studies can be found in the Characteristics of ongoing studies tables.

Risk of bias in included studies

The main flaws we found for risks of bias (≥ 20% high risk) across the 44 studies were in the following domains: performance bias, detection bias, attrition bias, and reporting bias (see Figure 2 and Figure 3 for 'Risk of bias' graphs, and Characteristics of included studies tables for further information). For selection bias, a large number of studies provided insufficient information to judge the risk of bias adequately. We identified most variability across studies for attrition and reporting bias.

Figure 2. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

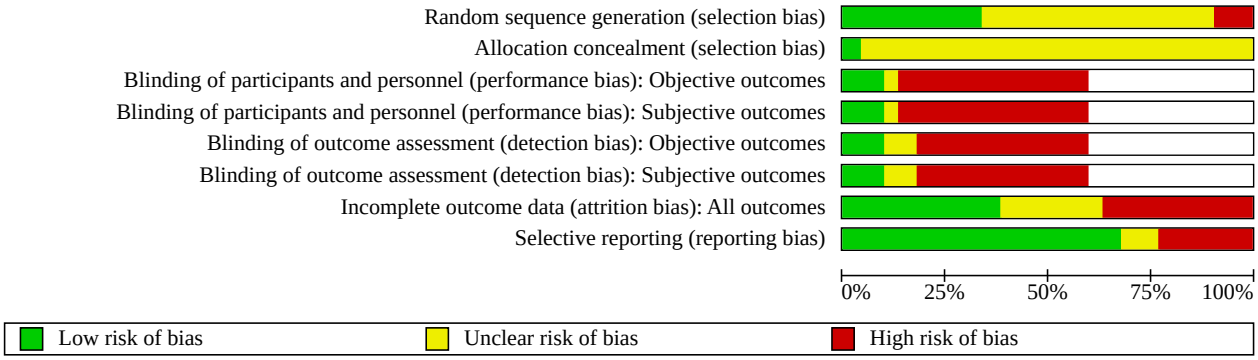


Figure 3. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.

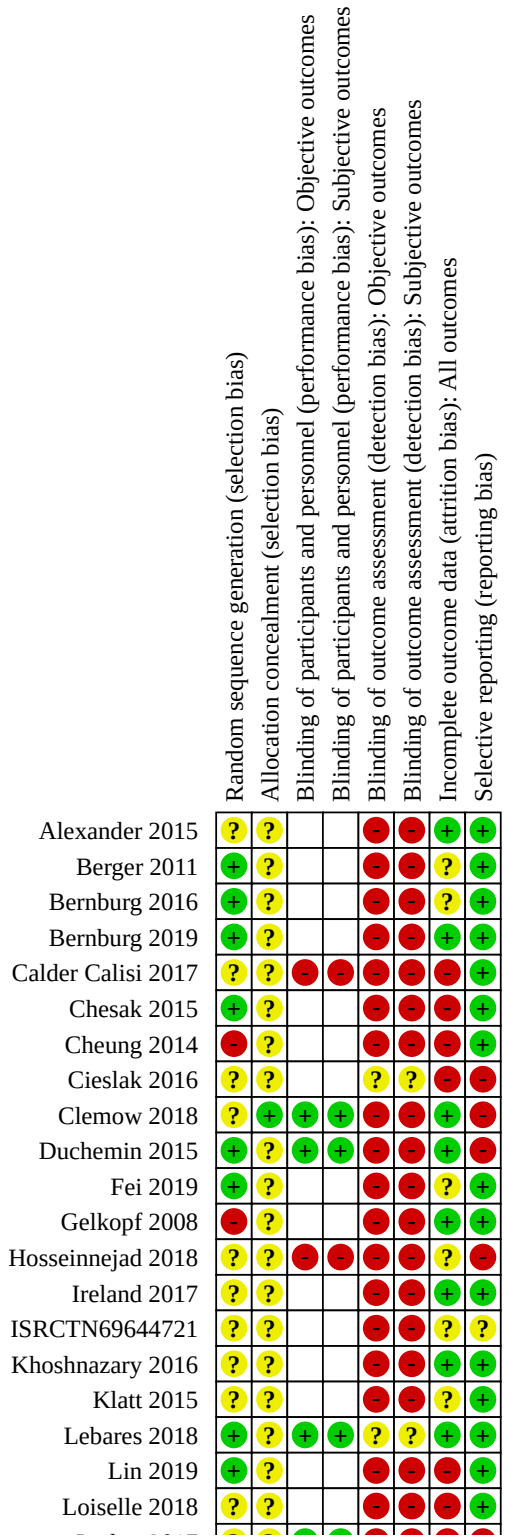
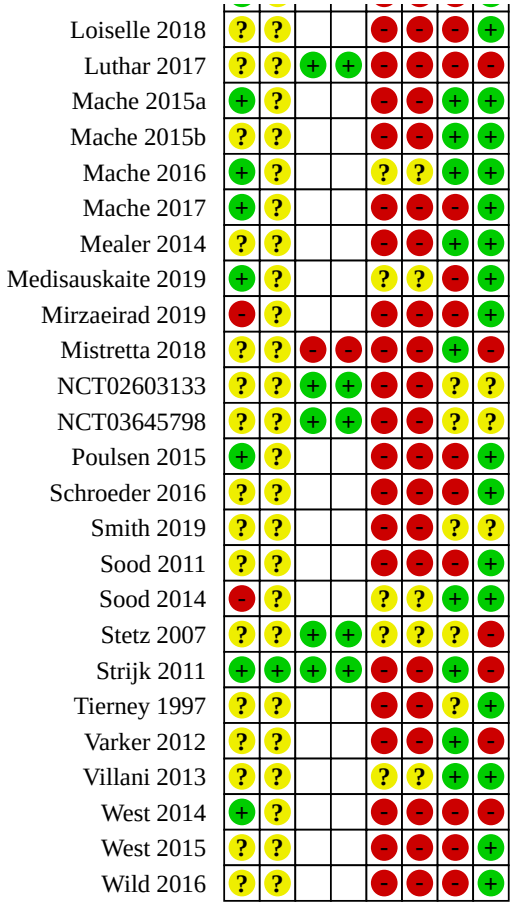


Figure 3. (Continued)



Allocation

Sequence generation

We rated 15 studies at low risk of bias, since the investigators described a random component in the sequence-generation process (e.g. computer-generated random sequence generation). For four of these studies, there was verified baseline comparability between study groups in sociodemographic characteristics (i.e. potential confounding factors) as well as outcome variables (Fei 2019; Lin 2019; Medisauskaite 2019; West 2014). For the other 11 studies, there was evidence of a genuine random assignment (e.g. random-number generation), but the authors provided no information about potential baseline differences in sociodemographic and outcome measures (Berger 2011; Bernburg 2016; Bernburg 2019; Chesak 2015; Duchemin 2015; Lebares 2018; Mache 2015a; Mache 2016; Mache 2017; Poulsen 2015; Strijk 2011).

We rated 20 studies as having unclear risk of bias because there was no description of the sequence-generation process (Alexander 2015; Calder Calisi 2017; Cieslak 2016; Clemow 2018; Hosseinnejad 2018; Ireland 2017; Khoshnazary 2016; Klatt 2015; Loiselle 2018; Luthar 2017; Mache 2015b; Mealer 2014; Mistretta 2018; Schroeder 2016; Sood 2011; Stetz 2007; Tierney 1997; Varker 2012; Villani 2013; Wild 2016). Thirteen of these RCTs also did not specify the baseline comparability of groups for (some) sociodemographic characteristics or outcomes of interest, or both (Calder Calisi 2017; Cieslak 2016; Hosseinnejad 2018; Ireland 2017; Klatt 2015; Mache 2015b; Mealer 2014; Sood 2011; Stetz 2007; Tierney 1997; Varker 2012; Villani 2013; Wild 2016). Based on the limited information in the conference abstracts or trial registrations, we considered five further studies at unclear risk of bias (ISRCTN69644721; NCT02603133; NCT03645798; Smith 2019; West 2015).

We judged four studies to be at high risk of selection bias since, despite the fact that randomisation, baseline comparability in sociodemographic characteristics or outcomes (or both) could not be verified on the basis of analysis (Cheung 2014; Gelkopf 2008; Mirzaeirad 2019; Sood 2014).

Allocation concealment

Allocation concealment was not well reported. Only two of the 44 studies had an adequate description of the allocation concealment process and we considered them to be at low risk of bias for this domain. Clemow 2018 described randomisation being done by calling an off-site person holding the randomisation envelopes, using the random-sized randomisation blocks provided by the study statistician. Strijk 2011 affirmed that randomisation was done by an independent researcher after the baseline assessment, that is, after participant enrolment was completed.

We rated the remaining 42 studies at unclear risk of bias. Four of these studies described the randomisation process being

concealed from participants or personnel recruiting participants, or both, but neglected to specify further the method of allocation concealment (Luthar 2017; Medisauskaite 2019; Sood 2014; West 2014). For one study (Stetz 2007) we received additional information from the authors ("computed a number with SPSS to randomly select"), which did not match the description in one of the reports (see Stetz 2007; pseudo-randomisation based on availability).

Three studies (plus West 2014 already mentioned above) affirmed that individuals or units were stratified (e.g. by gender, type of work) and randomly assigned to either the resilience intervention or a control group (Duchemin 2015; Lebares 2018; Wild 2016); however, the study authors did not describe how they designed this process.

Authors of 29 studies provided either insufficient or no information about the allocation concealment process (Alexander 2015; Berger 2011; Bernburg 2016; Bernburg 2019; Calder Calisi 2017; Chesak 2015; Cheung 2014; Cieslak 2016; Fei 2019; Gelkopf 2008; Hosseinnejad 2018; Ireland 2017; Khoshnazary 2016; Klatt 2015; Lin 2019; Loiselle 2018; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mealer 2014; Mirzaeirad 2019; Mistretta 2018; Poulsen 2015; Schroeder 2016; Sood 2011; Tierney 1997; Varker 2012; Villani 2013).

There was limited information in the conference abstracts or trial registrations of five studies to reach a decision on the risk of bias (ISRCTN69644721; NCT02603133; NCT03645798; Smith 2019; West 2015).

Blinding

Blinding of participants and personnel

Nine of the 44 studies assessed one or several objective outcomes such as salivary cortisol, sleep tracking by acceleration sensors or blood pressure (Clemow 2018; Duchemin 2015; Lebares 2018; Luthar 2017; Mistretta 2018; NCT02603133; NCT03645798; Stetz 2007; Strijk 2011). Although study personnel were not blinded in most of these studies (see next paragraph on subjective outcomes below), we judged those studies to be at low risk of performance bias in relation to objective outcomes.

For subjective outcomes, we rated three studies at unclear risk of performance bias (Cieslak 2016; Medisauskaite 2019; Villani 2013). Cieslak 2016 and Villani 2013 performed (blended) online or mobile-based resilience interventions without specifying blinding of participants and personnel. Medisauskaite 2019 did not describe the implementation of the training programme.

We judged 36 studies to be at high risk of performance bias because resilience interventions were performed entirely face-to-face (Alexander 2015; Berger 2011; Bernburg 2016; Bernburg 2019; Cheung 2014; Fei 2019; Gelkopf 2008; Ireland 2017; Klatt 2015; Khoshnazary 2016; Lebares 2018; Lin 2019; Loiselle 2018; Luthar 2017; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mirzaeirad 2019; Poulsen 2015; Schroeder 2016; Smith 2019; Sood 2011; Strijk 2011; Tierney 1997; Varker 2012; West 2014; West 2015; Wild 2016), or included face-to-face elements (Calder Calisi 2017; Chesak 2015; Duchemin 2015; Mealer 2014; Mistretta 2018; Sood 2014; ISRCTN69644721), resulting in a lack of blinding of personnel. We also rated the following five studies at high risk of performance bias: In Clemow 2018, research staff were also not blinded to group assignment and although the blinding of participants was unclear, we rated the study at high risk of bias due to the face-to-face delivery of resilience training. Hosseinnejad 2018 described the study as a double-blind clinical study, but, given the trial registration (no blinding specified) and the face-to-face delivery of the intervention, we judged the study to be at high risk of performance bias. For NCT02603133 and NCT03645798, we considered the outcomes to be likely to have been influenced by a lack of blinding, as the studies were described as open-label with no masking (NCT02603133) or as single-blinded in the trial registration (NCT03645798). Stetz 2007 included a resilience intervention that was performed in a laboratory. Although there was no face-to-face contact, the study personnel were not blinded, as verbal communication with participants was possible, and participants were observed by the intervention providers.

Blinding of outcome assessment

We considered all nine studies measuring objective outcomes to be at low risk of detection bias. Although six of these studies did not adequately describe the blinding of outcome assessment (Duchemin 2015; Lebares 2018; Luthar 2017; Mistretta 2018; Stetz 2007; Strijk 2011), we judged them to be at low risk of detection bias since we assessed the objective outcomes (e.g. physiological parameters) as unlikely to be influenced by the lack of blinding. We applied the same rating to two other studies that used objective outcomes, even though there was insufficient information in the trial registrations (NCT02603133; NCT03645798), as well as one study with no general blinding of research staff (Clemow 2018).

In the assessment of subjective outcomes, we considered seven studies to be at unclear risk of detection bias because the authors did not adequately describe the blinding of the assessment (Cieslak 2016; Lebares 2018; Mache 2016; Medisauskaite 2019; Sood 2014; Stetz 2007; Villani 2013) and the risk of performance bias (i.e. especially blinding of participants) was low or unclear (see blinding of participants and personnel).

We rated 37 studies at high risk of detection bias; 31 studies because, due to (potential) performance bias (especially no blinding of participants), we judged that the participants' responses to questionnaires may be likely to be affected by the lack of blinding (i.e. knowledge and beliefs about the intervention they received) (Alexander 2015; Berger 2011; Bernburg 2016; Bernburg 2019; Calder Calisi 2017; Chesak 2015; Cheung 2014; Duchemin 2015; Fei 2019; Gelkopf 2008; Hosseinnejad 2018; Ireland 2017; Khoshnazary 2016; Klatt 2015; Lin 2019; Loiselle 2018; Luthar 2017; Mache 2015a; Mache 2015b; Mache 2017; Mealer 2014; Mirzaeirad 2019; Mistretta 2018; Poulsen 2015; Schroeder 2016; Sood 2011; Strijk 2011; Tierney 1997; Varker 2012; West 2014; Wild 2016). Based on the information available in the conference abstracts or trial registrations, we rated five further studies at high risk of detection bias for the same reason (ISRCTN69644721; NCT02603133; NCT03645798; Smith 2019; West 2015). For Clemow 2018, the blinding of participants, who completed self-report questionnaires was unclear (see blinding of participants and personnel). However, as research staff were not blinded to group assignment in general, we judged the blinding of outcome assessment to be unlikely and also rated the study at high risk of detection bias.

Incomplete outcome data

We assessed 17 studies as having low risk of attrition bias because they met at least one of the following criteria: there were no missing outcome data (Alexander 2015; Duchemin 2015; Ireland

2017; Lebares 2018: no missing data for psychological variables and two exclusions from fMRI analysis not related to true outcome; Villani 2013); the losses were similar across intervention and control groups; the reasons for missing data were unlikely to be related to true outcome (e.g. health reasons); the losses were not substantial (< 10% from number of randomised participants; e.g. five dropouts from 90 participants in Mache 2015b); and/or study authors accounted for dropouts and losses to follow-up by using statistical analyses that aimed to reduce bias (e.g. multiple imputation) or prevent false positive conclusions (e.g. baseline observation carried forward) (Bernburg 2019; Clemow 2018; Gelkopf 2008; Khoshnazary 2016; Mache 2015a; Mache 2015b; Mache 2016; Mealer 2014; Mistretta 2018; Sood 2014; Strijk 2011; Varker 2012). An intention-to-treat (ITT) analysis was performed in four studies (Clemow 2018; Mistretta 2018; Sood 2014; Strijk 2011).

Overall, we rated 11 of the 44 studies at unclear risk of bias. One study did not fully account for dropouts throughout the study or whether this differed between groups (Stetz 2007). Hosseinnejad 2018 did not specify the number of participants analysed and we had to derive these indirectly from other statistical values in the report, with the help of the statistician (JK). Three studies reported results for all participants randomised (Berger 2011, Fei 2019, Tierney 1997), but did not state the amount of potential missing data and potential imputation. Similarly, Bernburg 2016 described the dropout rate (loss to follow-up) as very low and analysed all 54 randomised participants, but did not report the attrition rate. In Klatt 2015, the number of participants allocated to each group (n = 17) was provided by the original authors, but the amount of potential missing data was not further specified. We therefore also judged these studies to be at unclear risk of bias. We could not judge the risk of attrition bias from the information available in the conference abstracts or trial registrations for four studies (ISRCTN69644721; NCT02603133; NCT03645798; Smith 2019), which we consequently rated at unclear risk of bias.

We considered 16 studies to be at high risk of attrition bias. In six of them, the reasons for missing data were unlikely to be related to true outcome (e.g. similar levels of missing data between groups with a difference of two or less lost individuals); however, reasons were not further specified or study authors did not impute the missing data but performed available-case analysis (i.e. participants for whom outcomes were obtained at assessments) or per-protocol analysis (i.e. only participants who complied with their allocated intervention or attended a certain number of sessions), or both (Chesak 2015; Lin 2019; Luthar 2017; Mirzaeirad 2019; Schroeder 2016; West 2014). Calder Calisi 2017 did not provide sufficient information about dropouts such as the number of participants randomised to each group or attrition per group. However, based on the number of participants analysed, we supposed a per-protocol analysis and considered the study to be at high risk of bias. In eight of the 16 studies at high risk of attrition bias (Cheung 2014; Loiselle 2018; Mache 2017; Medisauskaite 2019; Poulsen 2015; Sood 2011; West 2015; Wild 2016), reasons for missing data were likely to be related to true outcome, due to imbalance in missing data between groups. In addition, an available-case or per-protocol analysis (or both) was conducted in six of these studies (Cheung 2014; Loiselle 2018; Mache 2017; Medisauskaite 2019; Poulsen 2015; Sood 2011). In Wild 2016, it was unclear how many participants were analysed. For West 2015, we received information about the number of missing data per group and the available-case analysis from the study authors.

Finally, in Cieslak 2016 missing data in the self-efficacy-enhancing group and the education module (control) were imputed using expectation maximisation in order to perform an intention-to-treat analysis. Nevertheless, we considered the study to be at high risk of bias because only two of three groups initially randomised were analysed, due to high dropout in the social support-enhancing module.

Selective reporting

To assess potential reporting bias for 29 non-registered studies or studies without a pre-published study protocol (Alexander 2015; Berger 2011; Bernburg 2016; Bernburg 2019; Calder Calisi 2017; Chesak 2015; Cieslak 2016; Duchemin 2015; Fei 2019; Gelkopf 2008; Ireland 2017; Khoshnazary 2016; Klatt 2015; Lin 2019; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mealer 2014; Mirzaeirad 2019; Poulsen 2015; Schroeder 2016; Sood 2011; Sood 2014; Stetz 2007; Tierney 1997; Varker 2012; Villani 2013; West 2015), we considered whether the outcome measures described in the Methods section of the paper were reported in the Results section. For West 2015, we were able to judge the risk of reporting bias, based on the respective sections in the conference abstract.

We considered 25 non-registered studies to be free of reporting bias because the published results corresponded to those expected in these types of studies (Alexander 2015; Berger 2011; Bernburg 2016; Bernburg 2019; Calder Calisi 2017; Chesak 2015; Fei 2019; Gelkopf 2008; Ireland 2017; Khoshnazary 2016; Klatt 2015; Lin 2019; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mealer 2014; Mirzaeirad 2019; Poulsen 2015; Schroeder 2016; Sood 2011; Sood 2014; Tierney 1997; Villani 2013; West 2015).

We rated four non-registered studies at high risk of bias, largely because not all of the prespecified outcomes were reported (Cieslak 2016; Duchemin 2015; Stetz 2007; Varker 2012). Cieslak 2016 randomly assigned participants to one of two intervention groups (self-efficacy-enhancing module, social support-enhancing module) or a control group. However, due to high dropout in the social support-enhancing module, only the results for two groups were analysed and reported.

Fifteen studies were prospectively or retrospectively registered (Cheung 2014; Clemow 2018; Hosseinnejad 2018; ISRCTN69644721; Lebares 2018; Loiselle 2018; Luthar 2017; Medisauskaite 2019; Mistretta 2018; NCT02603133; NCT03645798; Smith 2019; Strijk 2011; West 2014; Wild 2016). In addition, one study also provided a study protocol (Strijk 2011). Of these registered studies, we considered five studies to be at low risk of reporting bias as the published reports included all expected outcomes in the prespecified way (Cheung 2014; Lebares 2018; Loiselle 2018; Medisauskaite 2019; Wild 2016). Although actual helping behaviour as a prespecified outcome was not reported in Cheung 2014, we judged this study to be at low risk of bias as the study authors justified the non-reporting by the small number of participants reporting this outcome, and unfeasible statistical analyses.

For three registered trials (ISRCTN69644721; NCT02603133; NCT03645798), we could not determine the risk of reporting bias on the basis of trial registrations, as the studies were completed but unpublished trials or no further information could be provided from the study authors during the publication process. The same applied to Smith 2019, for whom only a conference abstract was available.

We judged six registered trials at high risk of reporting bias because not all of the prespecified outcomes (Luthar 2017; Strijk 2011; West 2014) or time points (Hosseinnejad 2018; Mistretta 2018) were reported, and/or reported outcomes had not been prespecified (Clemow 2018; Luthar 2017; Mistretta 2018; Strijk 2011; West 2014).

Other potential sources of bias

We assessed the baseline comparability between study groups after randomisation as part of selection bias (random-sequence generation) (see Allocation (selection bias)).

Effects of interventions

See: **Summary of findings 1** Resilience interventions compared to control condition for healthcare professionals

See: Summary of findings 1.

Overall, across the included studies in healthcare professionals, we were able to perform 22 pooled analyses that combined at least two studies.

We present the different outcome measures that we used to assess the primary and secondary outcomes in the included studies in Table 2 and Table 3, respectively. For the primary outcomes of resilience and well-being or quality of life, as well as all secondary outcomes (social support, optimism, self-efficacy, active coping, self-esteem, hardiness, positive emotions), positive values indicate a higher (i.e. better) level of the corresponding outcome in the intervention group compared to the control group (e.g. higher resilience), whereas negative values refer to lower levels of the outcome in the intervention arm. For the remaining primary outcomes of anxiety, depression and stress or stress perception, negative values indicate a lower (i.e. better) degree of these outcomes in the intervention arm (e.g. fewer depressive symptoms) compared to the control arm, while positive values refer to a higher level of depression, anxiety and stress or stress perception in the intervention group compared to control.

P values are reported exactly and where provided by study authors, unless P values are < 0.001, in which case they are expressed as P < 0.001. T values and P values of Egger's tests were rounded.

Comparison 1. Resilience intervention versus control condition in healthcare professionals

Primary outcomes

Resilience

Post-intervention

Overall, 16 studies (three with mixed samples: Cieslak 2016; ISRCTN69644721; Wild 2016) evaluated the effect of resilience intervention compared to control groups on resilience immediately post-intervention. Twelve studies reported data suitable for quantitative analysis (Bernburg 2019; Khoshnazary 2016; Klatt 2015; Lebares 2018; Lin 2019; Loiselle 2018; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mealer 2014; Schroeder 2016). The pooled effect estimate suggests evidence of a moderate effect of resilience interventions on resilience at post-intervention (standardised mean difference (SMD) 0.45, 95% confidence interval (CI) 0.25 to 0.65; P < 0.001; I^2 = 41%; Tau^2 = 0.05; P for heterogeneity = 0.07; G^2 = 66.9%; 95% prediction interval: −0.25 to 1.14; 12 studies, 690 participants; Analysis 1.1; very-low certainty evidence, see Summary of findings 1).

For resilience at post-intervention, we found no evidence of asymmetry in funnel plots or Egger's test (t = −1.04; df = 10; P = 0.32; see Appendix 16).

Based on statistical indicators, we found moderate heterogeneity for resilience at post-test.

Single study results

One study also measuring resilience at post-intervention (NCT03645798) could not be pooled with the studies above, since we could not obtain the data from the study authors.

Studies with mixed samples

We were unable to pool three mixed studies measuring resilience at post-intervention with the studies above, due to unavailable subgroup data (post-traumatic growth in Cieslak 2016 and Wild 2016) or unpublished data that could not be obtained from the study authors (ISRCTN69644721). For the total sample of 168 health and human service professionals (e.g. physicians, nurses, education specialists, police officers), Cieslak 2016 demonstrated a significant group effect on post-traumatic growth (Post-traumatic Growth Inventory-Short form; F = 6.10, P = 0.013) at post-intervention, with lower values in the resilience training (mean = 3.04 (standard deviation (SD) = 0.78)) compared to attention control (mean = 3.18 (SD = 0.77)). Wild 2016, for the total sample of employees or volunteers working as front-line or office-based staff in one of four emergency services (police, fire and rescue, ambulance, search and rescue; 430 participants randomised; number analysed not specified), reported no significant difference in the level of resilience (Connor-Davidson Resilience Scale) between resilience training and active control at post-intervention (F = 0.42, P = 0.66; intervention arm: mean = 67.90 (SD = 17.03); control arm: mean = 68.48 (SD = 15.26)).

Short-term follow-up (≤ 3 months)

The effect of resilience-training programmes versus control groups on resilience at short-term follow-up was assessed in 15 individually-randomised studies (three with mixed samples: Cieslak 2016; ISRCTN69644721; Wild 2016), of which 11 studies could be combined into a meta-analysis (Bernburg 2019; Chesak 2015; Cheung 2014; Lin 2019; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Schroeder 2016; Sood 2011; Sood 2014). The pooled SMD for resilience was 0.42 (95% CI 0.17 to 0.67; P = 0.001; I^2 = 71%; Tau^2 = 0.11; P for heterogeneity < 0.001; G^2 = 85.4%; 95% prediction interval: −0.40 to 1.24; 11 studies, 1325 participants; Analysis 1.2), suggesting evidence of a moderate difference between the resilience-training programme and control group (moderate effect size).

Based on funnel plots and Egger's test, we identified statistically significant asymmetry for resilience at short-term follow-up (Egger's test: t = 4.01; df = 9; P = 0.003).

Statistical indicators suggested substantial heterogeneity for resilience at short-term follow-up.

Single study results

One study available as a conference abstract (Smith 2019), which also measured resilience at short-term follow-up, could not be pooled with the studies above, since we could not obtain data by contacting the authors. For 29 nurses, Smith 2019 indicated no evidence of a difference in the change in resilience (CD-RISC) between baseline and one-month follow-up (P = 0.84) or three-month follow-up (P = 0.26) between resilience training and control.

Studies with mixed samples

Due to unavailable subgroup data (Cieslak 2016; Wild 2016) or unpublished data (ISRCTN69644721), we could not pool three mixed studies assessing resilience at short-term follow-up with the aforementioned studies. For the total sample of 168 participants, Cieslak 2016 reported no significant group effect on post-traumatic growth at one-month follow-up (F = 3.54, P = 0.062). Lower scores of post-traumatic growth were shown in the intervention arm (mean = 3.03 (SD = 0.81)) compared to the attention control arm (mean = 3.10 (SD = 0.79)). Wild 2016, for the total sample of four emergency services (including ambulance personnel; 430 participants randomised; number analysed not specified), also reported no significant between-group difference in resilience at three-month follow-up (F value see Resilience – post-intervention; intervention arm: mean = 68.67 (SD = 16.17); control arm: mean = 70.23 (SD = 14.69)).

Medium-term follow-up (> 3 to ≤ 6 months)

Two studies comparing a resilience intervention to control at medium-term follow-up provided suitable data for quantitative analysis (684 participants) and showed little or no evidence of a difference between the resilience intervention and control in resilience (SMD 0.35, 95% CI −0.41 to 1.11; P = 0.37; I^2 = 87%; Tau^2 = 0.27; P for heterogeneity = 0.005; G^2 = 0%; 95% prediction interval: incalculable due to only two studies; moderate effect size; 2 studies, 684 participants; Analysis 1.3).

For resilience at medium-term follow-up, we found considerable heterogeneity (e.g. I^2 of 87%), whereas G^2 indicated no statistical heterogeneity.

Long-term follow-up (> 6 months)

At long-term follow-up, only two studies assessed the effects of resilience intervention compared to control on self-reported resilience and could be combined in a meta-analysis (Bernburg 2019; Lebares 2018). The pooled SMD on resilience was 0.30 (95% CI −0.08 to 0.68; P = 0.12; I^2 = 0%; Tau^2 = 0; P for heterogeneity 0.97; G^2 = 0%; 95% prediction interval: incalculable due to only two studies; 2 studies, 107 participants; Analysis 1.4), indicating little or no evidence of a difference between the resilience-training programme and control group.

Statistical indicators consistently suggested no heterogeneity for resilience at long-term follow-up.

Mental health and well-being: anxiety

Post-intervention

Eight studies (including two with mixed samples: ISRCTN69644721; Wild 2016) evaluated the effect of resilience intervention compared to control on self-reported anxiety immediately post-intervention. Five studies reported data suitable for quantitative analysis (Calder Calisi 2017; Mealer 2014; Medisauskaite 2019; Mistretta 2018; Villani 2013). The pooled effect estimate suggests little or no evidence of an effect of resilience training on post-intervention anxiety (SMD −0.06, 95% CI −0.35 to 0.23; P = 0.67; I^2 = 0%; Tau^2 = 0; P for heterogeneity = 0.99; G^2 = 0.5%; 95% prediction interval: −0.19 to 0.06; 5 studies, 231 participants; Analysis 1.5; very-low certainty evidence, see Summary of findings 1).

Based on statistical indicators, there was no heterogeneity for anxiety at post-intervention.

Single study results

Stetz 2007 (see Stetz 2008) also assessed the effect of resilience training compared to control on post-intervention anxiety, but could not be combined with the above studies. The study authors only reported summary data for the Multiple Affect Adjective Check List-Revised (e.g. depression, anxiety, and positive affect subscale) and found evidence for a group difference in psychological stress (F = 3.3, P < 0.001; 63 participants randomised, number analysed not specified).

Studies with mixed samples

For two studies with mixed samples, we were unable to retrieve the subgroup data for healthcare professionals from the study authors (ISRCTN69644721; Wild 2016). For the total sample (including ambulance personnel; 430 participants randomised; number analysed not specified), Wild 2016 found no evidence of a between-group difference between resilience training and active control in anxiety (General Anxiety Disorder Scale-7) at post-test (intervention arm: mean = 3.15 (SD = 3.08); control arm: mean = 3.27 (SD = 3.43)). For the unpublished study, ISRCTN69644721, we were unable to obtain data on anxiety from the study authors.

Short-term follow-up (≤ 3 months)

At short-term follow-up, seven studies compared the impact of a resilience intervention versus control on anxiety. We were able to combine four studies into analysis (Chesak 2015; Mistretta 2018; Sood 2011; Sood 2014). The pooled SMD for short-term self-reported anxiety was −0.63 (95% CI −0.98 to −0.27; P < 0.001; I^2 = 0%; Tau^2 = 0; P for heterogeneity = 0.95; G^2 = 0%; 95% prediction interval: −1.40 to 0.15; 4 studies, 133 participants; Analysis 1.6), providing evidence for a moderate difference between groups favouring resilience training for this outcome (moderate effect size).

For anxiety at short-term follow-up, we found no heterogeneity based on statistical indicators.

Single study results

We could not pool one study (Varker 2012) with the aforementioned studies because it evaluated a resilience intervention developed for healthcare personnel in individuals from the general population (proof-of-concept study; 77 participants). The effect of a resilience intervention on anxiety compared to attention control was assessed at one-month follow-up (Depression Anxiety and Stress Scale). However, the study authors only reported summary data (multivariate analysis of variance (MANOVA) results) for depression, anxiety and stress with a significant time × group interaction (F = 2.89, P < 0.05). Post hoc analyses for anxiety were not reported.

Studies with mixed samples

Two mixed studies measuring anxiety at short-term follow-up could not be pooled with the above studies, due to unavailable subgroup or unpublished data for healthcare professionals (Wild 2016; ISRCTN69644721). Comparable with post-intervention, Wild 2016 found no evidence of a between-group difference in anxiety at three-month follow-up (intervention arm: mean = 2.83 (SD = 3.32); control arm: mean = 3.02 (SD = 3.76)) for the total sample (including ambulance personnel; 430 participants randomised; number analysed not specified).

Mental health and well-being: depression

Post-intervention

Overall, 20 studies (including three mixed studies: Cieslak 2016; ISRCTN69644721; Wild 2016) assessed the effect of a resilience intervention versus control on self-reported depression (or burnout; see Helmreich 2017 and Appendix 6 in this review) at post-intervention. For one study investigating healthcare and non-healthcare professionals, we were able to retrieve the relevant subgroup data from the study authors (Cieslak 2016). Comparable with the original study, we performed an intention-to-treat analysis based on expectation-minimisation (EM) imputation for healthcare professionals (n = 134; e.g. nurses, physicians, psychotherapists, social workers) included in Cieslak 2016. Analysis of 14 studies providing suitable data for effect size calculation (Alexander 2015; Calder Calisi 2017; Cieslak 2016; Ireland 2017; Lebares 2018; Loiselle 2018; Luthar 2017; Mache 2017; Mealer 2014; Medisauskaite 2019; Mistretta 2018; Schroeder 2016; West 2014; West 2015) suggested evidence for a small difference between resilience training and control group for post-intervention depression (SMD −0.29, 95% CI −0.50 to −0.09; P = 0.005; I^2 = 42%; Tau^2 = 0.06; P for heterogeneity = 0.05; G^2 = 89.3%; 95% prediction interval: −0.95 to 0.37; 14 studies, 788 participants; Analysis 1.7; very-low certainty evidence, see Summary of findings 1).

Based on funnel plots and Egger's test, we found no statistically significant asymmetry for depression at post-intervention (see Appendix 16; Egger's test: t = −0.10; df = 12; P = 0.93).

From the statistical indicators of heterogeneity, I^2 suggested moderate heterogeneity, whereas other values (e.g. Chi^2 test; G^2) indicated substantial heterogeneity for depression at post-test.

Single-study results

Four other studies comparing the effect of resilience training to control on post-intervention depression could not be pooled with the above studies for different reasons. Duchemin 2015 (32 participants) provided no post-test values for burnout, but only a narrative report of no change in burnout scores (emotional exhaustion, depersonalisation, personal accomplishment subscales of Maslach Burnout Inventory) between pre- and post-test. The number of participants with scores above 26 on emotional exhaustion was reduced by 34% in the resilience-training group compared to no change in the wait-list control group (no P value reported). As Stetz 2007 only reported summary outcome data (MANOVA results), there was insufficient information to estimate an intervention effect and to include it in Analysis 1.7. For two unpublished studies (NCT02603133; NCT03645798) we could not obtain the data from the study authors.

Studies with mixed samples

For two studies with mixed samples, we could not obtain the subgroup data for healthcare professionals from the study authors (ISRCTN69644721; Wild 2016). For the total sample (including ambulance personnel; 430 participants randomised; number analysed not specified), Wild 2016 found no evidence of a difference between resilience training and active control for depression (Patient Health Questionnaire-9) at post-test (intervention arm: mean = 3.48 (SD = 3.18); control arm: mean = 3.81 (SD = 4.42)). For the unpublished study (ISRCTN69644721) we could not obtain the subgroup data from the authors.

Short-term follow-up (≤ 3 months)

The effect of resilience training compared to control on self-reported depression at short-term follow-up was evaluated in 13 studies (including three mixed studies: Cieslak 2016; ISRCTN69644721; Wild 2016). Using the subgroup data provided by the study authors, we conducted an EM imputation in Cieslak 2016 (comparable to original study). An analysis of eight studies (including one mixed study with available subgroup data: Cieslak 2016), that could be combined (Berger 2011; Cieslak 2016; Clemow 2018; Luthar 2017; Mache 2017; Mistretta 2018; Schroeder 2016; West 2014) revealed evidence of a moderate difference between groups favouring resilience training for this outcome (SMD −0.52, 95% CI −0.81 to −0.23; P < 0.001; I^2 = 50%; Tau^2 = 0.08; P for heterogeneity = 0.05; G^2 = 97.0%; 95% prediction interval: −1.33 to 0.29; 8 studies; 545 participants; Analysis 1.8; moderate effect size).

For depression at short-term follow-up, substantial heterogeneity was indicated by all statistical values.

Single study results

Since we could not access data for one study available only as a conference abstract (Smith 2019), we could not combine this study, which also measured depression (burnout) at short-term follow-up, with the aforementioned studies. For 29 nurses (intervention arm: 16; control arm: 13), the authors reported a significant difference between resilience training and control in burnout scores (Professional Quality of Life Scale-5) at one-month follow-up (P = 0.04). As mentioned above (see Anxiety – short-term follow-up), Varker 2012 only reported summary data for depression at one-month follow-up (MANOVA results with anxiety, depression and stress) in individuals from the general population (77 participants). The authors demonstrated a statistically significant time × group interaction (F = 2.89, P < 0.05): While depression scores decreased in the intervention group, they increased in the control group. For one unpublished study, NCT02603133, we could not obtain the data from the study authors.

Studies with mixed sample

Two mixed studies measuring the effects of resilience intervention versus control on depression at short-term follow-up could not be pooled with the above studies (ISRCTN69644721; Wild 2016). Comparable to post-intervention, Wild 2016, based on the data for the total sample (including ambulance personnel; 430 participants randomised; number analysed not specified) also found no evidence for a difference in depression at three-month follow-up (intervention arm: mean = 3.17 (SD = 3.61); control arm: mean = 3.41 (SD = 4.08)). For one unpublished trial (ISRCTN69644721), we could not obtain the (subgroup) results for depression at this time point from the study authors.

Medium-term follow-up (> 3 to ≤ 6 months)

At medium-term follow-up, one study assessed the impact of resilience training compared to control on self-reported burnout (Mache 2017). Using the emotional exhaustion subscale of the Maslach Burnout Inventory (range: 1 (best) to 6 (worst)), Mache 2017 found a mean difference (MD) of −0.40 (95% CI −0.75 to −0.05; P = 0.03; 1 study, 60 participants; Analysis 1.9), indicating evidence for a difference between the resilience training and control groups.

Long-term follow-up (> 6 months)

The effects of a resilience intervention compared to control on self-reported depression or burnout at long-term follow-up were measured by two studies that could be combined into a meta-analysis (Lebares 2018; West 2014). The pooled SMD was 0.09 (95% CI −0.33 to 0.51; P = 0.68; I^2 = 0%; Tau^2 = 0; P for heterogeneity 0.56; G^2 = 0%; 95% prediction interval: incalculable due to only two studies; 2 studies, 87 participants; Analysis 1.10), indicating little or no evidence for a difference between the resilience-training programme and control groups for depression at long-term follow-up.

Statistical indicators consistently suggested no heterogeneity for depression at long-term follow-up.

Mental health and well-being: stress or stress perception

Post-intervention

Eighteen studies evaluated the effect of a resilience intervention compared to control groups on self-reported stress symptoms or the subjective perception of stress immediately post-intervention. We were able to combine 17 studies (Bernburg 2016; Bernburg 2019; Calder Calisi 2017; Duchemin 2015; Fei 2019; Ireland 2017; Lebares 2018; Lin 2019; Loiselle 2018; Luthar 2017; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mistretta 2018; Schroeder 2016; West 2014). The pooled effect estimate suggests evidence for a moderate effect of resilience interventions on stress or stress perception at post-intervention (SMD −0.61, 95% CI −1.07 to −0.15; P = 0.01; I^2 = 90%; Tau^2 = 0.79; P for heterogeneity < 0.001; G^2 = 98.7%; 95% prediction interval: −2.86 to 1.65; 17 studies, 997 participants; Analysis 1.11; very-low certainty evidence, see Summary of findings 1).

We found no indication of asymmetry for stress or stress perception immediately post-intervention (see Appendix 16; Egger' test: t = −0.34; df = 15; P = 0.74).

For stress or stress perception at post-test, all statistical values indicated substantial to considerable heterogeneity.

Single study results

One study also measuring stress or stress perception at post-intervention could not be pooled with the studies above for the following reason: in Mirzaeirad 2019 (80 participants), the relative proportion of participants with low, moderate and high (nursing) stress at post-intervention were presented (intervention arm: low stress = 3 (7.5%), moderate = 33 (82.5%), high = 4 (10%); control arm: low stress = 0, moderate = 22 (55%), high = 18 (45%)). The investigators reported a significant between-group difference favouring resilience training in perceived stress (P < 0.001).

Short-term follow-up (≤ 3 months)

At short-term follow-up, 17 studies compared the impact of resilience training on self-reported stress or stress perception to control. Fourteen studies reported data suitable for quantitative analysis and could be combined (Bernburg 2016; Bernburg 2019; Chesak 2015; Lin 2019; Luthar 2017; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mistretta 2018; Schroeder 2016; Sood 2011; Sood 2014; West 2014). Analysis of these studies suggests evidence for a moderate difference between groups favouring resilience training in stress or stress perception within three months post-intervention (SMD −0.46, 95% CI −0.67 to −0.25; P < 0.001; I^2 = 53%; Tau^2 = 0.08; P for heterogeneity = 0.01; G^2 = 99.1%; 95% prediction interval: −1.14 to 0.22; 14 studies, 788 participants; Analysis 1.12).

Based on funnel plots and Egger's test, we found no statistically significant asymmetry for stress or stress perception at short-term follow-up (Egger's test: t = −1.32; df = 12; P = 0.21).

For stress or stress perception at short-term follow-up, results for statistical heterogeneity were mixed, with I^2 indicating moderate to substantial heterogeneity (53%), while others (e.g. G^2) suggested substantial heterogeneity.

Single study results

Three studies also measuring stress or stress perception at short-term follow-up could not be pooled with the studies above. We could not obtain the data after contacting the authors for one study available as a conference abstract (Smith 2019). As mentioned above (see Anxiety), Varker 2012, as a proof-of-concept study, only reported summary data for stress (MANOVA results with anxiety, depression and stress) in individuals from the general population. The study authors found a significant time × group interaction (F = 2.89, P < 0.05; 77 participants). Post hoc tests revealed a larger reduction in stress in the intervention arm compared to the control arm. The findings for perceived stress (nursing stress) at three-month follow-up in Mirzaeirad 2019 (80 participants) were only reported indirectly by analysis of covariance (ANCOVA) results (F = 108.141; P < 0.001).

Medium-term follow-up (> 3 to ≤ 6 months)

At medium-term follow-up, one study reported on stress or stress perception (Mache 2017). Using the Perceived Stress Questionnaire (range: 1 (best) to 4 (worst)), the authors reported a significant difference (P < 0.01) in favour of the intervention arm at six-month follow-up (intervention arm: mean = 2.80 (SD = 0.70); control arm: mean = 3.20 (SD = 0.62)). The MD also indicated evidence of an effect of the resilience intervention on stress or perception of stress at medium-term follow-up (MD −0.40, 95% CI −0.73 to −0.07; P = 0.02; 1 study, 60 participants; Analysis 1.13).

Long-term follow-up (> 6 months)

Three studies measured the effects of resilience intervention compared to control on self-reported stress or stress perception at long-term follow-up and could be combined in a meta-analysis (Bernburg 2019; Lebares 2018; West 2014). The pooled SMD was −0.39 (95% CI −0.84 to 0.05; P = 0.09; I^2 = 47%; Tau^2 = 0.07; P for heterogeneity 0.15; G^2 = 94.0%; 95% prediction interval: −4.85 to 4.07; 3 studies, 173 participants; Analysis 1.14), suggesting little or no evidence for a difference between a resilience-training

programme and control group for stress or stress perception at long-term follow-up.

For stress or stress perception at long-term follow-up, we partly found moderate heterogeneity (e.g. I^2, Chi^2 test), while G^2 suggested substantial heterogeneity.

Mental health and well-being: well-being or quality of life

Post-intervention

At post-intervention, 17 studies (including two with mixed samples: ISRCTN69644721; Wild 2016) assessed the effect of a resilience intervention compared to control on self-reported well-being or quality of life. Thirteen studies provided data suitable for quantitative analysis (Bernburg 2016; Calder Calisi 2017; Duchemin 2015; Klatt 2015; Lin 2019; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mistretta 2018; Strijk 2011; West 2014; West 2015). The analysis revealed little or no evidence of an effect of training (SMD 0.14, 95% CI −0.01 to 0.30; P = 0.07; I^2 = 31%; Tau^2 = 0.02; P for heterogeneity = 0.13; G^2 = 93.4%; 95% prediction interval: −0.41 to 0.75; 13 studies, 1494 participants; Analysis 1.15; very-low certainty evidence, see Summary of findings 1).

We found no statistical indication of asymmetry for well-being or quality of life at post-intervention (see Appendix 16; Egger's test: t = 1.91; df = 11; P = 0.08).

We found mixed results for heterogeneity, with three indicators (e.g. I^2) representing moderate heterogeneity, while G^2 indicated substantial heterogeneity.

Single study results

Two unpublished trials (NCT02603133; NCT03645798) also assessed the effect of a resilience intervention compared to control on post-intervention happiness (NCT02603133) and job satisfaction (NCT03645798), but could not be pooled with the abovementioned studies because we were unable to obtain the data from the study authors.

Studies with mixed samples

We were unable to include two mixed studies examining healthcare and non-healthcare professionals in the meta-analysis for well-being or quality of life at post-test, as relevant subgroup data were not available (ISRCTN69644721; Wild 2016). For the total sample investigated (including ambulance personnel; 430 participants randomised; number analysed not specified), Wild 2016 found no significant difference between resilience training and active control on well-being (Warwick-Edinburgh Mental Wellbeing scale) at post-test (F = 0.06, P = 0.94; intervention arm: mean = 50.70 (SD = 9.37); control arm: mean = 51.28 (SD = 9.93)). For one unpublished trial (ISRCTN69644721) subgroup data for ambulance personnel were not available from the study authors.

Short-term follow-up (≤ 3 months)

The effect of resilience training compared to control on self-reported well-being or quality of life at short-term follow-up was evaluated in 15 studies (including two with mixed samples: ISRCTN69644721; Wild 2016). Analysis of 12 studies for which quantitative results were available (Bernburg 2016; Cheung 2014; Hosseinnejad 2018; Lin 2019; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mistretta 2018; Sood 2011; Sood 2014; West 2014), suggested little or no evidence for an effect of training (SMD 0.07, 95% CI −0.04 to 0.18; P = 0.22; I^2 = 1%; Tau^2 = 0; P for heterogeneity = 0.43; G^2 = 91.3%; 95% prediction interval: −0.21 to 0.46; 12 studies, 1413 participants; Analysis 1.16).

Based on funnel plots and Egger's test, we identified statistically significant asymmetry for well-being or quality of life at short-term follow-up (Egger's test: t = 2.43; df = 10; P = 0.04).

For well-being or quality of life at short-term follow-up, we also found mixed results for statistical heterogeneity, with three indicators (e.g. I^2) suggesting no important heterogeneity, whereas G^2 indicated substantial heterogeneity.

Studies with mixed samples

Two studies with mixed samples also compared the effects of a resilience intervention to control on well-being or quality of life at short-term follow-up, but could not be combined in analysis due to unavailable subgroup data. Wild 2016, for the total sample from four emergency services (430 participants randomised; number analysed not specified), found no significant between-group difference in well-being (F = 0.06, P = 0.94; intervention arm: mean = 50.56 (SD = 9.02); control arm: mean = 50.88 (SD = 9.43)). For the unpublished trial (ISRCTN69644721) we could not obtain subgroup data for ambulance personnel from the study authors.

Medium-term follow-up (> 3 to ≤ 6 months)

All three studies comparing a resilience intervention to control at medium-term follow-up provided suitable data for quantitative analysis and showed little or no evidence for a difference between the resilience intervention and control on well-being or quality of life (SMD −0.08, 95% CI −0.31 to 0.16; P = 0.52; I^2 = 73%; Tau^2 = 0.03; P for heterogeneity = 0.02; G^2 = 97.7%; 95% prediction interval: −2.71 to 2.56; 3 studies, 1414 participants; Analysis 1.17).

Based on statistical indicators, we found substantial heterogeneity for well-being or quality of life at medium-term follow-up.

Long-term follow-up (> 6 months)

At long-term follow-up, only one study compared the effects of a resilience intervention to control on quality of life (West 2014). Using a single-item linear analogue question (range 0 (worst) to 10 (best)), the study authors found an increase in quality of life of 1.5% in the intervention arm compared to 1.8% in the control arm (P = 0.63). Similarly, the MD also indicated little or no effect of training on quality of life at 12 months post-intervention (MD −0.20, 95% CI −0.94 to 0.54; P = 0.59; 1 study, 66 participants; Analysis 1.18).

Secondary outcomes

Resilience factors: social support

Post-intervention

Studies with mixed samples

Only one (mixed) study (Wild 2016) assessed perceived social support at post-intervention. Since we could not obtain subgroup data from the study authors, we could not calculate a mean difference. For the total sample (i.e. employees or volunteers working as front-line or office-based staff in one of four emergency services: police, fire and rescue, ambulance, search and rescue; 430 participants randomised; number analysed not specified), Wild

2016 reported no significant differences between the intervention and control group in perceived social support (13 items for social support) at home (F = 0.402, P = 0.67) or at work (F = 0.896, P = 0.40), at post-intervention (at home: intervention arm: mean = 33.63 (SD = 6.44), control arm: mean = 32.83 (SD = 7.09); at work: intervention arm: mean = 27.20 (SD = 6.59), control arm: mean = 27.14 (SD = 7.16)).

Short-term follow-up (≤ 3 months)

We combined data from two studies to estimate the effects of a resilience intervention compared to control on social support at short-term follow-up (Cheung 2014; Clemow 2018). The pooled SMD for social support was −0.07 (95% CI −0.22 to 0.08; P = 0.36; I^2 = 0%; Tau^2 = 0; P for heterogeneity = 0.96; G^2 = 0%; 95% prediction interval: incalculable due to only two studies; 2 studies, 825 participants; Analysis 1.19), suggesting little or no evidence for an effect of a resilience intervention on social support within three months post-intervention.

For social support at short-term follow-up, we found no heterogeneity based on statistical indicators.

Studies with mixed samples

Wild 2016 reported on perceived social support at short-term follow-up in a mixed sample. However, subgroup data for ambulance personnel were not available. For the total sample (i.e. four emergency services: police, fire and rescue, ambulance, search and rescue; 430 participants randomised; number analysed not specified), the investigators reported no significant difference between the intervention and control group in perceived social support (13 items for social support) at home (F = 0.402, P = 0.67) or at work (F = 0.896, P = 0.40) at the three-month follow-up (at home: intervention arm mean = 34.17 (SD = 6.51), control arm mean = 33.28 (SD = 7.80); at work: intervention arm mean = 27.67 (SD = 6.60), control arm mean = 26.79 (SD = 7.08)).

Medium-term follow-up (> 3 to ≤ 6 months)

At medium-term follow-up, Cheung 2014 reported lower values for social support (Multidimensional Scale of Perceived Social Support; range 1 (worst) to 7 (best)) in the intervention group (mean = 4.94 (SD = 1.11) compared to wait-list control (mean = 5.04 (SD = 1.08)). However, the authors identified no significant time × treatment interaction (F = 0.85, P > 0.05) and no significant change in social support in both groups over time. Similarly, the MD for this outcome also indicated little or no evidence for a difference in social support at medium-term follow-up (MD −0.10; 95% CI −0.27 to 0.07; P = 0.25; 1 study, 624 participants; Analysis 1.20).

Optimism

Post-intervention

At post-intervention, three studies (including one mixed study: Gelkopf 2008) reported the effects of a resilience intervention compared to control on self-reported optimism (Gelkopf 2008; Mache 2015a; Mache 2015b). We obtained the subgroup data for healthcare professionals in Gelkopf 2008 from the study authors. The analysis revealed a moderate effect favouring resilience training (SMD 0.41, 95% CI 0.10 to 0.72; P = 0.009; I^2 = 0%; Tau^2 = 0; P for heterogeneity = 0.93; G^2 = 0%; 95% prediction interval: −1.58 to 2.40; 3 studies, 169 participants; Analysis 1.21).

For optimism at post-test, no heterogeneity was indicated by any statistical values.

Short-term follow-up (≤ 3 months)

Two studies assessed the effect of a resilience-training programme versus control on optimism at short-term follow-up (Mache 2015a; Mache 2015b). We combined the data from the two studies, which suggested evidence for a moderate effect of resilience training on optimism within three months post-intervention (SMD 0.44, 95% CI 0.12 to 0.76; P = 0.008; I^2 = 0%; Tau^2 = 0; P for heterogeneity = 0.72; G^2 = 0%; 95% prediction interval: incalculable due to only two studies; 2 studies, 153 participants; Analysis 1.22).

Statistical indicators consistently suggested no heterogeneity for optimism at short-term follow-up.

Self-efficacy

Post-intervention

Eight individually-randomised studies assessed the effect of a resilience intervention compared to control on self-reported self-efficacy at post-intervention (with three studies with mixed samples: Cieslak 2016; Gelkopf 2008; Wild 2016); including two of the mixed studies (Cieslak 2016: EM imputation performed; Gelkopf 2008: subgroup data from the study authors), we had six studies providing data suitable for quantitative analysis (Bernburg 2019; Cieslak 2016; Gelkopf 2008; Mache 2015a; Mache 2015b; Mache 2016). The analysis revealed evidence for a moderate difference favouring resilience training for self-efficacy at post-test (SMD 0.43, 95% CI 0.25 to 0.62; P < 0.001; I^2 = 0%; Tau^2 = 0; P for heterogeneity = 0.52; G^2 = 45.4%; 95% prediction interval: −0.004 to 0.88; 6 studies, 461 participants; Analysis 1.23).

We found mixed results for heterogeneity in self-efficacy at post-intervention, with some indicators suggesting no heterogeneity (e.g. I^2), whereas G^2 was of moderate size.

Single study results

For the unpublished study NCT03645798, we were unable to retrieve any data from the authors.

Studies with mixed samples

Wild 2016 also assessed self-efficacy at post-intervention, but we were unable to combine these data with the studies above, due to unavailable subgroup data for ambulance personnel. For the total sample (430 participants randomised; number analysed not specified) including employees or volunteers from four emergency services, Wild 2016 reported no significant difference (F = 1.85, P = 0.16) between resilience training and active control in self-reported self-efficacy (General Self-Efficacy Scale) at post-intervention (intervention arm: mean = 31.74 (SD = 4.49); control arm: mean = 31.91 (SD = 4.74)).

Short-term follow-up (≤ 3 months)

At short-term follow-up, nine studies reported on self-efficacy, including two mixed studies involving healthcare and non-healthcare professionals (Cieslak 2016; Wild 2016). After having received the relevant subgroup data for Cieslak 2016 and performing EM imputation for this study, we combined the data from seven studies (Berger 2011; Bernburg 2019; Cheung 2014; Cieslak 2016; Mache 2015a; Mache 2015b; Mache 2016), comparing

the impact of a resilience-training programme to control on self-efficacy. The pooled effect estimate (SMD) was 0.32 (95% CI 0.13 to 0.51; P = 0.001; I^2 = 51%; Tau^2 = 0.03; P for heterogeneity = 0.06; G^2 = 69.6%; 95% prediction interval: −0.30 to 0.96; 7 studies, 1258 participants; Analysis 1.24), suggesting a small effect of resilience training on self-reported self-efficacy within three months post-intervention.

For self-efficacy at short-term follow-up, we found moderate to substantial heterogeneity.

Single study results

One further study reporting on self-reported self-efficacy at short-term follow-up could not be included in the meta-analysis. Smith 2019 had no quantitative findings for self-efficacy (measured by the Occupational Coping Self-Efficacy Questionnaire for Nurses; see NCT03017469) in the conference abstract, and we could not retrieve the data from the study authors.

Studies with mixed samples

We were unable to pool data from Wild 2016, investigating employees or volunteers from four emergency services, with the studies above, due to unavailable subgroup data for ambulance personnel. For the total sample (430 participants randomised; number analysed not specified), the study authors reported no significant difference (F = 1.85, P = 0.16) between resilience training and active control in self-reported self-efficacy (General Self-Efficacy Scale) at three-month follow-up (intervention arm: mean = 31.96 (SD = 4.56); control arm: mean = 32.52 (SD = 4.30)).

Medium-term follow-up (> 3 to ≤ 6 months)

In one study measuring self-efficacy (13-item self-efficacy scale; range 1 (worst) to 4 (best)) at medium-term follow-up (Cheung 2014), higher scores for self-efficacy were found in the intervention arm (mean = 3.01 (SD = 0.38)) than the control arm (mean = 2.84 (SD = 0.45)). The study authors reported a significant time × treatment interaction (F = 30.28, P < 0.001), with a sustained increase in self-efficacy in the intervention arm at six-months follow-up compared to no change in the control arm. The MD also suggested evidence of an effect of resilience training on this outcome at medium-term follow-up (MD 0.17, 95% CI 0.10 to 0.24; P < 0.001; 1 study, 624 participants; Analysis 1.25).

Long-term follow-up (> 6 months)

Only one study compared the effects of a resilience intervention to control on self-reported self-efficacy at long-term follow-up (Bernburg 2019). Using the Self-Efficacy, Optimism and Pessimism (SWOP-K9) scale (range 0 (worst) to 4 (best)), the investigators reported a significant between-group difference for self-efficacy at nine-month follow-up (P = 0.01; probable typo in Table 2). The MD indicated little or no evidence of an effect of training on self-efficacy at long-term follow-up (MD 0.19, 95% CI −0.02 to 0.40; P = 0.08; 1 study, 86 participants; Analysis 1.26).

Active coping

Post-intervention

Four studies (including two studies with mixed samples: Gelkopf 2008; Wild 2016) assessed the effect of a resilience intervention compared to control on the resilience factor of active coping at immediate post-intervention. For Gelkopf 2008, we received the relevant subgroup data from the investigators, resulting in three studies providing data suitable for quantitative analysis (Gelkopf 2008; Medisauskaite 2019; Villani 2013). The pooled SMD, was 0.28 (95% CI −0.31 to 0.87; P = 0.35; I^2 = 52%; Tau^2 = 0.14; P for heterogeneity = 0.12; G^2 = 93.6%; 95% prediction interval: −5.85 to 6.41; 3 studies, 137 participants; Analysis 1.27), suggesting little or no evidence for a difference between resilience training and control in post-intervention active coping.

For active coping at post-intervention, moderate to substantial heterogeneity was indicated by statistical values.

Studies with mixed samples

Wild 2016 also assessed active coping at post-intervention, but could not be pooled with the aforementioned studies, due to unavailable subgroup data for ambulance personnel. For the total sample (i.e. employees or volunteers working as front-line or office-based staff in one of four emergency services: police, fire and rescue, ambulance, search and rescue; 430 participants randomised; number analysed not specified), Wild 2016 reported no evidence of a between-group difference in active coping at post-test (intervention arm: mean = 5.45 (SD = 1.53); control arm: mean = 5.38 (SD = 1.56); P value not reported)).

Short-term follow-up (≤ 3 months)

From the two studies comparing the effects of resilience training to control on active coping at short-term follow-up (including the mixed study by Wild 2016), Cheung 2014 reported lower scores of active coping (adaptive coping) assessed by the Brief Coping Orientations to Problems Experience (Brief COPE) scale (range for adaptive coping: 1 (worst) to 4 (best)) in the intervention arm (mean = 2.51 (SD = 0.65)) than in the control arm (mean = 2.53 (SD = 0.62)). The MD for this study indicated little or no evidence of effect of a resilience intervention compared to wait-list control on active coping at short-term follow-up (MD −0.02, 95% CI −0.11 to 0.07; P = 0.67; 1 study, 733 participants; Analysis 1.28).

Studies with mixed samples

Wild 2016 could not be pooled with Cheung 2014, as we were not able to obtain the subgroup data for healthcare professionals from the authors. Similarly to post-intervention, the study showed no evidence of a difference between resilience training and active control for the total sample (four emergency services; 430 participants randomised; number analysed not specified) at short-term follow-up (intervention arm: mean = 5.37 (SD = 1.55); control arm: mean = 5.66 (SD = 1.57); P value not presented).

Medium-term follow-up (> 3 ≤ 6 months)

At medium-term follow-up, only one study assessed the effects on active coping. Cheung 2014 reported lower scores of active coping (adaptive coping) assessed by the Brief COPE scale (range for adaptive coping: 1 (worst) to 4 (best)) in the intervention arm (mean = 2.57 (SD = 0.62)) than in the control arm (mean = 2.6 (SD = 0.57)). The study authors found a significant time × treatment interaction (F = 4.09, P < 0.05), with an increase in active coping in the control arm compared to no change in the intervention arm. The MD for this study indicated little or no evidence of an effect of resilience intervention compared to wait-list control on active coping at medium-term follow-up (MD −0.03, 95% CI −0.12 to 0.06; P = 0.53; 1 study, 624 participants; Analysis 1.29).

Self-esteem

Short-term follow-up (≤ 3 months)

At short-term follow-up, one study (Berger 2011) compared the effect of a resilience intervention to control on self-esteem. Using the Rosenberg Self-Esteem Scale (RSE; range 10 (worst) to 40 (best)), the study authors found an increase in self-esteem in the intervention arm after training (mean = 37.4 (SD = 3.5)) compared to the control arm (mean = 32.1 (SD = 3.9)), but no significant time x group interaction (F = 2.8, P > 0.05). The MD indicated evidence for an effect of the resilience intervention on this outcome (MD 5.30, 95% CI 3.67 to 6.93; P < 0.001; 1 study, 80 participants; Analysis 1.30).

Hardiness

Post-intervention

One study assessed the effects of hardiness training compared to a no-intervention control on hardiness at post-intervention (Tierney 1997). Using the Personal Views Survey, Tierney 1997 reported higher values of hardiness in the intervention arm (mean = 78.16 (SD = 6.98)) compared to the control arm (mean = 74.64 (SD = 8.71)), with no significant difference in change scores between the two conditions. The MD also showed little or no evidence of a difference in favour of the resilience intervention for post-intervention hardiness (MD 3.52, 95% CI −1.19 to 8.23; P = 0.14; 1 study, 43 participants; Analysis 1.31).

Medium-term follow-up (> 3 to ≤ 6 months)

At medium-term follow-up, Tierney 1997 showed similar hardiness scores (Personal Views Survey) in the two groups (intervention arm: mean = 75.73 (SD = 5.85); control arm: mean = 75.49 (SD = 7.40)). We computed the MD, which indicated little or no evidence for an effect of resilience training compared to the no-intervention control on hardiness at six-month follow-up (MD 0.24, 95% CI −3.74 to 4.22; P = 0.91; 1 study, 43 participants; Analysis 1.32).

Positive emotions

Post-intervention

Three studies assessed the effect of a resilience intervention compared to control on self-reported positive emotions at immediate post-intervention. Two studies (Fei 2019; Lin 2019) provided data suitable for quantitative analysis. The pooled effect estimate revealed a large effect in favour of resilience training on positive emotions at post-test (SMD 0.85, 95% CI 0.17 to 1.53; P = 0.01; I^2 = 82%; Tau^2 = 0.20; P for heterogeneity = 0.02; G^2 = 0%; 95% prediction interval: incalculable due to only two studies; 2 studies, 212 participants; Analysis 1.33).

For positive emotions at post-test, we found substantial to considerable heterogeneity based on several indicators (i.e. I^2 of 82%), whereas G^2 suggested no heterogeneity.

Single study results

One further study also measured the effects of a resilience intervention compared to control on positive emotions at post-intervention, but could not be pooled with the aforementioned studies. Stetz 2007 (see final report Stetz 2008) only reported summary data of analyses (two-way MANOVA results for the Multiple Affect Adjective Check List-Revised, including, for example, depression, anxiety and positive affect), and demonstrated a significant effect for the participants' psychological stress levels (F = 3.3, P < 0.001; 63 participants randomised, number analysed not specified). Single results for the outcomes relevant for this review were not reported.

Short-term follow-up (≤ 3 months)

At short-term follow-up, only one study compared the effects of a resilience intervention to wait-list control on self-reported positive emotions (Lin 2019). Using the positive affect subscale of the Positive and Negative Affect Schedule (range: 10 (worst) to 50 (best)), the investigators found a significant time x group interaction on positive affect at three-month follow-up (F = 6.62; P < 0.01) in favour of the resilience training (intervention arm: mean = 33.21 (SD = 7.38); control arm: mean = 29.00 (SD = 5.62)). The MD also indicated evidence for a positive effect of resilience training on positive emotions at short-term follow-up (MD 4.21, 95% CI 1.49 to 6.93; P = 0.002; 1 study, 90 participants; Analysis 1.34).

Adverse events

Only three studies assessed the potential adverse or undesired effects of resilience training in healthcare professionals, all of them reporting no such effects (Lebares 2018; Loiselle 2018; Strijk 2011). Most studies in healthcare professionals provided no data on potential adverse effects.

Subgroup analyses

We performed five subgroup analyses for four of our primary outcomes at post-intervention, the exception being anxiety. For resilience, stress or stress perception and well-being or quality of life, we also conducted five subgroup analyses at short-term follow-up.

Resilience

None of the subgroup analyses showed any evidence of a significant subgroup effect at post-intervention: setting (Chi^2 = 0.68; df = 1; P = 0.41; I^2 = 0%; Analysis 2.1); delivery format (Chi^2 = 0.12; df = 1; P = 0.73; I^2 = 0%; Analysis 2.2); training intensity (Chi^2 = 2.99; df = 2; P = 0.22; I^2 = 33.1%; Analysis 2.3); theoretical foundation (Chi^2 = 3.02; df = 2; P = 0.22; I^2 = 33.7%; Analysis 2.4); or study comparator (Chi^2 = 2.59; df = 3; P = 0.46; I^2 = 0%; Analysis 2.5).

Two subgroup analyses showed evidence of a significant subgroup effect at short-term follow-up: training intensity (Chi^2 = 17.84; df = 2; P < 0.001; I^2 = 88.8%; Analysis 2.8), where compared to control, high-intensity training (SMD 0.46, 95% CI 0.26 to 0.66; P < 0.001; 7 studies, 494 participants), but not low-intensity (SMD 0.53, 95% CI −0.14 to 1.20; P = 0.12; 3 studies, 98 participants) or moderate-intensity training (SMD −0.05, 95% CI −0.20 to 0.09; P = 0.50; 1 study, 733 participants) appeared to increase resilience; and theoretical foundation (Chi^2 = 21.43; df = 3; P < 0.001; I^2 = 86.0%; Analysis 2.9), where compared to control, mindfulness-based (SMD 1.05, 95% CI 0.22 to 1.88; P = 0.01; 1 study, 26 participants) and combined training programmes (SMD 0.43, 95% CI 0.24 to 0.62; P < 0.001; 6 studies, 468 participants) appeared to increase resilience, but not AIT-based (SMD 0.53, 95% CI −0.14 to 1.20; P = 0.12; 3 studies, 98 participants) or unspecified resilience interventions (SMD −0.05, 95% CI −0.20 to 0.09; P = 0.50; 1 study; 733 participants). The remaining subgroup analyses showed no evidence of a significant subgroup difference: setting (Chi^2 = 4.81; df = 2; P = 0.09; I^2 = 58.5%; Analysis 2.6); delivery format (Chi^2 = 0.12; df = 1; P = 0.72; I^2 = 0%;

Analysis 2.7); or study comparator (Chi² = 0.63; df = 2; P = 0.73; I² = 0%; Analysis 2.10).

Depression

None of the subgroup analyses showed any evidence of a significant subgroup effect at post-intervention: setting (Chi² = 5.34; df = 3; P = 0.15; I² = 43.9%; Analysis 2.11); delivery format (Chi² = 1.42; df = 2; P = 0.49; I² = 0%; Analysis 2.12); training intensity (Chi² = 0.26; df = 2; P = 0.88; I² = 0%; Analysis 2.13); theoretical foundation (Chi² = 2.44; df = 3; P = 0.49; I² = 0%; Analysis 2.14); or study comparator (Chi² = 7.08; df = 4; P = 0.13; I² = 43.5%; Analysis 2.15).

Stress or stress perception

None of the subgroup analyses showed any evidence of a significant subgroup effect at post-intervention: setting (Chi² = 1.22; df = 1; P = 0.27; I² = 17.8%; Analysis 2.16); delivery format (Chi² = 1.34, df = 1; P = 0.25; I² = 25.2%; Analysis 2.17); training intensity (Chi² = 0.23; df = 1; P = 0.63; I² = 0%; Analysis 2.18); theoretical foundation (Chi² = 3.49; df = 2; P = 0.17; I² = 42.6%; Analysis 2.19); or study comparator (Chi² = 1.01; df = 3; P = 0.80; I² = 0%; Analysis 2.20).

None of the subgroup analyses showed any evidence of a significant subgroup effect at short-term follow-up: setting (Chi² = 1.46; df = 2; P = 0.48; I² = 0%; Analysis 2.21); delivery format (Chi² = 0.03; df = 1; P = 0.87; I² = 0%; Analysis 2.22); training intensity (Chi² = 1.74; df = 2; P = 0.42; I² = 0%; Analysis 2.23); theoretical foundation (Chi² = 5.28; df = 3; P = 0.15; I² = 43.2%; Analysis 2.24); or study comparator (Chi² = 5.68; df = 2; P = 0.06; I² = 64.8%; Analysis 2.25).

Well-being or quality of life

One subgroup analysis showed evidence of a significant subgroup effect at post-intervention for theoretical foundation (Chi² = 10.79; df = 3; P = 0.01; I² = 72.2%; Analysis 2.29): the SMDs were 0.83 (95% CI 0.32 to 1.33; P = 0.001; 2 studies, 66 participants) for mindfulness-based training; −0.02 (95% CI −0.17 to 0.13; P = 0.79; 1 study, 730 participants) for coaching-based training; 0.14 (95% CI −0.03 to 0.31; P = 0.10; 9 studies, 591 participants) for combined training programmes; and 0 (95% CI −0.38 to 0.38; P = 1.00; 1 study, 107 participants) for unspecified resilience training. The remaining subgroup analyses provided no evidence of a significant subgroup difference: setting (Chi² = 3.17; df = 1; P = 0.07; I² = 68.5%; Analysis 2.26); delivery format (Chi² = 1.51; df = 1; P = 0.22; I² = 33.9%; Analysis 2.27); training intensity (Chi² = 1.15; df = 1; P = 0.28; I² = 13.3%; Analysis 2.28); or study comparator (Chi² = 4.58; df = 2; P = 0.10; I² = 56.3%; Analysis 2.30).

None of the subgroup analyses showed any evidence of a significant subgroup effect at short-term follow-up: setting (Chi² = 2.23; df = 2; P = 0.33; I² = 10.5%; Analysis 2.31); delivery format (Chi² = 0.45; df = 1; P = 0.50; I² = 0%; Analysis 2.32); training intensity (Chi² = 0.40; df = 2; P = 0.82; I² = 0%; Analysis 2.33); theoretical foundation (Chi² = 0.45; df = 2; P = 0.80; I² = 0%; Analysis 2.34); or study comparator (Chi² = 3.21; df = 2; P = 0.20; I² = 37.6%; Analysis 2.35).

Sensitivity analyses

We performed six sensitivity analyses for the primary outcomes of depression (at post-intervention only), stress or stress perception and well-being or quality of life at post-intervention and short-term follow-up. With respect to resilience, we conducted a sensitivity analysis of the underlying resilience concept at post-test only; it was not possible at short-term follow-up since all studies used a state-oriented scale. In addition, the planned sensitivity analysis regarding reporting bias was not possible for resilience, due to all studies being at low risk of reporting bias. No sensitivity analysis was performed for anxiety.

Resilience

Post-intervention

- Underlying resilience concept: Following the exclusion of one study using a trait scale of resilience, we found evidence of a moderate effect in favour of resilience training (SMD 0.45, 95% CI 0.24 to 0.67; P < 0.001; 11 studies, 669 participants; Analysis 3.1).
- Attrition bias: Following the exclusion of four studies at high risk of bias, we found no evidence of a subgroup difference between studies at low and unclear risk of bias (Chi² = 0; df = 1; P = 0.97; I² = 0%; Analysis 3.2), indicating that these studies could be combined in a sensitivity analysis. We found evidence of a moderate effect in favour of resilience training (SMD 0.50, 95% CI 0.30 to 0.71; P < 0.001; 8 studies, 466 participants; Analysis 3.2).
- Trial registration: Following the exclusion of 10 studies without trial registration, we found little or no evidence of an effect of resilience intervention (SMD −0.07, 95% CI −0.82 to 0.67; P = 0.84; 2 studies, 54 participants; Analysis 3.3).
- Level of missing data: Following the exclusion of four studies with ≥ 10% missing data in primary outcome or other outcomes, we found evidence of a moderate effect of resilience training (SMD 0.50, 95% CI 0.30 to 0.71; P < 0.001; 8 studies, 466 participants; Analysis 3.4).
- Managing missing data: Following the exclusion of five studies with missing data of ≥ 10% and no imputation of missing data, we found evidence of a moderate effect in favour of training (SMD 0.45, 95% CI 0.25 to 0.65; P < 0.001; 7 studies, 393 participants; Analysis 3.5).
- Fixed-effect pair-wise meta-analysis: We found evidence of a moderate difference in favour of resilience training (SMD 0.47, 95% CI 0.31 to 0.62; P < 0.001; 12 studies, 690 participants; Analysis 3.6).

Short-term follow-up (≤ 3 months)

- Attrition bias: Following the exclusion of six studies at high risk of bias, we found evidence of a small effect of resilience training (SMD 0.31, 95% CI 0.09 to 0.54; P = 0.007; 5 studies, 337 participants; Analysis 3.7).
- Trial registration: Following the exclusion of 10 studies without trial registration, we found little or no evidence of an effect of training (MD −0.03; 95% CI −0.12 to 0.06; P = 0.50; 1 study, 733 participants; Analysis 3.8).
- Level of missing data: Following the exclusion of seven studies with high levels of missing data, we found a moderate effect in favour of the resilience intervention (SMD 0.36, 95% CI 0.13 to 0.58; P = 0.002; 4 studies, 311 participants; Analysis 3.9).
- Managing missing data: Following the exclusion of six studies with missing outcome data of ≥ 10% and no imputation of

missing data, we found evidence of a small effect of training (SMD 0.31, 95% CI 0.09 to 0.54; P = 0.007; 5 studies, 337 participants; Analysis 3.10).

- Fixed-effect pair-wise meta-analysis: We found evidence of a small effect of resilience training compared to control (SMD 0.18, 95% CI 0.07 to 0.29; P = 0.001; 11 studies, 1325 participants; Analysis 3.11).

Depression

Post-intervention

- Attrition bias: Following the exclusion of nine studies at high risk of bias, we found evidence of a moderate effect in favour of resilience training (SMD −0.41; 95% CI −0.72 to −0.11; P = 0.008; 5 studies; 169 participants; Analysis 3.12).
- Reporting bias: Following the exclusion of four studies at high risk of bias, there was little or no evidence of an effect of training (SMD −0.30; 95% CI −0.61 to 0.01; P = 0.06; 10 studies; 510 participants; Analysis 3.13).
- Trial registration: Following the exclusion of eight studies without trial registration, we found little or no evidence of an effect of training (SMD −0.10; 95% CI −0.33 to 0.14; P = 0.41; 6 studies; 289 participants; Analysis 3.14).
- Level of missing data: Following the exclusion of eight studies with high levels of missing data, we found evidence of a moderate effect in favour of resilience intervention (SMD −0.34; 95% CI −0.60 to −0.09; P = 0.009; 6 studies; 239 participants; Analysis 3.15).
- Managing missing data: Following the exclusion of six studies with missing outcome data of ≥ 10% and no imputation of missing data, we found evidence of a small effect in favour of resilience training (SMD −0.33; 95% CI −0.53 to −0.14; P < 0.001; 8 studies; 410 participants; Analysis 3.16).
- Fixed-effect pair-wise meta-analysis: There was evidence of a small effect of resilience training (SMD −0.28; 95% CI −0.43 to −0.14; P < 0.001; 14 studies; 788 participants; Analysis 3.17).

Stress or stress perception

Post-intervention

- Attrition bias: Following the exclusion of seven studies at high risk of bias, we found no evidence of a subgroup difference between studies at low and unclear risk of bias (Chi^2 = 0.73; df = 1; P = 0.39; I^2 = 0%; Analysis 3.18), indicating that these studies could be combined in a sensitivity analysis. We found evidence of a large effect of resilience training (SMD −0.75, 95% CI −1.47 to −0.02; P = 0.04; 10 studies, 621 participants; Analysis 3.18).
- Reporting bias: Following the exclusion of four studies at high risk of bias, we found evidence of a large effect in favour of resilience training (SMD −0.81; 95% CI −1.38 to −0.25; P = 0.005; 13 studies, 822 participants; Analysis 3.19).
- Trial registration: Following the exclusion of 12 studies without trial registration, there was little or no evidence of an effect of resilience intervention (SMD −0.15, 95% CI −0.43 to 0.14; P = 0.31; 5 studies, 197 participants; Analysis 3.20).
- Level of missing data: Following the exclusion of six studies with high levels of missing data, we found little or no evidence of an effect of resilience training (SMD −0.64, 95% CI −1.30 to 0.02; P = 0.06; 11 studies, 690 participants; Analysis 3.21).
- Managing missing data: Following the exclusion of five studies with missing outcome data of ≥ 10% and no imputation of missing data, we found evidence of a moderate effect in favour of resilience training (SMD −0.62, 95% CI −1.23 to −0.01; P = 0.05; 12 studies, 727 participants; Analysis 3.22).
- Fixed-effect pair-wise meta-analysis: There was evidence of a moderate effect of resilience training (SMD −0.56, 95% CI −0.70 to −0.42; P < 0.001; 17 studies, 997 participants; Analysis 3.23).

Short-term follow-up (≤ 3 months)

- Attrition bias: Following the exclusion of seven studies at high risk of bias, we found no evidence of a subgroup difference between studies at low and unclear risk of bias (Chi^2 = 1.52; df = 1; P = 0.22; I^2 = 34%; Analysis 3.24), indicating that these studies could be combined in a sensitivity analysis. There was evidence of a small effect of resilience training (SMD −0.30, 95% CI −0.52 to −0.07; P = 0.009; 7 studies, 427 participants; Analysis 3.24).
- Reporting bias: Following the exclusion of three studies at high risk of bias, we found evidence of a moderate effect in favour of resilience training (SMD −0.52, 95% CI −0.75 to −0.29; P < 0.001; 11 studies, 644 participants; Analysis 3.25).
- Trial registration: Following the exclusion of 11 studies without trial registration, there was little or no evidence of an effect of resilience training (SMD −0.22; 95% CI −0.71 to 0.28; P = 0.39; 3 studies, 144 participants; Analysis 3.26).
- Level of missing data: Following the exclusion of seven studies with high levels of missing data, we found evidence of a small effect in favour of resilience training (SMD −0.27, 95% CI −0.53 to −0.00; P = 0.05; 7 studies, 471 participants; Analysis 3.27).
- Managing missing data: Following the exclusion of five studies with missing outcome data of ≥ 10% and no imputation of missing data, we found evidence of a small effect of resilience intervention (SMD −0.27, 95% CI −0.49 to −0.06; P = 0.01; 9 studies, 534 participants; Analysis 3.28).
- Fixed-effect pair-wise meta-analysis: we found evidence of a moderate effect in favour of resilience intervention (SMD −0.43, 95% CI −0.58 to −0.29; P < 0.001; 14 studies, 788 participants; Analysis 3.29).

Well-being or quality of life

Post-intervention

- Attrition bias: Following the exclusion of five studies at high risk of bias, we found no evidence of a subgroup difference between studies at low and unclear risk of bias (Chi^2 = 1.43; df = 1; P = 0.23; I^2 = 30.1%; Analysis 3.30), indicating that these studies could be combined in a sensitivity analysis. There was little or no evidence of an effect of resilience training (SMD 0.15, 95% CI −0.06 to 0.35; P = 0.17; 8 studies, 1112 participants; Analysis 3.30).
- Reporting bias: Following the exclusion of four studies at high risk of bias, we found evidence of a small effect of resilience intervention (SMD 0.20, 95% CI 0.03 to 0.36; P = 0.02; 9 studies, 628 participants; Analysis 3.31).
- Trial registration: Following the exclusion of 10 studies without trial registration, we found little or no evidence of an effect of training (SMD −0.04, 95% CI −0.18 to 0.10; P = 0.56; 3 studies, 834 participants; Analysis 3.32).
- Level of missing data: Following the exclusion of six studies with high levels of missing data, we found little or no evidence of an

effect of resilience intervention (SMD 0.20, 95% CI −0.06 to 0.46; P = 0.14; 7 studies, 412 participants; Analysis 3.33).

- Managing missing data: Following the exclusion of four studies with missing outcome data of ≥ 10% and no imputation of missing data, we found little or no evidence of an effect of training (SMD 0.11, 95% CI −0.08 to 0.29; P = 0.27; 9 studies, 1179 participants; Analysis 3.34).
- Fixed-effect pair-wise meta-analysis: We found little or no evidence of an effect of resilience training (SMD 0.08, 95% CI −0.02 to 0.19; P = 0.13; 13 studies, 1494 participants; Analysis 3.35).

Short-term follow-up (≤ 3 months)

- Attrition bias: Following the exclusion of five studies at high risk of bias, there was no evidence of a subgroup difference between studies at low and unclear risk of bias ($Chi^2 = 2.89$; df = 1; P = 0.09; $I^2 = 65.4\%$; Analysis 3.36), indicating that these studies could be combined in a sensitivity analysis. We found little or no evidence of an effect of resilience training (SMD 0.14, 95% CI −0.05 to 0.33; P = 0.16; 7 studies, 422 participants; Analysis 3.36).
- Reporting bias: Following the exclusion of three studies at high risk of bias, we found little or no evidence of an effect of resilience intervention (SMD 0.03, 95% CI −0.08 to 0.14; P = 0.59; 9 studies, 1227 participants; Analysis 3.37).
- Trial registration: Following the exclusion of eight studies without trial registration, we found little or no evidence of an effect of training (SMD 0.10, 95% CI −0.17 to 0.36; P = 0.46; 4 studies, 919 participants; Analysis 3.38).
- Level of missing data: Following the exclusion of seven studies with high levels of missing data, we found little or no evidence of an effect of resilience training (SMD 0.04, 95% CI −0.17 to 0.25; P = 0.70; 5 studies, 348 participants; Analysis 3.39).
- Managing missing data: Following the exclusion of five studies with missing outcome data of ≥ 10% and no imputation of missing data, we found little or no evidence of an effect of training (SMD 0.04, 95% CI −0.15 to 0.24; P = 0.66; 7 studies, 411 participants; Analysis 3.40).
- Fixed-effect pair-wise meta-analysis: We found little or no evidence of an effect of resilience training (SMD 0.06, 95% CI −0.04 to 0.17; P = 0.24; 12 studies, 1413 participants; Analysis 3.41).

DISCUSSION

Summary of main results

We identified 44 randomised controlled trials (RCTs) that fulfilled the inclusion criteria of this review, four of which were conducted in mixed samples and one study assessed the impact of resilience training for healthcare workers in general-population volunteers.

There is very-low certainty evidence (meaning that the true effect may differ markedly from the estimated effect) that resilience interventions might be more effective than control for improving resilience, self-reported symptoms of depression, and stress or stress perception at post-test. Effect sizes ranged from small to moderate. We found little or no evidence of an effect of training on anxiety symptoms at post-intervention. At short-term follow-up (three months or less post-intervention), the effect size of the reduction in depressive symptoms increased from small to moderate. The possible moderate effects for resilience and for stress or stress perception found at post-test slightly decreased, but were also maintained. We also found very-low certainty evidence of a moderate effect in favour of resilience training on anxiety symptoms. At medium-term follow-up (more than three months to six months or less), we no longer found evidence of a difference between the resilience intervention and control for resilience, while a single study (Mache 2017) still provided evidence of a decrease in burnout and stress symptoms. At long-term follow-up (more than six months), the positive effects of training on the primary outcomes were no longer evident. We found little or no evidence of an effect of training on well-being or quality of life at any time point. Anxiety was not measured at medium- and long-term follow-up by any study.

For the secondary outcomes at post-test and short-term follow-up, we found evidence of small and moderate effects in favour of resilience training for optimism, self-efficacy, self-esteem (only short-term follow-up), and positive emotions that were only maintained in the medium term for self-efficacy (single study: Cheung 2014). There was little or no evidence for a difference between training and control for social support, active coping, and hardiness at any assessment. Not all of the secondary outcomes were measured at each time point; a long-term follow-up was only available for self-efficacy.

Subgroup analyses for the primary outcomes at post-test and short-term follow-up (except anxiety and depression) indicated no consistent effect modifiers. The subgroup analysis of training intensity for resilience at short-term follow-up provided evidence of a difference in favour of high-intensity training. For theoretical foundation, the subgroup analyses for well-being or quality of life at post-test and for resilience at short-term follow-up showed evidence of a difference in favour of mindfulness-based resilience interventions (both outcomes) and combined programmes (resilience). Beyond that, however, we identified little or no evidence of differences in the efficacy of resilience training for the primary outcomes depending on setting, delivery format, training intensity, theoretical foundation or study comparator. The analyses are restricted by the small number of studies for some of the subgroups, the limited quality of included studies, and the weighting of subgroup analyses for certain subgroups.

With respect to sensitivity analysis at post-test and short-term follow-up (except for anxiety and depression), we mostly found no evidence of an effect of resilience training when excluding studies without trial registration or a published study protocol. The exclusion of studies at high risk of attrition bias, reporting bias or with high levels of missing data, as well as sensitivity analyses related to the management of missing data and the use of fixed-effect instead of random-effects models, partly led to changes in the evidence found. Removing studies measuring resilience with a trait scale (post-test) left the evidence unchanged for a positive effect on resilience.

Overall, the evidence included in this review is of very low certainty, meaning that we can draw no clear conclusions.

Overall completeness and applicability of evidence

The review highlights some issues about the overall completeness and applicability of the evidence for the effects of resilience interventions in healthcare workers (for details, see Appendix 17).

Participants

Since stress-related mental disorders are more prevalent in women (Kuehner 2017; Li 2017; Riecher-Rössler 2017; WHO 2019), and since women report lower resilience (Kunzler 2018), the high proportion of **women** among the study participants may be explained by a higher interest in women to participate in resilience interventions. The applicability of the findings of this review to men may be limited, since gender differences in the prevalence of stress-related mental disorders may reflect differences in biological vulnerability, social roles, or stress reactivity (Nazroo 1998; Verma 2011; WHO 2019), thereby causing a potentially different effect of resilience training in men and women.

Concerning the participants' **age,** middle-aged participants (50 to 65 years) before their retirement were rarely examined. Moran 1998 postulated a curvilinear association with a higher stressor exposure in emergency workers at the beginning and by the end of their working life compared to a moderate level of work experience. Similarly, the period before retirement as an important transitional event may be stressful (Bossé 1991; Selye 1980). Thus, employees aged 50 to 65 years might benefit differently, perhaps to a greater extent, from resilience interventions. The evidence from this review does not allow us to answer this question.

With regard to **healthcare sectors**, the included studies were mainly conducted in a hospital setting, and included physicians, nurses and different hospital personnel (37/44 studies), with various medical departments represented.

About two-thirds of the 44 studies assessed **mental health at baseline.** The clinical relevance of mental symptoms, i.e. whether symptom load justified a diagnosis of mental disorder, is unclear for most studies, since no study screened for mental disorders using a structured interview. However, to get a clear picture of the participants' baseline mental health could be important, as the large effect sizes in some studies (e.g. Bernburg 2019) might in part also be explained by the inclusion of participants with a pre-existing burden of mental symptoms or even clinical diagnoses.

For **location**, the evidence was concentrated in North America, Europe and Asia (including the Near East), with only three studies from Australia. The applicability of the findings to other locations and ethnicities (e.g. South America, Africa, Oceania) therefore remains unclear. Of the 44 included studies, 36 were conducted in high-income**countries** (e.g. USA) and eight in upper-middle income countries (e.g. China). We therefore recommend some caution about the cross-cultural applicability of the evidence.

In summary, the findings may be most applicable to the young and middle-aged, to female healthcare workers, to those living in high-income countries.

Interventions

Although the benefits of **online- and mobile-based** interventions (e.g. 24/7 availability) have recently been discussed (Cuijpers 2017; Heber 2017; Heron 2010), we identified only three studies delivered in this format. In addition, most of the interventions were of **high or moderate intensity**, with treatment durations varying considerably. Except for ACT and PST, all **theoretical foundations** prespecified in our protocol (Helmreich 2017) have been tested in RCTs found in this review. The number of RCTs varies, with most studies investigating combined theoretical foundations. Overall, the findings of this review are mostly applicable to group interventions of high intensity, delivered face-to-face and using a combination of theoretical approaches.

Comparators

For **attention and active controls**, there was considerable heterogeneity of setting, delivery format and content, rendering comparability between single-study comparisons difficult.

The primary use of no-intervention and wait-list controls, in particular, is problematic, since these control groups were shown to yield inflated effect sizes compared to active comparators in psychotherapy research (Mohr 2014). In our review, however, subgroup analyses testing comparators did not reach statistical significance for any outcome, which might also be attributable to the small number of studies in the subgroups of active and attention control compared to no intervention and wait-list control.

Outcomes

Different measures for resilience were used in the review (see Table 2). For the potential effect of the underlying concept of resilience, the exclusion of trait-based resilience measures did not modify the effect size on resilience at post-test. However, this finding might be associated with only one study (Lebares 2018) using a trait-based measure.

Although there is still no consensus about the **definition of resilience**, two aspects are viewed as essential: the exposure to substantial risk or adversity, and the maintenance or fast recovery of mental health despite this adversity (Earvolino-Ramirez 2007). By considering studies of healthcare professionals – a target group often exposed to significant stressors – that assessed resilience or another measure of psychological adjustment, we ensured a greater homogeneity between the included studies.

A large **variety of assessments** were also admitted for the primary outcomes of mental health and well-being (e.g. burnout and depression scales for depression; Helmreich 2017). This diversity of measures has to be considered as a potential source of heterogeneity in our meta-analyses, and might have an impact on the interpretation of results.

Although**resilience factors**, such as social support, are discussed as well-evidenced resilience factors (see Helmreich 2017), relatively few of the included studies assessed these outcomes at the different periods of follow-up.

Since most of the included studies had small samples, the **attrition bias** found for 16 studies has to be interpreted with caution.

Potential **adverse effects** were not specified in most included studies (see Adverse events in Effects of interventions), and only three studies reported no adverse or undesired effects. For psychotherapy, however, several possible adverse outcomes have been discussed (e.g. emotional arousal; Berk 2009; Moritz 2019). As resilience interventions often include confronting participants with individual problems (e.g. by teaching structured problem-solving), some of these training programmes might also have the potential to harm certain participants.

Lastly, very few studies had **medium- or long-term follow-up assessments**, which limited our ability to examine whether any benefits of resilience interventions are sustained in the long term.

Quality of the evidence

Using the GRADE approach (Schünemann 2013; Schünemann 2019b), we rated the overall **certainty of evidence at post-intervention** for all primary outcomes as very low, for the following reasons: First, important **methodological limitations** reduced the certainty of the evidence offered by most included studies. There was unclear and high risk of bias for several domains across the studies, especially high risk of bias in blinding of participants and personnel, loss to follow-up and unclear methods of sequence generation, allocation concealment and blinding of outcome assessment. Selective outcome reporting was occasionally an issue.

Second, four outcomes had moderate (I^2 > 30%) or substantial (stress or stress perception, I^2 = 90%) levels of **unexplained heterogeneity** and only partially overlapping CIs, leading to inconsistency.

Third, for all (primary) outcomes at post-intervention, the **evidence was indirect**, as studies were limited to certain participants (e.g. young to middle-aged adults), particular versions of resilience intervention (e.g. group setting, face-to-face delivery, mindfulness-based and combined theoretical foundation) and certain comparators (e.g. no intervention, wait-list).

Finally, due to the small number of participants included in the meta-analysis for anxiety (fewer than 400 participants), inconsistent messages of the 95% CI for the intervention effect (anxiety, well-being or quality of life), and the 95% CI encompassing both a very small treatment effect and crossing the threshold for appreciable benefit of the intervention (depression), **imprecision** was a problem for three outcomes at post-intervention.

We did not downgrade for **publication bias** for any of the primary outcomes at post-intervention. Based on funnel plots (see Appendix 16, except for anxiety) and Egger's test, there was no statistical or visual evidence of asymmetry (see also Effects of interventions, except for anxiety). The funnel plots were symmetrical in shape and, if available, the results of grey literature did not differ from other published studies for the (non-)evidence or the direction of effect (resilience, depression, stress or stress perception, well-being or quality of life). Due to the scarcity of larger studies across the primary outcomes at post-test (with the exception of Strijk 2011 for well-being or quality of life), a small-study effect was difficult to assess and cannot be ruled out completely. Nevertheless, an overestimation of effects in smaller studies seemed unlikely, since the meta-analyses mostly included small studies with significant as well as non-significant results. Although the evidence was largely based on small studies, there was no indication of conflicts of interest of relevance for the post-test meta-analyses.

Three primary outcomes: we also examined funnel plots and Egger's test at short-term follow-up (> 10 studies), and found similar results for stress or stress perception, with no indication of publication bias. Despite statistical and (slight) visual evidence of funnel plot asymmetry for resilience and well-being or quality of life at short-term follow-up, we also did not assume there was publication bias for these outcomes for several reasons: 'Negative' studies (i.e. statistically non-significant studies) had also been published and studies appeared to be missing in the area of high statistical significance (P < 0.01), making publication bias unlikely according to the *Cochrane Handbook* (Page 2019). In addition, the results of one unpublished study in both meta-analyses (Cheung 2014) did not differ from other published studies. For both outcomes, the evidence was based on a multitude of small studies (resilience: 10/11, well-being or quality of life: 11/12 studies). In such cases, according to the GRADE approach (Guyatt 2011e), publication bias should be suspected if most of these studies have been commercially funded or when conflicts of interest are assumed. For resilience and well-being or quality of life, a potential conflict of interest was indicated from the authors or likely for three studies (Chesak 2015; Sood 2011; Sood 2014). However, as these studies represented a minority and several of them also included non-significant results, there was insufficient evidence of publication bias. Other forms of selection bias (language bias, location or database bias, multiple publication bias, provision of data bias, citation bias, outcome reporting bias) could not explain the funnel plot asymmetry. For both outcomes, the non-significant finding of Cheung 2014 as an unpublished study could indicate a potential time-lag bias. Again, small-study effects were difficult to assess for both outcomes due to the lack of larger studies, but were unlikely, as both significant and non-significant results were reported by small studies. Besides, the effect size did not differ according to study size due to true heterogeneity (Page 2019), as there were no consistent clinical (e.g. population, setting or delivery format of resilience intervention) or methodological differences between studies of different size. Finally, we must consider whether alternative explanations of funnel plot asymmetry for both outcomes might refer to artefacts due the use of SMDs or chance (Page 2019). More details about the assessment and exclusion of publication bias for the primary outcomes of this review are presented in Appendix 18.

Regarding adverse events, we were unable to assess several GRADE domains (e.g. precision, publication bias), due to the small number of studies documenting any adverse effects of study participation (e.g. by verbal feedback from participants; Lebares 2018; Loiselle 2018; Strijk 2011). Based on the narrative reports in these studies, we downgraded this outcome for study limitations and indirectness.

Overall, the GRADE certainty rating was very low for all primary outcomes at post-intervention, which means that there is a high degree of uncertainty about the estimates of effect observed. Future research in this area is very likely to substantially impact the effect estimates of resilience interventions.

Potential biases in the review process

Search methods

Appendix 19 includes further information on how we prevented potential biases in the search methods for this review. Except for five completed but unpublished studies (ISRCTN69644721; NCT02603133; NCT03645798; Smith 2019; West 2015), we were able to retrieve the full texts for all included studies. In accordance with the Cochrane Developmental, Psychosocial and Learning Problems (CDPLP) editorial team, we considered alternative sources (e.g. trial register entry) for these five studies. In eight cases, we could find no contact data from the investigators, or received no reply from the study authors, or the responses were inadequate and did not provide sufficient information to enable us to reach a decision about the eligibility of the studies (see Characteristics of studies awaiting classification). We attempted to conduct a

comprehensive search; however, the fact that 12 studies have not yet been incorporated, and will only be added in the update of this review could be considered a potential source bias.

Correspondence with the authors was required for 32 included studies. For three studies, for which we aimed to double-check the available information (e.g. number of participants analysed) or to receive unadjusted outcome data by contacting the authors, we decided to rely on the reports and to include the studies in the meta-analyses despite the missing response (Fei 2019; Loiselle 2018; Medisauskaite 2019). For four studies, we used alternative statistical information to include them in quantitative analysis (Calder Calisi 2017; Clemow 2018; Hosseinnejad 2018: Klatt 2015). For three studies (ISRCTN69644721; NCT03645798; Smith 2019), we received information that no data could be provided, as the studies were completed, and in the process of analysis or publication. For three further studies (NCT02603133; Stetz 2007; Wild 2016), the primary investigators responded to our first inquiry, but not to a second inquiry, or were not able to provide the relevant subgroup data at the time of data analysis (Wild 2016).

Post hoc changes

We made a post hoc change to the eligibility criteria for the Types of interventions (see Differences between protocol and review) by subsequently limiting the study selection to interventions that explicitly stated the aim of fostering resilience, hardiness or post-traumatic growth. Although the change raises the possibility of bias in the review process, we felt it was necessary to guarantee highly-objective eligibility criteria and transparency. We do not believe that this departure from the protocol (Helmreich 2017) is a serious bias. Due to the focus on interventions with the mention of at least one of the three terms, general health-promoting interventions (e.g. well-being therapy, chronic disease self-management, self-management training after negative life events) not meeting this criterion were excluded from this review. However, other psychological interventions in healthcare professionals that are eventually more economical than the theoretical approaches found in this review might also foster mental health, despite stressors (i.e. resilience), although not being labelled as 'resilience training'.

We also made a post hoc change to the eligibility criteria for Types of participants (see Differences between protocol and review) by limiting the review to healthcare professionals. Although the change raises the possibility of bias, we felt it was necessary because the restriction to healthcare professionals guarantees a systematic review with sufficiently homogeneous comparisons.

Further potential biases

Even within each type of theoretical foundation, there was partial clinical heterogeneity, in terms of intervention setting, delivery or intensity. However, as there is still no consensus or 'gold standard' about how to design resilience-training programmes leading to variety (see previous reviews, e.g. Leppin 2014), we decided to pool the data. We took this decision as this review had a larger evidence base than previous meta-analyses and we were able to investigate potential heterogeneity by subgroup analysis.

Beyond the five main results for the primary outcomes at post-test, the large number of the pooled analyses, subgroup and sensitivity analyses in this review might have increased the probability of a type I error, potentially leading to false positive results.

Another important limitation of this review is the unknown stressor or risk exposure in most included studies (see Implications for research). Although employment in the healthcare sector might be associated with substantial stressors among participants of the included studies, we did not apply a *proven* risk or stressor exposure as an inclusion criterion of this review (see Types of participants), but only *potential* stressor exposure. However, based on the definition of resilience (Windle 2011a), the effects of resilience interventions on resilience cannot be determined without ensuring a significant risk. The missing assessment of stressor exposure is a general problem of resilience-intervention research (Chmitorz 2018).

Agreements and disagreements with other studies or reviews

Studies or reviews in different clinical and non-clinical adult populations

As mentioned under Why it is important to do this review, the efficacy of resilience interventions for adult populations has been previously examined in 13 systematic reviews and five meta-analyses. Overall, the reviews largely found positive effects of resilience training on different outcomes (e.g. resilience, mental health, physical health, performance), but many review authors have pointed out the need for further research associated with aspects such as the low methodological quality of the primary studies. Many of the reviews also considered study designs other than RCTs (e.g. Bauer 2018; Massey 2019) and focused on certain target groups (e.g. Milne 2016; Pallavicini 2016; Pesantes 2015; Petriwskyj 2016) or certain forms of intervention (e.g. Deady 2017). The number of RCTs specifically on resilience training was therefore rather limited, making comparisons with our review difficult.

Some of the previous reviews (Joyce 2018; Macedo 2014; Leppin 2014; Robertson 2015; Vanhove 2016) used broader eligibility criteria (e.g. clinical and non-clinical individuals) and identified more RCTs compared to other reviews, facilitating comparisons with our work. Despite varying inclusion criteria, the findings of our review largely agree with this previous research, although our review is based on evidence from a much larger body of studies. Furthermore, our review is focused on healthcare professionals, which is different from the mixed target groups in the previous reviews. For example, Macedo 2014 (seven RCTs), whilst not pooling any data, identified some degree of effectiveness of resilience-training programmes. Similarly, Robertson 2015 (eight RCTs) found indications of benefit for personal resilience, mental health, well-being and work performance in employees. With the exception of well-being as well as job performance, which we did not examine here, these findings were confirmed by this review. With respect to the positive short-term effects for resilience and depressive symptoms up to three months post-intervention, our review is largely consistent with several meta-analyses, which also found small-to-moderate positive effects of resilience training on resilience up to three months post-intervention (Joyce 2018: 17 RCTs; Leppin 2014: 25 RCTs) and small proximal effects (≤ 1 month post-intervention) on psychological deficits (e.g. depressive symptoms) (Vanhove 2016: 14 RCTs). In contrast to Vanhove 2016, who also identified positive effects on well-being (≤ 1 month post-intervention), we found little or no evidence of an effect on this outcome. On the other hand, this result is consistent with Leppin 2014 (quality of life), whereas we found different evidence of training effects on depressive symptoms (small-to-moderate

reduction) compared with Leppin 2014 (no evidence of effect). The delayed effect on anxiety between post-test and short-term follow-up in our review is comparable with Vanhove 2016, who only found maintained effects of training for the prevention of psychological deficits at more than one month after training. Consistently with Leppin 2014, the study comparator was also not identified as an effect modifier in our review. Based on our subgroup analyses, we could not replicate the findings of previous reviews (Joyce 2018; Vanhove 2016), which identified advantages in favour of group versus individual settings (Vanhove 2016), individual setting and classroom-based (group) format versus computer-based delivery (Vanhove 2016), or positive effects of CBT-based, mindfulness-based and mixed interventions (Joyce 2018). This inconsistency might be explained by the limited number of studies in some subgroup analyses of our review, the weighting of subgroup analyses for certain subgroups (e.g. group setting), and the lack of studies in certain subgroups (e.g. online- and mobile-based delivery; CBT-based interventions). We also used a different definition of 'combined' interventions (i.e. other compilations than mindfulness and CBT) from Joyce 2018.

Studies or reviews in healthcare professionals

With respect to healthcare staff, 13 systematic reviews and one meta-analysis have so far synthesised the efficacy of resilience-training programmes in this target group, although not all of them have focused solely on interventions (see Why it is important to do this review). Comparable with our review, four previous publications examined healthcare workers in general (Cleary 2018) or combined healthcare professionals and students (Gilmartin 2017; Rogers 2016; Pezaro 2017). However, most only targeted certain subgroups of healthcare workers (e.g. nurses, midwives, physicians; Concilio 2019; Delgado 2017; Elliott 2012; Foster 2019; Fox 2018; Gillman 2015; Hunter 2016; Robertson 2016; Lavin Venegas 2019; Wright 2017). Similar to the problems for the reviews described above, most previous reviews in healthcare staff (except for Elliott 2012) also included study designs other than RCTs. The number of RCTs on resilience training was therefore rather limited (i.e. 0 to 9 RCTs among 5 to 33 included studies in the 14 reviews), in contrast with our review which identified 44 RCTs across various groups of healthcare staff. Since the review questions of some of the 14 reviews did not solely focus on the construct of resilience or on intervention studies, the primary studies included here did not always explicitly mention the intention of fostering resilience. Instead, broader mental health interventions (e.g. Gilmartin 2017) or programmes targeting aspects of care (e.g. Elliott 2012) were also considered, which renders comparisons with our review difficult.

This review is most comparable with Cleary 2018, who only included psychological interventions prospectively designed to enhance resilience and considered different groups of healthcare workers. The RCTs on resilience training in physicians (Mache 2015b; Mache 2016; Sood 2011; Sood 2014), nurses (Chesak 2015; Mealer 2014) and different hospital personnel (Klatt 2015), identified by Cleary 2018, were also included in our review, except for Rowe 2006 (additional reference to Rowe 1999) and Maunder 2010. Our searches also identified the latter two studies but we excluded them for the following reasons: We did not consider Maunder 2010 to be an RCT as the study involved a random assignment to three different doses of resilience intervention, but without a control group. We excluded Rowe 2006 due to an 'ineligible intervention', since the focus of the training did not seem to be on fostering hardiness (i.e. hardiness was only examined as a correlate of burnout as the main study outcome). With respect to the subgroup of physicians, the same applies to Fox 2018. The RCTs included here (Klatt 2015; Mache 2015a; Mache 2016; Mache 2017; Rowe 2000 (second reference to Rowe 1999); Sood 2011; Sood 2014) were also included in our review, except for Rowe 2000 (excluded for the same reasons as Rowe 2006). Furthermore, we found a large number of the non-RCTs reported in Cleary 2018 and Fox 2018 during the study identification process for our review. The only previous meta-analysis (Lavin Venegas 2019), which included 17 studies (4 RCTs) on resilience training in physicians, was not able to perform pooled analysis for resilience due to heterogeneity in study designs and outcome measures. With regard to burnout, meta-analyses were only performed for observational studies; one RCT (Dyrbye 2016) showed no evidence of a difference between resilience training and control for burnout. We did not include the latter study in our review, as resilience or a related construct was not mentioned in the publication. Lavin Venegas 2019 only conducted subgroup analyses for primary care physicians on the basis of two non-RCTs, and found no evidence of a difference for burnout. The findings of these two reviews are therefore hardly comparable, although some subgroup analyses of our review also had limited power and were heavily weighted for a certain subgroup.

AUTHORS' CONCLUSIONS

Implications for practice

There is very uncertain evidence that resilience interventions are effective in improving resilience or certain resilience-related factors such as optimism, self-reported symptoms of depression, and stress or stress perception at post-test (small and moderate effect sizes).

The generalisability and applicability of the available evidence is limited by the scarcity of studies with long-term follow-up, the divergent efficacy measures used to assess resilience, the heterogeneous design and content of interventions (with a dominance of high-intensity face-to-face interventions delivered in a group setting), and the limited geographical locations (i.e. high-income countries). In addition, we rated the certainty of the evidence from this review as being very low across all primary outcomes at post-test. We therefore cannot draw strong conclusions about the effects of resilience interventions, as the true effect may be markedly different from the estimated effect.

We know little about the longer-term effects of resilience training on most outcomes, because few studies included follow-up assessments. Booster sessions were not conducted in any of the included studies.

The limited evidence that resilience training improves well-being or quality of life and several resilience factors might indicate the need to adapt the current intervention techniques used.

Overall, the results of our review provide very uncertain evidence about whether resilience-training programmes may be helpful in stabilising and improving the mental health of healthcare professionals as an occupational group with high stressor exposure.

Implications for research

The findings of this review point to the need for further research of high methodological quality in order to determine the efficacy of resilience interventions in healthcare professionals.

For future research, a consensus on the definition of resilience and adequate outcome measures to be used consistently across the field would be important. Following the growing consensus on resilience as a dynamic outcome (Bonanno 2015; Kalisch 2017), intervention studies might be guided by this definition and examine resilience as a primary outcome (Chmitorz 2018). Due to only five studies measuring healthcare professionals' stressor exposure (Berger 2011; Cieslak 2016; Gelkopf 2008; Varker 2012; Wild 2016), it remains unclear whether healthcare professionals really benefit from resilience training by being better able to cope with stressors. Future studies should therefore measure resilience as a person's mental health in relation to individual stressor load. Only if the risk or stressor exposure (which is different from the subjective perception of stress) is assessed, may researchers gain knowledge about the changes in resilience by an intervention. In addition to the number of stressors, certain covariates such as the type of stressors (e.g. micro- versus macro-stressors, psychological versus physiological stressors, acute versus chronic stressors) or the perceived severity of stressors should be assessed.

Study designs; there is a need for improved comparators, at least treatment as usual (TAU) or ideally active and attention control (Chmitorz 2018), to allow fair comparisons between resilience intervention and control. As already suggested (Chmitorz 2018), resilience-training programmes could be implemented during or after the presence of a stressor. However, future studies should also use designs in which resilience training is provided prior to circumscribed stress situations (e.g. rotation of a physician to an emergency ward), in order to draw conclusions on resilience effects of the intervention, and to see whether the training does indeed improve resilience to the specific stress situation (Chmitorz 2018; Kalisch 2015). In general, pre- and post-assessments of the outcome indicators (e.g. for resilience) should be conducted, with future studies also filling the gap of longer follow-up periods and measuring the stressor exposure before, throughout and after the intervention. Also, it could be interesting to investigate whether booster sessions might help maintaining the effects of training over time. To ensure sufficient statistical power, the use of adequate sample sizes based on a priori analyses seems to be an urgent need in this field. Intervention studies might also benefit from comprehensive baseline diagnostics of mental health (e.g. clinical interview) and better reporting of eligibility criteria for pre-existing mental symptoms. This would allow for more precise conclusions about whether resilience training reduces (clinically relevant) mental symptoms. Furthermore, the conceptual implications of the resilience concept would require a baseline mental health assessment. In order to investigate the effects of interventions on resilience (i.e. mental health in relation to stressor load) and to determine a specific 'resilience pattern or trajectory' under consideration, the status of psychological functioning as an outcome of interest at baseline is important. For example, when researchers are interested in testing the effects of an intervention in stressor-exposed individuals on the resilience trajectory of sustained mental health (see also Description of the condition), they would have to prove a positive mental health level at baseline and at post-intervention. On the other hand, researchers considering a sample with elevated levels of mental symptoms at pre-test would be able to investigate the resilience trajectory of recovery or even of post-traumatic growth, i.e. an increased level of functioning compared to outset prior to stressors. Beyond RCTs, dismantling designs could be helpful in clarifying the efficacy of single components of resilience training.

In general, there is a need for better reporting of intervention studies using international guidelines such as the CONSORT statement (Schulz 2010). To guarantee higher transparency of study conduct and reporting, primary investigators could register trials or publish study protocols according to the SPIRIT guidelines (Standard Protocol Items: Recommendations for Interventional Trials; Chan 2013a; Chan 2013b).

Finally, future studies in this field should focus more on male participants and on employees above the age of 50. Research efforts should be intensified in low- and middle-income countries in order to reach more robust conclusions about the effectiveness of training across various settings. For certain formats of intervention (e.g. online- and mobile-based), more studies would be desirable.

In sum, there is still a need for additional evidence to answer the question about which resilience interventions are really effective in healthcare professionals and how they should ideally be implemented.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Alexander 2015

Study characteristics	
Methods	**Study design:** RCT
	Study grouping: parallel group
	Unit of randomisation: individuals

Alexander 2015 *(Continued)*

	Power (power & sample size calculation, level of power achieved): target recruitment and enrolment was 50 participants, with 25 in each group. This recruitment goal allowed for 10% attrition, with the expectation that 40 participants would complete the study; assumption based on a power analysis in G*Power, which indicated that for a repeated measures ANOVA with interaction effects, a minimum sample of 40 was needed to find significance with a moderate effect size (Cohen's f = 0.25), α = 0.05, power = 0.80, and an estimated correlation among repeated measures of 0.40 **Imputation of missing data:** not applicable since all participants remained in the study
Participants	**Country:** USA **Setting:** urban (560-bed) teaching hospital as host of yoga research study **Age:** mean = 46.38 (SD = 10.23) years **Sample size (randomised):** 40 **Sex:** 39 women, 1 man **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** in MBI: burnout, emotional exhaustion: IG = 17.60 (10.36), CG = 20.40 (13.19); burnout, depersonalisation: IG = 4.05 (5.09), CG = 4.35 (3.83); burnout, personal accomplishment: IG = 37.15 (8.53), CG = 36.10 (9.93) **Population description:** nurses within partner hospital system **Inclusion criteria:** 1) being a nurse within the partner hospital system; 2) no prior experience with yoga practice; 3) willingness to complete 8 weekly sessions and homework exercises; 4) willingness to be randomly assigned to IG or CG **Exclusion criteria:** 1) serious illness or major orthopedic diagnoses of the neck, back, pelvis, or lower extremities that could interfere with completion of the yoga intervention protocol **Attrition (withdrawals and exclusions):** information received from authors (Alexander 2019 [pers comm]): all participants remained in the study **Reasons for missing data:** not relevant

Interventions	**Intervention:** yoga intervention (supervised yoga instruction) (n = 20)
	
	• *delivery*: face-to-face; probably group setting; handouts for each session to provide further information and a visual reminder of the exercises (basis for cultivating home practice)
	• *providers*: experienced yoga instructor, (osteopathic physician in the local community), who has provided health promotion services and yoga instruction in the Kundalini tradition through a wellness-based community practice for more than 27 years
	• *duration of treatment period and timing*: 8 weeks; homework exercises
	• *description*:
	  ◦ EMPHASIS: to provide participants with self-care tools to manage and reduce stress; one tool = enhanced self-awareness, helping individuals become more aware of the simple, unconscious, daily activities, and functions that have a cumulative impact on health and well-being. Throughout the day, most individuals' awareness is focused on activities outside the body while little attention is given to internal sensations and thoughts. Consequently, most bodily functions, such as breathing, are done unconsciously. Conscious awareness of the way in which one sits, stands, breathes, and thinks is crucial to improving the response to mental and physical stress. By teaching individuals how to observe themselves, many bodily and mental functions improve without strenuous or time-consuming exercise or activities
	  ◦ EARLY YOGA SESSIONS: participants learn to become conscious of their breathing; breathing = both a conscious and unconscious process and therefore gives conscious access to the autonomic nervous system. Inhalation stimulates the sympathetic nervous system, while exhalation stimulates the parasympathetic nervous system. When one inhales, heart rate increases and when one exhales, heart rate decreases. Practicing mindful breathing allows individuals to calm the body and mind immediately, thereby decreasing stress or energising the nervous system if one feels fatigued or depressed

Alexander 2015 *(Continued)*

- THROUGHOUT INTERVENTION: participants are taught the basics of postural alignment, deep breathing, and monitoring the mind with simple meditations. Each session concludes with deep relaxation. As the series progresses, additional exercises, breathing practices, and meditations are added to expose participants to the wide range of movements that can work not only the skeletal muscles but also other body systems such as the internal organs, nervous system, circulation, and emotions

- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: yoga

Control: treatment as usual (not further specified) (n = 20)

Outcomes

Outcomes collected and reported:

- health-promoting behaviours - Health Promoting Lifestyle Profile II
- mindfulness - Freiburg Mindfulness Inventory
- burnout, emotional exhaustion - MBI
- burnout, depersonalisation - MBI
- burnout, personal accomplishment - MBI

Time points measured and reported: 1) pre-intervention; 2) post-intervention

Adverse events: not specified

Notes

Contact with authors: We contacted authors to get the information about potential attrition and missing data in the study as well as the number of participants analysed for the outcomes reported in Table 3 (Alexander 2019 [pers comm]).

Study start/end date: not specified

Funding source: following financial support for the research, authorship, and/or publication of this article: research supported by the Research and Creative Activities Fund of Texas Christian University

Declaration of interest: no potential conflicts of interest with respect to the research, authorship, and/or publication of this article

Ethical approval needed/obtained for study: approved by the IRB at the affiliated university

Comments by study authors: not specified

Miscellaneous outcomes by the review authors: information received from authors (Alexander 2019 [pers comm]): all participants remained in the study
Correspondence: Gina K. Alexander, PhD, Assistant Professor, Texas Christian University, Harris College of Nursing and Health Sciences, TCU Box 298620, Fort Worth, Texas 76129, USA; g.alexander@tcu.edu

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "After individuals completed consent forms and baseline assessments, they were enrolled in the study and randomized to the intervention (yoga) or usual care control group." Quote: "no significant differences in demographics were found between the control and experimental groups, suggesting that the two groups were similar in demographic makeup and the research team did not need to control for demographic characteristics in the primary analyses."

Alexander 2015 *(Continued)*

		Quote: "No significant differences between the intervention and control groups were found at baseline (p > .05)." Judgement comment: insufficient information about random sequence generation to permit judgment of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for sociodemographic characteristics and outcome variables (P > .05) on the basis of analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Judgement comment: information received from authors: all participants remained in the study
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Berger 2011

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** Israel **Setting:** well baby clinics **Age:** mean = 48.5 (SD = 7.26) years **Sample size (randomised):** 80 **Sex:** 80 women **Comorbidity (mean (SD) of respective measures in indicated, if available at baseline):** baseline results for secondary traumatisation factors (ProQOL scale) compared to norms based on 2 large-scale studies, of CP samples and MHCPs in the USA: higher levels of compassion fatigue (22.5% in this sample vs 13% in CP and 13.2% in the MHCP) and burnout (32.5% in this sample vs 23% in CP and 13% in

Berger 2011 *(Continued)*

	MHCP) and higher levels of lack of compassion satisfaction (68.7% in this sample vs 37.0% in CP and 39.3% in MHCP) **Population description:** 90 well baby clinic nurses living under chronic threat of war and terror; from the most affected areas in the north and the south of Israel **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified

Interventions	**Intervention:** well baby clinic staff preparedness programme (n = 42)
	
	• *delivery*: face-to-face; group sessions (15 - 20 nurses); each session: included theoretical knowledge of various topics, experiential exercises where the examples from the nurses' work or personal life experience were shared, learned skills which were practised during the session and homework assignments in-between sessions
	• *providers*: not specified
	• *duration of treatment period and timing*: 12 weekly 6-hour sessions; homework assignments between sessions; three x 5-hour supervision sessions held monthly after the intervention
	• *description*:
	  ○ SESSION 1 – Identifying personal resources: establishing a safe and secure atmosphere, setting goals and expectations and identifying WBC nurses' personal resource profiles. Nurses' tasks: observe and monitor one's own coping strategies at home and in the clinic
	  ○ SESSION 2 – Strengthening and learning new coping skills: learning how to strengthen their natural resources as well as acquiring new sensory-motor, cognitive and emotional coping skills in deficient areas. Nurses' tasks: practise the new skills at home and in the clinic with the parents
	  ○ SESSION 3 – Attachment theory and child-parent relationship: overview of attachment theory including normative and abnormal transitions based on research and current developmental theories. Nurses' tasks: observe and monitor distressed children at home and in the clinic
	  ○ SESSION 4 – The phenomenology of traumatised young children: overview of stressful and traumatised infants and toddlers with a focus on developmental issues, child-parent relationships and attachment patterns. Nurses' tasks: observe and monitor distressed children at home and in the clinic
	  ○ SESSION 5 – Establishing safety and security for young children: learning how to help parents foster a safe and secure environment for their children, particularly during stressful and traumatic periods. Nurses' tasks: instruct and demonstrate safety-inducing techniques to parents
	  ○ SESSION 6 – Assisting parents to stabilise and soothe young children: learning how to teach parents relaxation and affect-modulation strategies for distressed infants and children. Nurses' tasks: practise and model the strategies in the clinic with parents
	  ○ SESSION 7 – Acknowledging and containing the emotional world of young children: sensitising parents to the emotional reactions of children during traumatic stress and teaching them emotional containment techniques. Nurses' tasks: practise learned techniques in the clinic with parents
	  ○ SESSION 8 – Helping parents deal with children's fears: gaining knowledge about age-appropriate fears and learn ways to normalise and encourage parents to tolerate and handle them. Nurses' tasks: practise strategies to handle the children's fears in the clinic with parents
	  ○ SESSION 9 – Anger, rage and aggressive behaviour of children: learning the role of aggression and anger in children during traumatic situations and ways to set limits and express anger in a con-

Berger 2011 *(Continued)*

structive manner. Nurses' tasks: practise ways to deal with anger and behavioural problems with parents

- SESSION 10 - Building a social shield: acknowledging the importance of social support during traumatic stress and learning ways to assist parents and themselves to seek social support. Nurses' tasks: explore ways to strengthen nurses' peer support as well as enhancing parents' social support
- SESSION 11 – Preventing secondary traumatisation and burnout: Providing an overview of signs of secondary traumatisation and burnout and exploring the underlying mechanisms. Learning techniques to prevent and decrease these phenomena. Nurses' tasks: practise the learned techniques
- SESSION 12 - Seeking a better future: reviewing all the skills and techniques that were learned in the programme and planning how to use them further in the future. Nurses will be given an opportunity for closure. Nurses' tasks: establish a stress-prevention programme for young children and their parents and apply it within the clinic
- AIMS: provide nurses with psycho-educational knowledge pertaining to stress and trauma in infants and young children, to provide them with screening tools for identifying children and parents at risk of developing stress-related problems, equip them with stress management techniques for both children and adults; included knowledge about attachment theory and the development of the child-parent relationship, the processing of stressful and traumatic experiences, identifying personal strengths and acquiring new coping techniques; nurses learned and practised self-maintenance tools including skills such as breathing, meditation, relaxation, physical exercises, self-affirmation and guided imagery; techniques were taught and applied so as to enhance staff team-building and mutual support

- *compliance*: 37 (88.2%) participated in all sessions, 3 (7.1%) participated in 11 sessions, and 2 (4.7%) participated in 10 sessions
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: designed by the first author in collaboration with the well baby clinic's chief nurse and the regional supervisors; based on a need assessment performed by the regional supervisors; modules chosen were intended to address the difficulties reported by the well baby clinics' nurses during the war (insufficient personal resources to cope with traumatic conditions, minimal knowledge about stress and trauma in young children, lack of techniques to deal with acutely-stressed children and their parents); some of the work was based on a resiliency manual for elementary school children developed by the authors (e.g. Berger 2007)

Control: wait-list control (n = 38)

Outcomes

Outcomes collected and reported:

- professional sense of self-efficacy - Disaster-Helper Self-Efficacy Scale
- secondary traumatisation, (lack) of compassion satisfaction - ProQOL
- secondary traumatisation, burnout - ProQOL
- secondary traumatisation, compassion fatigue - ProQOL
- self-esteem - Rosenberg self- esteem scale
- hope - Hope Scale
- sense of mastery - Mastery Scale

Time points measured and reported: 1) pre-intervention; 2) 3-month follow-up (3 months post-intervention during follow-up session)

Adverse events: not specified

Notes

Contact with authors: no correspondence required

Study start/end date: intervention took place between February and May 2007; exact study dates not specified

Funding source: funding of the intervention by the ministry of health (no other roles)

Declaration of interest: none declared

Ethical approval needed/obtained for study: ethical approval by University of Haifa ethics committee

Berger 2011 *(Continued)*

Comments by authors: not specified

Miscellaneous outcomes by the review authors: not relevant

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "From the 80 who agreed, using a random number generator procedure, 42 WBC nurses received the intervention, while 38 were put on a control condition waiting list (WL)." Quote: "The demographic and exposure data are presented in Table 1. Univariate analyses comparing all the demographic and exposure variables showed no significant differences between the groups." Judgement comment: The investigators describe a random component in the sequence generation process (random-number generator) and there is verified baseline comparability of groups for demographic and exposure variables.; baseline comparability for outcome variables unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (unclear if there were any missing data and if missing data were imputed, for example)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available, but it is clear that the published report includes all expected outcomes, including those that were prespecified

Bernburg 2016

Study characteristics

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified

Bernburg 2016 *(Continued)*

	Imputation of missing data: not specified
Participants	**Country:** Germany **Setting:** department of paediatric clinics (of 10 hospitals) **Age:** mean = 27 (SD = 2.1) years **Sample size (randomised):** 54 **Sex:** 38 women, 16 men **Comorbidity (mean (SD) of respective measures in indicated, if available at baseline:** not specified **Population description:** junior physicians working in department of paediatric clinics from 10 hospitals **Inclusion criteria:** 1) employment in paediatrics; 2) working full-time in a hospital; 3) work experience of < 2 years; 4) being able and willing to participate; 5) agreement to complete 3 questionnaires **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** high response rate; dropout rate (loss to follow-up) was very low; number of withdrawals or exclusions not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** PCT (n = 26) • *delivery*: face-to-face; group sessions (2 training groups); theoretical input, watching videos, oral group discussions, experimental exercises, and home assignments • *providers*: 2 qualified psychologists, both trained in cognitive-behavioral and solution-focused work performed the PCT in 2 training groups • *duration of treatment period and timing*: 12 x 1½-hour weekly sessions • *description*: focused on current working situations and problems, coping strategies, and support between colleagues and future professional goals ◦ SESSIONS: (1) introduction: "working life of a paediatrician", (2) first work experiences in paediatrics, (3) and (4) psychosocial skills for paediatricians (mindfulness, self-awareness, resilience), (5) handling conflict in the work setting, (6) seeking guidance about one's own clinical performance in paediatric medicine, (7) relaxation techniques (progressive muscle relaxation), (8) organisational culture, reporting one's own mistakes and dealing with mistakes caused by others, (9) communication in the hospital setting, (10) dealing with difficult decisions, social support, how to speak up to supervisors and senior physicians, (11) self-care, coping with work-related stress, and (12) session evaluation • *compliance*: not specified • *integrity of delivery*: not specified • *economic information*: not specified • *theoretical basis*: psychosocial skills training, combined with cognitive-behavioural and solution-focused counselling **Control:** no intervention; comparison group did not receive any support related to the intervention topic such as any other psychosocial skills training, counselling, or therapy (n = 28)
Outcomes	**Outcomes collected and reported:** ***Primary outcome*** • job satisfaction - Copenhagen Psychosocial Questionnaire • perceived stress - Perceived Stress Questionnaire • work engagement - short version Utrecht Work Engagement Scale

Bernburg 2016 *(Continued)*

	Time points measured and reported: 1) pre-intervention; 2) post-intervention (after 3-month intervention); 3) 3-month follow-up (3 months post-intervention/6 months after baseline) **Adverse events:** not specified
Notes	**Contact with authors:** no correspondence required **Study start/end date:** performed between May 2014 to October 2014 **Funding source:** no funding support **Declaration of interest:** no conflicts of interest declared **Ethical approval needed/obtained for study:** ethical approval by the Free University Berlin **Comments by authors:** not specified **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Monika Bernburg: akinomber@hotmail.com; corresponding author: Stefanie Mache, Institute of Occupational Medicine, Social Medicine and Environmental Medicine, Goethe-University, Theodor-Stern-Kai 7, 60590 Frankfurt am Main, Germany; Institute for Occupational and Maritime Medicine (ZfAM), University Medical Center Hamburg-Eppendorf, Seewartenstrasse 10, 20459 Hamburg, Germany; s.mache@uke.de

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Study participants were randomized into two groups (intervention and comparison group): (1) names of the pediatricians were listed in alphabetical order and (2) afterwards each name got a random number. The numbers had been allocated from number tables to the intervention or comparison group." Quote: "The fact that, although the comparison group and the intervened group shared similar levels of perceived job stress at baseline" Quote: "Baseline data on socio-demographic differences indicate only small, insignificant differences between our intervention and comparison group." Judgement comment: The investigators describe a random component in the sequence generation process (random-number table) and there is verified baseline comparability of groups for some sociodemographic variables and perceived stress.; baseline comparability for other outcome variables (job satisfaction, work engagement) unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment (online questionnaires); but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)

Bernburg 2016 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote: "The high response rate in this study demonstrates a further strength: the drop-out rate (loss to follow-up) was very low." Judgement comment: insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (dropout rate is unclear; unclear if missing data were imputed, for example)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available, but it is clear that the published report includes all expected outcomes, including those that were prespecified

Bernburg 2019

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** no imputation of missing data; per-protocol analysis (i.e. without the 6 participants who were excluded due to sickness absence)
Participants	**Country:** Germany **Setting:** nurses working in psychiatric hospital departments; training modules conducted off-duty; training setting not specified **Age:** mean = 32.03 (SD = 2.4) years **Sample size (randomised):** 92 **Sex:** 69 women, 17 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** perceived stress in PSQ: IG = 3.34 (0.49), CG = 3.49 (0.50) **Population description:** nurses working in psychiatric hospital departments **Inclusion criteria:** 1) employment as a full-time nurse in a psychiatric hospital department; 2) time to take part in the study over the whole time period; 3) written consent to finish the surveys (at baseline and 3 follow-up periods) **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** 6 exclusions (group not specified) **Reasons for missing data:** sickness absence (n = 6)
Interventions	**Intervention:** mental health promotion intervention (n = not specified; after n = 6 total exclusions: n = 44) • *delivery*: face-to-face group setting (researchers included 4 groups; group size approximately 10 - 12 nurses); all training modules involve theoretical input, watching videos, oral group discussions, experimental exercises, home assignments

Bernburg 2019 *(Continued)*

- *providers*: 2 certified instructors (registered and accredited as psychotherapists) performed the training; with sufficient qualifications in cognitive behavioral therapy and systemic/solution-focused brief therapy in group settings
- *duration of treatment period and timing*: 12 weekly 1½ - 2-hour sessions; sessions performed off-duty
- *description*:
  - focused on current working situations and problems, coping strategies, and support between colleagues and future professional goals
  - includes work-related stress management training, problem-solving techniques, solution-focused counselling
  - CONTENT OF TRAINING MODULES:
    - 1. UNIT Introduction: opening, psycho-educational information and discussion on the topic: working as a nurse/Psychiatry
    - 2./3. UNIT: module on work-related problems and strategies to solve problems in the working context of nurses in Psychiatry
    - 4./5. UNIT: module on relaxation techniques, emotion regulation techniques, cognitive strategies, acceptance, and tolerance of emotions and effective self-support
    - 6./7. UNIT: module on conflict management at work: conflict types and conflict handling in the hospital setting
    - 8. UNIT: module on planning for the future: looking for supervision and feedback on one's own job performance
    - 9. UNIT: module on communication for nurses: how to improve communication with patients, colleagues and supervisors in the hospital setting
    - 10. UNIT: module on organisational hospital culture: i.e. how to report mistakes to colleagues and supervisors and dealing with mistakes
    - 11. UNIT: module on social support: how to use social support during work, how to handle difficult work situations
    - 12. UNIT: overall training evaluation by the participating nurses
- *compliance:*
  - n = 6 excluded due to sickness absence (not specified which group)
  - satisfaction with training: participants give good and satisfied grades; overall satisfaction score: 1.39; all nurses verify that training was worth attending (mean = 5.21) and that they have learnt something meaningful and important in this course (mean = 4.31); training motivated them to train and practise the content offered (mean = 4.87)
- *integrity of delivery*: not specified
- *economic information*: not specified; training sessions were performed off-duty
- *theoretical basis*: designed on basis and values of i.e. mindfulness and acceptance training, cognitive behavioural training and solution-focused group work (Wise 2012)

Control: wait-list control (n = not specified; after n = 6 total exclusions: n = 42); no training, but answers to all surveys included in the study

Outcomes

Outcomes collected and reported:

Primary outcome

- perceived stress - PSQ

Secondary outcome

- resilience - Brief Resilient Coping Scale self-efficacy - Self-Efficacy, Optimism and Pessimism
- emotion regulation skills, comprehension - Emotion Regulation Skills Questionnaire (ERSQ-27)
- emotion regulation skills, acceptance - ERSQ-27
- emotion regulation skills, self-support - ERSQ-27
- relationship to patients, support - German Quality of Relationship Inventory (QRI)
- relationship to patients, conflict - QRI
- relationship to patients, depth - QRI

Bernburg 2019 *(Continued)*

	Time points measured and reported: 1) pre-intervention; 2) post-intervention (at 3 months, i.e. at the end of 3-month intervention; follow-up 1); 3) 3-month follow-up (at 6 months, i.e. 3 months after end of 3-month intervention; follow-up 2); 4) 9-month follow-up (at 12 months, i.e. 9 months after 3-month intervention; follow-up 3) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors to ask about the number of exclusions per group and whether it is correct that they performed per-protocol analysis with n = 44 in IG and n = 42 in CG for the outcomes reported in Table 2 (Mache 2019a [pers comm]). **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** no conflict of interest to disclose **Ethical approval needed/obtained for study:** not specified **Comments by authors:** not specified **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Monika Bernburg: akinomber@hotmail.com; corresponding author: Stefanie Mache, Institute of Occupational Medicine, Social Medicine and Environmental Medicine, Goethe-University, Theodor-Stern-Kai 7, 60590 Frankfurt am Main, Germany; Institute for Occupational and Maritime Medicine (ZfAM), University Medical Center Hamburg-Eppendorf, Seewartenstrasse 10, 20459 Hamburg, Germany; s.mache@uke.de

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "This study is designed as randomized controlled pilot study." Quote: "Afterwards, these nurses were randomized into two study groups through a computer-generated algorithm." Quote: "Socio-demographics are illustrated in Table 1. We found no significant differences between intervention and WCG with regard to gender, age, and working experience." Judgement comment: The investigators describe a random component in the sequence generation process (computer-generated algorithm) and there is verified baseline comparability of groups for sociodemographic characteristics (see Table 1); baseline comparability for outcomes (i.e. statistical (non) significance in Table 2) not specified
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment (online surveys); however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)

Bernburg 2019 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Due to sickness absence, six nurses were excluded. So in the end, 44 nurses were included in the intervention group (IG) and 42 nurses took part in the waitlist control group (WCG)." Judgement comment: reasons for missing data unlikely to be related to true outcome (see reasons for missing data: sickness absence); number of participants randomised to each group and excluded from each group not stated; per-protocol analysis (only participants who took part in 2 groups)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Calder Calisi 2017

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** power not specified; small sample size of pilot study a limitation, as does not allow for a large enough change between the 2 groups pre- and post-intervention **Imputation of missing data:** no imputation of missing data; per-protocol analysis (i.e. 7 dropouts excluded)
Participants	**Country:** USA **Setting:** Massachusetts General Hospital **Age:** range = 27 - 60 years **Sample size (randomised):** 53 **Sex:** 53 women (nurses) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** state anxiety (State Trait Anxiety Inventory, STAI): IG = 38.40 (6.65), CG = 38.14 (7.56); anxiety (Visual Analog Scale, VAS; range = 0 (no anxiety) to 7 (most anxiety)): IG = 3.92 (1.44), CG = 3.59 (1.26); depression (VAS; range = 0 - 7): IG = 2.68 (1.49), CG = 2.86 (1.58) **Population description:** (cardiac) nurses **Included criteria:** not specified **Excluded criteria:** not specified **Attrition (withdrawals and exclusions):** 7 (13.2%) discontinued the study **Reasons for missing data:** not specified as participants provided no reasons for withdrawing a
Interventions	**Intervention:** Relaxation Response (RR) (n randomised = not specified; after 7 dropouts, n = 24) • *delivery*: combined setting: face-to-face (in-service), group setting (classes) + individual training of relaxation technique at home • *providers*: not specified for in-service in RR; self-guided training over 8 weeks • *duration of treatment period and timing*: 8 weeks in total: single 45-minute session (in-service) + individual daily practice (exercises for 10 - 20 minutes, twice day) for 8 weeks

Calder Calisi 2017 *(Continued)*

- *description*:
  - relaxation technique created by Benson
  - IN-SERVICE regarding RR: nurses learn about benefits and utilisation of RR in their personal lives and practise actual technique in the class
  - 8 WEEKS: participants encouraged to do breathing exercises for 10 - 20 minutes, twice a day, for 8 weeks and to keep journal of their relaxation breathing sessions; RR consists of diaphragmatic breathing pattern and a repetitive mental focus that breaks the train of everyday thought
- *compliance*: not specified; n = 7 withdrew from study in general; all data were accepted in the study, i.e. also from nurses in IG who may have completed fewer than the suggested number of relaxation sessions
- *integrity of delivery*: not specified; participants keep journal of their relaxation breathing sessions
- *economic information*: not specified
- *theoretical basis*:
  - relaxation; developed by Dr Herbert Benson (Benson 2000)
  - RR = complementary therapy that supports holistic self-care, including the physical, emotional, mental, and spiritual aspects of the individual
  - Theoretical framework of the study as whole: Watson's Theory on Human Caring: value of "transpersonal caring" or the interaction between the caregiver and the care receiver through various interventions to induce positive change in patients' lives

Control: wait-list control (n randomised not specified; after n = 7 dropouts: n = 22; eligible to receive the class at the end of the study, if they so desired)

Outcomes

Outcomes collected and reported:

- state anxiety - STAI
- trait anxiety - STAI
- anxiety - VAS/Semantic differential scales
- depression - VAS/Semantic differential scales
- work-related stress - VAS/Semantic differential scales
- well-being - VAS/Semantic differential scales
- confidence to teach - VAS/Semantic differential scale

Time points measure and reported: 1) pre-intervention; 2) post-intervention

Adverse events: not specified

Notes

Contact with authors: We contacted the authors to receive the means and SDs for all outcomes at post-intervention (instead of change scores), but received no response to 2 inquiries

Study start/end date: not specified
Funding source: Make a Difference Grant at Massachusetts General Hospital
Declaration of interest: not specified
Ethical approval needed/obtained for study: approved by hospital IRB
Comments by study authors: not specified
Miscellaneous outcomes by the review authors: not relevant
Correspondence: Catherine Calder Calisi, Massachusetts General Hospital, 36 Arrowwood Street, Methuen, Massachusetts 01844; ccalder1@partners.org

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "This pilot study used a randomized, wait-list control, quantitative study design" Quote: "The nurses who agreed to voluntary participation were randomized into either the wait-list control group or the intervention group."

Calder Calisi 2017 *(Continued)*

		Quote: "As shown in Table 1, the two study groups were well balanced at baseline with respect to state-trait anxiety as well as the semantic differential scale measures of anxiety, depression, well-being, work-related stress, and confidence teaching the RR." Judgement comment: insufficient information about random sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for outcome variables on the basis of analysis (see Table 1; all P values > 0.31); baseline comparability for sociodemographic characteristics not specified
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (in part face-to-face intervention in class) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Forty-six nurses (all female) completed the study (24 nurses in the intervention group and 22 nurses in the control group) of the 53 registered nurses who enrolled in the study." Quote: "However, 7 participants (13.2%) discontinued the study without providing reasons for withdrawal." Judgement comment: unclear if reasons for missing data are related to true outcome (number of participants randomised to each group is not stated; n = 7 dropouts, but unclear which group); per-protocol analysis (i.e. only participants who completed the study)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available, but it is clear that the published reports include all expected outcomes, including those that were prespecified

Chesak 2015

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** no imputation of missing data; per-protocol analysis with participants who complied with allocated intervention and for whom outcomes were obtained
Participants	**Country:** USA **Setting:** nurse orientation programme at Mayo Clinic

Chesak 2015 *(Continued)*

Age: mean = 28.16 (SD = 8.29) years

Sample size (randomised): 55

Sex: 38 women, 2 men (in analysed sample)

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: anxiety GAD-7: IG = 3.11 (2.76), CG = 4.25 (2.77)

Population description: nurses who were new to the institution or transitioning to a new unit or new role and who were undergoing new-nurse orientation

Inclusion criteria: 1) registered nurses (RN) who were enrolled in 1 of 2 designated nurse orientation classes; 2) RNs who were willing and able to participate in all aspects of the study; 3) RNs who were provided with, understood, and signed the informed consent

Exclusion criteria: 1) if they reported currently or recently (within the past 6 months) experiencing a psychotic episode; 2) if they reported a clinically significant acute psychiatric event, or a physical illness

Attrition (withdrawals and exclusions): 4 withdrawals before the intervention (IG = 2, CG = 2); total number of withdrawals: n = 15 (IG = 8/27 (29.6%), CG = 7/28 (25%)); i.e. 40 completed the study (IG = 19, CG = 21)

Reasons for missing data: 4 withdrawals before the intervention: declined to participate in allocated group prior to first group session; not exactly specified for further withdrawals (nurse participants who voluntarily dropped out of the study: inability to make time for the programme)

Interventions

Intervention: Stress Management and Resiliency Training (SMART) (n = 27)

- *delivery*: face-to-face session; handouts on each of the topics via email
- *providers*: study investigator; not further specified
- *duration of treatment period and timing*: single 90-minute session; 1-hour follow-up session after 4 weeks; bi-weekly handouts
- *description:*
  - presentation of a model of stress and resilience, integrating neuroscience and biology (during single session)
  - based on this model, mind-body approaches to managing stress were discussed, including developing intentional attention and practising gratitude, compassion, acceptance, forgiveness, and higher meaning
- *compliance*: n = 27 randomised; n = 2 declined to participate in intervention (after randomisation); All 25 participants in the intervention group participated in the first group session. Only 4 participants were present at the follow-up session for the intervention group, mainly because of scheduling issues
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: SMART programme developed at Mayo Clinic by a physician in the Division of Complementary and Integrative Medicine who has extensive experience in the field of resiliency training; the programme is designed to help participants understand the neuroscience and biology of stress. From that understanding, participants learn skills to develop intentional attention and reframe life experiences using the 5 core principles of gratitude, compassion, acceptance, forgiveness, and higher meaning.
- *economic information*: not specified

Control: active control (n = 28)

- *delivery*: lecture
- *providers*: not specified
- *duration of treatment period and timing (frequency, duration of each session)*: not specified
- *description*: lecture associated with the nursing orientation programme that covered topics related to stress, including reality shock and work-life connectedness
- *compliance*: n = 28 randomised; n = 2 declined to participate in control (after randomisation), 26 took part in the control group

Chesak 2015 *(Continued)*

- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: not specified

Outcomes	**Outcomes collected and reported:** ***Primary outcome*** • perceived stress - Perceived Stress Scale • mindfulness - Mindful Attention Awareness Scale • anxiety - GAD-7 • resilience - Connor-Davidson Resilience Scale **Time points measured and reported:** 1) pre-intervention; 2) 3-month follow-up (3 months after single-session intervention) **Adverse events:** not specified
Notes	**Contact with authors:** no correspondence required **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** Dr Sood has a proprietary interest in a company that teaches resiliency programmes. The other authors have no financial or proprietary interest in the subject matter of this article. **Ethical approval needed/obtained for study:** IRB-approved trial **Comments by authors:** not specified **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Sherry S. Chesak, PhD, Department of Nursing, Mayo Clinic, 200 First St. SW Rochester, Minnesota 55905Tel: (507) 255-3236; chesak.sherry@mayo.edu

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Participants were randomized into either the intervention or control group through the use of a random number generator." Judgement comment: The investigators describe a random component in the sequence generation process (random-number generator); no information about comparability of groups at baseline or respective analysis (statistical (non)significance of differences in demographic variables unclear; baseline comparability for outcome variables not specified
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment (online questionnaires); however, due to potential performance bias (no blinding of participants), the review authors judge that the partici-

Chesak 2015 *(Continued)*

		pants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "55 consented and were randomized - 27 into the intervention arm and 28 into the control arm. Prior to the first group session, 2 participants from each group declined to participate." Quote: "Analysis was restricted to participants who completed the study, including all follow-up assessments." Quote: "Forty subjects (19 intervention, 21 control) completed the baseline and follow-up assessments. Some subjects did not complete all scales at both time points. Data are presented only for those who completed the given scale at both baseline and follow-up." Judgement comment: reasons for missing data unlikely to be related to true outcome with relative balance in missing data between groups (IG: n = 8, CG: n = 7); no reasons for missing data stated for each group; per-protocol analysis with participants who complied with allocated intervention and for whom outcomes were obtained
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available, but it is clear that the published report includes all expected outcomes, including those that were prespecified

Cheung 2014

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** Based on a small effect size of Cohen's d = 0.2 for the outcome measures, and an attrition rate of 30% during the 6-month follow-up, sample sizes of 259 in each arm could achieve a power of 0.80 to detect a significant difference. A total sample of 518 was needed (Machin 1997); however, interest from the AMS was higher than expected and the total sample size immediately pre-training (n = 802) was higher than the sample size that was needed **Imputation of missing data:** no imputation of missing data; per-protocol analysis (only participants who completed allocated intervention, i.e. without 2 participants in IG who did not complete PFA intervention) and available case analysis (only participants for whom outcomes were obtained)
Participants	**Country:** China (including Hong Kong) **Setting:** AMS of the Hong Kong Special Administrative Region **Age:** mean = 37.38 (SD = 11.78) years **Sample size (randomised):** 918 **Sex:** 412 women, 391 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** general psychopathology in GHQ-28: IG = 0.67 (0.31), CG = 0.60 (0.32); psychological distress in DASS-21: IG = 0.80 (0.57), CG = 0.76 (0.57); distress from traumatic exposure IES-R: IG = 0.68 (0.64), CG = 0.60 (0.67); signif-

Cheung 2014 *(Continued)*

icantly higher depression and anxiety symptoms than normative sample of university students (P < 0.001); significantly lower stress symptoms than normative sample (P < 0.001)

Population description: members of AMS of the Hong Kong Special Administrative Region, a government division responsible for providing voluntary supplementary medical and health service in times of community emergency; voluntary first responders of the AMS with and without previous trauma exposure

Inclusion criteria: 1) first responders, including fire fighters, police, ambulance officers, rescuers and auxiliary medical personnel; 2) with and without previous trauma exposure (see appendix of the publication, information from trial registration)

Exclusion criteria: interested individuals with psychiatric history or current diagnosis of psychiatric disorders (see appendix of the publication, information from trial registration)

Attrition (withdrawals and exclusions): between randomisation and pre-intervention assessment: 116 withdrawals (IG = 63, CG = 53); between pre- and post-intervention (during training): 2 withdrawals (IG = 2); 67 withdrawals between post-intervention and 3-month follow-up (IG = 29; CG = 38); 109 withdrawals between 3-month follow-up and 6-month follow-up (IG = 45; CG = 64); completion rate for total trial (i.e. from pre-intervention assessment to 6-month follow-up): IG = 80%, CG = 75%

Reasons for missing data: not specified

Interventions

Intervention: PFA (n = 458)

- *delivery*: face-to-face; group sessions; didactic lecture, group discussions, simulation role-play exercises
- *providers*: all sessions conducted by author, who is registered clinical psychologist in Hong Kong and has frontline experience in offering psychological support to disaster survivors
- *duration of treatment period and timing*: 1-day 7-hour training
- *description*:
  - content developed and based on 8 core actions:
    - 1) CONTACT AND ENGAGEMENT: how to approach people in need
    - 2) SAFETY AND COMFORT: emphasises principles of safety and comfort of the individuals and protection of survivors from additional traumatic experiences
    - 3) STABILISATION: describes stabilisation and grounding techniques for calming emotionally overwhelmed survivors
    - 4) INFORMATION GATHERING: gathering of necessary information about the current situations and services available
    - 5) PRACTICAL ASSISTANCE: highlights how to offer practical assistance and discuss with individuals what they can do for themselves
    - 6) CONNECTION WITH SOCIAL SUPPORTS: connect individuals with their social support
    - 7) INFORMATION ON COPING: to some individuals, knowing the normal stress reactions and learning some relaxation skills helped them cope with abnormal situations
    - 8) LINKAGE WITH COLLABORATIVE SERVICES: for severely disturbed people, 8th core action is about referrals and links to existing services in the community for long-term follow-up; 3 simulation role play exercises with scenarios relevant to Hong Kong situation to practice core actions; discussion of responder's self-care and taking care of each other in the field
  - PART 1 (120 minutes): pre-programme assessment; welcome and introduction; introduction of PFA knowledge on disaster mental health; PFA core action 1. contact and engagement; PFA core action 2. safety and comfort; PFA core action 3. stabilisation; scenario-based simulation role-play exercise: flooding in a fishing village
  - PART 2 (90 minutes): PFA core action 4. information gathering: current needs; PFA core action 5. practical assistance; scenario-based simulation role-play exercise: fire disaster happened in a 20-storey residential building in downtown
  - PART 3 (90 minutes): PFA core action 6. connection with social supports; PFA core action 7. information on coping; PFA core action 8. linkage with collaborative services;
  - PART 4 (120 minutes): self and team care; scenario-based simulation role-play exercise: airport disaster; post-programme assessment

Cheung 2014 *(Continued)*

- *compliance*: 393/395 completed the intervention, n = 2 dropouts (see flow chart)
- *integrity of delivery*: not specified
- *economic information (intervention cost, changes in other costs as result of intervention)*: not specified
- *Theoretical basis*: Chinese translation of the PFA: Field operation guide 2nd edition by National Child Traumatic Stress Network National Center for Post-traumatic Stress Disorder (Brymer 2006)

Control: wait-list control (n = 460)

Outcomes	**Outcomes collected and reported:** **Primary outcomes:** • actual helping behaviour - single items for psychological support to people affected in emergency and details of service - not reported (numbers of participants who engaged in providing actual psychological support during time points too small for statistical analyses) • self-efficacy - 13-item self-efficacy scale **- reported** • knowledge of PFA and disaster mental health - self-developed scale **- reported** **Secondary outcomes:** • general psychopathology - GHQ-28 • psychological distress - DASS-21 • distress from exposure to trauma - IES-R • resilience - Conner-Davidson Resilience Scale • coping with stress (adaptive and maladaptive coping) - Brief Coping Orientation to Problems Experienced • life satisfaction - Satisfaction with Life Scale • social support - Multidimensional Scale of Perceived Social Support **Time points measured and reported:** 1) pre-intervention; 2) post-intervention (only IN IG); 3) 3-month follow-up (3-months post-intervention); 6) 6-month follow-up (6 months post-intervention) **Adverse events:** not specified
Notes	**Contact with authors:** no correspondence required **Study start/end date:** April 2011 to November 2011 **Funding source:** Chinese University of Hong Kong (CUHK) Direct Grant for Research #2009.2.041; Student Research Grant (see trial registration) **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** ethics approvals from Survey and Behavioral Research Ethics Committee and Clinical Research Ethics Committee **Comments by authors:** registered at the CUHK Centre for Clinical Trials, Clinical Trials Registry (CUHK-CCT00278) **Miscellaneous outcomes by the review authors:** dissertation **Correspondence:** Yee Lai Eliza Cheung, School of Public Health and Primary Care, CUHK; eliza.cheung@cuhk.edu.hk; chair: Prof. Yeung Shan Samuel Wong; supervisor: Prof. Ying Yang Emily Chan; The Jockey Cluc School of Public Health and Primary Care, CUHK, Ngan Shing St, Sha Tin, Hongkong; emily.chan@cuhk.edu.hk

Risk of bias

Bias	Authors' judgement	Support for judgement

Cheung 2014 *(Continued)*

Random sequence generation (selection bias)	High risk	Quote: "Computerized randomization was conducted using SPSS." Quote: "Participants were then randomly assigned to the waitlist control group or the PFA group using random numbers generated by SPSS." Quote: "Means and standard deviations of outcome variables across conditions at Time 1, Time 1b (post-training), Time 2 (3-month follow-up), and Time 3 (6-month follow-up) were presented in Table 9. Daggers denote significant differences of the baseline scores between intervention and control group" Quote: "At Time 1, no significant differences were found between intervention and control groups for age, gender, income, occupations, education, marital status, and previous training in post-disaster psychological interventions" Quote: "Meanwhile, significant difference was found for trauma history between intervention and controls groups, χ^2=63.40, p<.001. There was 67.8% of the intervention group reported prior traumatic experience while 39.8% of the control did that. Intervention group reported proportionately more prior traumatic experience than control group despite randomization." Judgement comment: The investigators describe a random component in the sequence generation process (computerised randomisation) and there is verified baseline comparability between groups for most sociodemographic characteristics except for trauma history/prior traumatic experience between groups; no significant baseline differences between groups in most outcome variables (psychological distress, distress from exposure to trauma, maladaptive coping, resilience and social support); however, significant baseline differences in self-efficacy, knowledge of PFA and disaster mental health, general psychopathology, adaptive coping and life satisfaction
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Quote: "Investigators and authorized research assistants were responsible for data collection and consolidation. Main researcher who was also the trainer in the Psychological first aid training had access only to the anonymous dataset for further analyses due to the protection of participants' anonymity." Judgement comment: insufficient information about blinding of outcome assessment (paper-pencil and online questionnaires; unclear if investigators and research assistants responsible for data collection were blinded); however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Figure 4. Algorithm of the randomized controlled study" Quote: "Among the 458 participants assigned to training intervention, 395 of them joined 9 identical training sessions on the training days from April to June 2011. A total of 393 completed pre-post questionnaires (Appendix VI) were received at Time 1 and Time 1b, 364 participants completed the 3-month follow-up questionnaire at Time 2, and 319 at 6- month follow-up at Time 3. Among the waitlist control group, 407 out of 460 filled the questionnaires and 53 withdrew from the study before it starts and 369 participants completed the 3-month follow-up questionnaire. At 6-month follow up, 305 filled in the ques-

Cheung 2014 *(Continued)*

		tionnaire (Figure 4 for the flow of the study). The completion rate of intervention arm is 80% while that of control group is 75%." Judgement comment: reasons for missing data likely to be related to true outcome with imbalance in missing data between groups (over study course: IG: n = 139; CG: n = 155); reasons for missing data in groups not stated; available-case analysis (only participants for whom outcomes were obtained; see Table 9) and per-protocol analysis (only participants who completed allocated intervention, i.e. without n = 2 participants in IG who did not complete PFA intervention)
Selective reporting (reporting bias)	Low risk	Judgement comment: trial registration available (registered at the CUHK Centre for Clinical Trials,Clinical Trials Registry (Appendix V); CUHK_CCT00278); all of the study's prespecified (primary and secondary) outcomes that are of interest in the review have been reported in the prespecified way; only actual psychological support provided/actual helping behaviour was not analysed and could therefore not be reported (too small numbers for statistical analyses)

Cieslak 2016

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Power (power sample size calculation, level of power achieved):** not specified **Unit of randomisation:** individuals **Imputation of missing data:** 85 in IG2 excluded due to high dropout; for missing data in IG1 and CG: multiple imputation method (imputation with regression procedures; estimated maximisation); intention-to-treat analysis for these 2 groups only
Participants	**Country:** Poland **Setting:** health and human service professionals; setting not specified; designated website **Age:** mean = 37.49 (SD = 10.39) years **Sample size (randomised):** 253 (in total randomised to 3 groups); 168 participants in IG1 and CG reported here **Sex:** 131 women, 37 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** STSS: IG1 = 2.26 (0.58), CG = 2.42 (0.66); burnout (OLBI) at baseline: IG1 = 2.86 (0.51); CG = 3.00 (0.71) **Population description:** health and human service professionals (e.g. physicians, nurses, first responders, social workers, psychotherapists, education specialists, police officers and firefighters, other human service providers) exposed indirectly to traumatic events at work **Inclusion criteria:** 1) providing services for survivors of traumatic events for at least 1 year; 2) experiencing indirect exposure to a traumatic event at work; 3) consent for participating in an internet-based programme aiming at the enhancement of psychosocial resources improving mental health **Exclusion criteria:** professionals without exposure to trauma **Attrition (withdrawals and exclusions):** IG2 = 85 exclusions due to high dropout at post-intervention (62%) and follow-up (78%); 86 (51.2%) exclusions in 2 other groups because did not respond to questionnaire at post-intervention (IG1 = 46/87 (52.9%), CG = 40/81 (49.4%)); 100 (59.5%) did not respond to

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	questionnaires at follow-up (IG1 = 54/87 (62.1%), CG = 46/81 (56.8%)); only 68 participants completed all IG1/CG procedures and participated in 3 measurements **Reasons for missing data:** 54/168 participants in IG1 and CG gave reasons for withdrawal: e.g. personal reasons not related to intervention (39%), technical problems with website or internet access (15%)

Interventions	In total, 2 intervention groups (self-efficacy-enhancement module and social support-enhancing module) and 1 control group (educational module); social support-enhancing module (n = 85) was not included in analyses due to high dropout
	
	Intervention: self-efficacy enhancement module of 'The Helpers' Stress' (n = 87)
	
	• *delivery*:
	  ◦ web-based intervention (designated website)
	  ◦ 4 modules/exercises (depending on module more interactive requiring some action like typing, filing, arguments etc. or less interactive (containing only instructions for exercises, e.g. think about, imagine that…)
	  ◦ participants write down thoughts and comments in their diary
	  ◦ option to ask the experimenters about technical and procedural issues referring to the sessions; automatic e-mail reminders
	• *providers*: designed to be implemented without help; automatic e-mail reminders; possibility to contact authors of the programme; possibility to have contact by phone or e-mail with a psychologist; all experimenters had a Master's degree in psychology and had at least 1 year work experience in the context of occupational health
	• *duration of treatment period and timing*: 4 - 6 weeks to read the content and do the exercises (1 session a week)
	• *description*:
	  ◦ 4 sessions: (1) introductory informational materials, (2) self-efficacy exercises or extended information materials in the experimental and control groups respectively, (3) homework assignments, and (4) summaries of the session
	  ◦ participants asked to make notes in their web-based personal diary to keep track of their thoughts referring to the sessions and their content; techniques complementary to face-to-face cognitive-behaviour treatment, such as activity planning, skill training, and cognitive bias modification
	  ◦ exercises refer to: identifying and recollecting one's own mastery experience, analysing personal experiences of dealing with barriers, planning for self-efficacy enhancement, identifying negative thoughts indicating self-doubts and transforming them into self-efficacy statements,and identifying positive emotions accompanying self-efficacy statement; exercises required to write thoughts and statements online
	  ◦ across the exercises, participants asked to choose the context: they could refer to dealing with any stressors encountered at home or work; elicited self-efficacy statements contextualised respectively (either referred to work-related tasks and stressors, including indirect exposure to traumatic events or to home-related tasks and stressors); homework assignments included suggestions about how participants might try to enhance their psychosocial resources (no specific homework assignments to be completed online)
	  ◦ SESSION 1: gaining self-efficacy from own past mastery experiences: participants asked to choose and recollect relevant personal situations when they were successful. Participants learned about thoughts, beliefs and behaviours that may prompt self-efficacy.
	  ◦ SESSION 2: participants asked to choose area of their life in which they experience stress and try to recall situations in which they did not handle stress as well as intended; they learned how different interpretations of failures and successes might affect self-efficacy and which interpretations are beneficial for their self-efficacy beliefs and well-being
	  ◦ SESSION 3: participants asked to identify barriers which hinder their ability to harbour strong self-efficacy beliefs; they learned how to face those negative thoughts and reformulate them into positive, self-efficacy-enhancing statements; asked to name their personal benefits of harbouring strong self-efficacy beliefs; participants form detailed plan about how to boost their self-efficacy beliefs
	  ◦ SESSION 4: participants asked to focus on their positive thoughts and learned how to increase the availability of positive thoughts; they learn about reciprocal relations between positive self-statements and positive emotions

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- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*:
  - Self-efficacy-enhancing module in this study: uses CBT techniques and aims at strengthening relevant resource self-efficacy; content partially adapted from previously-developed internet-based intervention for survivors of direct exposure to trauma (Steinmetz 2012) which targeted self-efficacy through mastery experience, verbal persuasion, and emotion regulation techniques; also provided tools enabling survivors to seek social support for dealing with consequences of exposure to a natural disaster

Control: attention control (educational module of "The Helpers' Stress") (n = 81)

- *delivery*: web-based intervention (designated website); 4 modules/exercises; less interactive than IG; option to ask the experimenters about technical and procedural issues referring to the sessions; automatic e-mail reminders
- *providers*: designed to be implemented without help; automatic e-mail reminders; possibility to contact authors of the programme; possibility to have contact by phone or e-mail with a psychologist; all experimenters had a Master's degree in psychology and had at least 1 year work experience in the context of occupational health
- *duration of treatment period and timing*: 4 - 6 weeks to read the content and do the exercises (1 session a week)
- *description*:
  - contained mainly educational materials on coping with stress at work and indirect exposure to trauma; 4 sessions: (1) introductory informational materials, (2) self-efficacy exercises or extended information materials in the experimental and control groups respectively, (3) homework assignments, and (4) summaries of the session
  - participants asked to make notes in their web-based personal diary to keep track of their thoughts referring to the sessions and their content; read-only educational materials, without exercises which required writing statements online; education referred to resources that could enable workers to manage work-related tasks and work-related stress, including indirect exposure to traumatic events; materials discussed various stressors (work-related and home-related), social and psychological resources (including social support and self-efficacy) that enable individuals to deal with stressors, and adverse consequences of stress at work,including STS and job burnout; homework assignments included suggestions about how participants might try to enhance their psychosocial resources
  - SESSION 1: educational materials: causes and symptoms of stress (including work stress), possible consequences of exposure to stress at work or at home across physical, social, and psychological aspects of health and well-being
  - SESSION 2: educational materials about eliciting social support, social support enhancement; role of social support in dealing with stress
  - SESSION 3: reading materials explaining concept of self-efficacy; content corresponds with the content of the materials used in self-efficacy enhancement (instead of interactive form, reading materials are presented); are accompanied by short instructions (e.g. "Try to think about your biggest accomplishments and personal successes")
  - SESSION 4: educational materials discussing other psychological and social resources like sense of coherence or hardiness which may be used to cope with stress at work and its consequences; educational materials about causes and symptoms of secondary traumatic stress; educational materials about the causes and symptoms of job burnout
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information (intervention cost, changes in other costs as result of intervention)*: not specified
- *theoretical basis*: educational module in this study: also uses techniques of CBT (psycho-education) but only contains basic contents of resources self-efficacy and social support; content partially adapted from previously-developed internet-based intervention for survivors of direct exposure to trauma (Steinmetz 2012)

Outcomes	**Outcomes collected and reported:**

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- self-efficacy - Secondary Trauma Self-Efficacy Scale
- self-efficacy - WSBMS
- secondary traumatic stress - STSS
- secondary post-traumatic growth - Post-traumatic Growth Inventory-Short form
- burnout - OLBI
- work engagement - Utrecht Work Engagement Scale

(indirect exposure to traumatic events at work is not an outcome measure; only assessed at time 1)

Time points measured and reported: 1) pre-intervention; 2) post-intervention; 3) 1-month follow-up (1-month post-intervention)

Adverse events: not specified

Notes	**Contact with authors:** We contacted the authors to get the information whether Cieslak 2016 and Rogala 2016 were two reports on the same study. We also asked for the subgroup data for health and human service professionals (physicians, nurses, first responders, social workers, psychotherapists) (Rogala 2019 [pers comm]). **Study start/end date:** recruitment between October 2012 and May 2013; exact study dates not specified **Funding source:** created as part of the N N106 139537 grant awarded by the Ministry of Science and Higher Education and currently administered by Narodowe Centrum Nauki (contract No. 1395/B/H03/2009/37), implemented at the SWPS (University of Social Sciences and Humanities). Project manager: Dr Roman Cieślak **Declaration of interest:** research conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest **Ethical approval needed/obtained for study:** approved by the IRB at the SWPS University of Social Sciences and Humanities **Comments by authors:** not specified **Miscellaneous outcomes by the review authors:** Rogala 2016 in Polish (translated) **Correspondence:** Roman Cieslak, Department of Psychology, SWPS University of Social Sciences and Humanities, Warsaw, Poland and Trauma Health and Hazards Center, Department of Psychology, University of Colorado Colorado Springs, Colorado Springs, CO, USA; rcieslak@uccs.edu; Anna Rogala: SWPS University, Chodakowska 19/31, 03-815 Warsaw; anna.rogala@swps.edu.pl

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Po rejestracji uczestnicy, którzy zapoznali się z regulaminem bada- nia i podpisali zgodę na udział w nim, zostali losowo przydzieleni do jednego z 3 modułów interwencyjnych" ["After registration, participants who read the test regulations and signed consent to participate in it were randomly assigned to one of the three intervention modules"] Quote: "Interwencja składała się z modułu 1 – wzmacniają- cego przekonania o własnej skuteczności, modułu 2 – wzmacniającego spostrzegane wsparcie społeczne oraz modułu 3 – edukacyjnego. Każdy z uczestników bada- nia został losowo przypisany do jednego z nich." ["The intervention consisted of module 1 - strengthening the conviction of its own effectiveness, module 2 - reinforcing perceived social support and module 3 - educational. Each of the study participants was randomly assigned to one of them."]

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		Quote: "Respondents were randomly assigned to the experimental and control groups: the self-efficacy enhancement intervention (n = 87) or an education active control group (n = 81)." Quote: "Participants assigned to the two groups did not differ across the study variables. In particular, non-significant effects were found for age, F(1,166) = 0.95, p = 0.33, gender, χ 2 = (1, N = 168) = 0.46, p = 0.27, profession, χ 2 = (8, N = 165) = 4.40, p = 0.82, the duration of employment, F(1,166) = 0.09, p = 0.76, T1 indirect exposure, F(1,166) = 2.87, p = 0.09, self-efficacy at T1, F(1,166) = 2.53, p = 0.11, STS at T1, F(1,166) = 2.75, p = 0.10, and SPTG at T1, F(1,166) = 0.97, p = 0.33." Judgement comment: insufficient information about random sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for sociodemographic variables and some outcome measures (self-efficacy, secondary traumatic stress, secondary post-traumatic growth); baseline comparability for other outcome variables (2nd measure for self-efficacy, burnout, work engagement) unclear
Allocation concealment (selection bias)	Unclear risk	Quote: "Finally, our study does not conform to all standards of fully randomized controlled trials, applying blinding procedures and evaluating the fidelity of the intervention processes. Thus, any conclusions should be treated with caution." Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	Unclear risk	Quote: "Finally, our study does not conform to all standards of fully randomized controlled trials, applying blinding procedures" Judgement comment: insufficient information about blinding of participants and personnel to permit judgement of 'Low risk' or 'High risk' (web-based intervention, in part interactive; unclear if no blinding procedures refers to performing the intervention or outcome assessment)
Blinding of outcome assessment (detection bias) Subjective outcomes	Unclear risk	Quote: "Finally, our study does not conform to all standards of fully randomized controlled trials, applying blinding procedures and evaluating the fidelity of the intervention processes. Thus, any conclusions should be treated with caution." Judgement comment: insufficient information about blinding of outcome assessment to permit judgement of 'Low risk' or 'High risk' (online questionnaires; unclear if no blinding procedures refers to performing the intervention or outcome assessment)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "FIGURE 1 | Flow of participants in a study." Quote: "Only 68 participants completed all experimental/control group procedures and participated in the measurements at T1, T2, and T3. Overall, 54 participants dropped out from the experimental condition, and 46 dropped out from the control condition, making a total of 100 (59.5%)." Quote: "Spośród 168 uczestników badania, którzy wypełnili skale w pomiarze 1. (T1), 51,2% osób nie wypełniło kwestionariuszy w pomiarze 2. (T2), a odsetek ten wzrósł do 59,5% w pomiarze 3. (T3). W celu sprawdzenia, czy danych brakowało w sposób losowy, zastosowano test MCAR Little'a (Missing Completely at Random). Jego wynik okazał się nieistotny statystycznie (Chi 2 (2216) = 1596,86, p = 1), co potwierdziło losowość braków danych. Różnica między 2 modułami w zakresie liczby osób, które wycofały się z badania, nie była statystycznie istotna (Chi 2 (1, N = 168) = 0,48, p = 0,49)." ["Of the 168 study participants who completed the scale in Measure 1 (T1), 51.2% did not complete the questionnaires in Measure 2. (T2), and this proportion increased to

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59.5% in measurement 3 (T3). In order to check whether the data was missing randomly, the MCA Little's (Missing Completely at Random) test was used. His result turned out to be statistically insignificant (Chi2 (2216) = 1566.86, p = 1), which confirmed the randomness of missing data. The difference between the two modules in terms of the number of people who withdrew from the study was not statistically significant (Chi2 (1, N = 168) = 0.48, p = 0.49)."]

Quote: "Braki danych uzupełniono, stosując metodę wielokrotnego podstawiania (multiple imputation method). W fazie podstawiania wprowadzono 3 skale mierzące odpowiednio: przekonania o własnej skuteczności, wypalenie zawodowe i zaangażowanie w pracę (jako predyktory i zmienne podstawiane), a także rodzaj modułu interwencyjnego (wyłącznie jako predyktor). Liczba podstawień wyniosła 5. Po zastosowaniu metody wielokrotnego podstawiania uzyskano dane od 168 osób we wszystkich 3 pomiarach." ["Data deficiencies were completed using the multiple imputation method. In the substitution phase, 3 scales were introduced, measuring, respectively: self-efficacy convictions, occupational burnout and involvement in work (as predictors and substitutable variables), and the type of intervention module (only as a predictor). The number of substitutions was 5. After applying the multiple substitution method, data from 168 people in all 3 measurements were obtained."]

Quote: "Missing data were imputed with regression procedures (estimated maximization). In line with suggestions to apply intention–to–treat analysis for the experimental studies with health-related outcomes (Gupta, 2011), data from dropouts were also imputed. Missing data analysis indicated that data were missing completely at random, with Little's $\chi 2 = (2035) = 1732.05$, p = 1.00. Thus, the final analysis was conducted with a sample of N = 168."

Quote: "Due to high drop-out rate at T2 and T3 in social support enhancement module, we excluded from analysis participants assigned to this condition."

Quote: "Dodatkowo wykluczono z analizy dane pochodzące od uczestników badania, którzy zostali przypisani do modułu wzmacniającego spostrzegane wsparcie społeczne (N = 85) ze względu na wysoki odsetek osób (78%), które nie wypełniły kwestionariuszy w drugim (T2) i trzecim pomiarze (T3) (tzw. drop-out) (ryc. 1)." ["In addition, data derived from study participants assigned to the self-efficacy enhancing module (N = 85) were excluded from the analysis due to the high percentage of people (78%) who did not fill in questionnaires in the second (T2) and third measurement (T3) (so-called drop-out) (Figure 1)."]

Quote: "Compared to completers, those who dropped out did not differ in self-efficacy at T1, F(1,166) = 2.23, p = 0.11, STS at T1, F(1,166) = 2.80, p = 0.10, SPTG at T1, F(1,166) = 1.66, p = 0.20, the indirect exposure to trauma at work, F(1,166) = 2.75, p = 0.10, gender, $\chi 2 = (1, N = 168) = 0.41$, p = 0.52, age, F(1,158) = 0.95, p = 0.33, profession, $\chi 2 = (8, N = 165) = 3.11$, p = 0.93), and the duration of employment, F(1,157) = 1.72, p = 0.19, $\eta 2 = 0.01$. Finally, the dropout rates were the same for the experimental and the control groups, $\chi 2 = (1, N = 168) = 0.71$, p = 0.40."

Quote: "Those who dropped out were asked to provide reasons for not completing the study. The open–ended question was applied. Among those who responded (n = 54) the most frequent reasons to discontinue were personal reasons unrelated to the trial (39%) and the technical problems with the website or internet access (15%)."

Quote: "For participants who did not complete the study, a short questionnaire was sent asking for the reason. 54 people answered, which as the reason for the resignation gave, among others personal reasons not related to the intervention (39%) and technical problems on the website of the intervention (15%)."

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		Judgement comment: high dropout of participants in social support-enhancing module and exclusion of these participants from the analysis; reasons for missing data in 2 other groups (self-efficacy-enhancing and educational module) unlikely to be related to true outcome (missing data at random); missing data were imputed (multiple imputation method); intention-to-treat analysis
Selective reporting (reporting bias)	High risk	Quote: "Efektywność interwencji została więc zmierzona przez porównanie wyników uczestników przypisanych do modułu edukacyjnego i modułu wzmacniającego przekonania o własnej skuteczności. Hipotezy dotyczące modułu interwencji mającego na celu wzmacnianie spostrzeganego wsparcia społecznego nie mogły więc być zweryfikowane." ["Thus, the effectiveness of the intervention was measured by comparing the results of the participants assigned to the educational module and the self-efficacy enhancing module. Hypotheses regarding the intervention module aimed at strengthening the perceived social support could not be verified."] Judgement comment: no study protocol available; prespecified hypotheses on the social support enhancing module could not be tested due to high dropout, so only data on the self-efficacy-enhancing module and the educational module were analysed; within these analyses, all prespecified outcomes and time points have been reported

Clemow 2018

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** imputation for psychosocial outcomes not specified; for blood pressure measures: multilevel, repeated-measures regression analysis to generate full information maximum likelihood estimates of the group-specific average change in systolic blood pressure (SBP) and diastolic blood pressure (DBP); per-protocol analysis (i.e. only participants in IG who attended at least 6 sessions) and available-case analysis (i.e. only participants in both groups who completed follow-up assessments) + intention-to-treat analysis (n = 92)
Participants	**Country:** USA **Setting:** delivered in workplace (large urban medical centre) **Age:** mean = 48.5 (SD = 8.7) years **Sample size (randomised):** 92 **Sex:** 71 women, 21 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** depression CES-D: IG = 14.5 (8.7), CG = 11.2 (10.2); burnout, emotional exhaustion (MBI): IG = 19.2 (10.8), CG = 23.2 (12.6); burnout, depersonalisation: IG = 5.4 (5.2), CG = 4.2 (4.4); burnout, personal accomplishment: IG = 32.3 (9.7), CG = 31.5 (11.3) **Population description:** employees (aged 18 – 70 years) of a large urban medical centre identified through workplace blood pressure (BP) screenings

Clemow 2018 *(Continued)*

Inclusion criteria: 1) employees of large urban medical centre; 2) aged 18 - 70 years; 3) whose screening BP (average of 3 measurements) was ≥ 140 mm Hg SBP or 90 mm Hg (DBP) and whose average readings did not exceed 180/110 mm Hg at both screening and subsequent baseline evaluation

Exclusion criteria: 1) pregnancy; 2) end-stage renal disease

Attrition (withdrawals and exclusions): 11 dropouts after randomisation (IG = 6, CG = 5; i.e. did not complete follow-up assessment); 2 participants (in IG) later found to have been ineligible

Reasons for missing data: not specified (n = 11); average BP measurement computed in error - actually below cut-off (n = 2 ineligible after randomisation)

Interventions

Intervention: LifeSkills workshop (stress and anger management intervention/workshop on cognitive-behavioural coping skills) (n = 46)

- *delivery*: face-to-face group setting (groups of 8 - 10 participants) with video as adjunct to each session; individual consultation offered to participants who missed a session
- *providers*: 3 doctoral-level clinical or counselling psychologists trained according to guidelines used by Williams LifeSkills, Inc., to serve as group facilitators; receive ongoing supervision from the senior study clinician to ensure fidelity to the material; sessions followed the Williams LifeSkills Workshop manual and video; same facilitator works with the same group of participants throughout the course of the intervention
- *duration of treatment period and timing*: 10 weekly 1-hour sessions; group sessions conducted at midday lunch breaks, during workday (between 12 noon - 2.00 pm)
- *description*:
  - workshop on cognitive-behavioural coping skills; LifeSkills Workshop = structured cognitive-behavioural group intervention that draws on cognitive-behavioural techniques and stress reduction approaches
  - training is framed as training to increase a person's resiliency for coping with stressful situations, rather than as treatment for a mental disorder
  - facilitator leads participants through each of several behavioural skills, modelling them as necessary
  - VIDEO developed as adjunct to each session, is integrated into each session, which standardises the presentation of material
  - SKILLS include: self-monitoring, such as identification and evaluation of thoughts, feelings, and behaviours in response to stressful situations; problem-solving; assertiveness in dealing with anger- and stress-inducing events or demands, or both; deflection skills to reduce distress in stressful situations, such as breathing and muscle relaxation, distraction, and increasing distress tolerance; communication skills; and increasing empathy and building positive relationships
  - facilitators offer individual consultation to participants who missed a session
- *compliance*: randomised participants attended with mean (SD) of 8.1 (1.8) group sessions, with 89.3% attending 7 or more sessions; n = 39/46 attended at least 6 sessions and completed follow-up assessments (i.e. considered in per-protocol analysis)
- *integrity of delivery*: involvement of developers of intervention in study restricted to ensure treatment fidelity through training and initial supervision of the clinician who subsequently trained and supervised the clinicians who delivered the intervention; weekly sessions are audio-recorded to monitor treatment fidelity and to allow for supervision of the facilitators; facilitators receive ongoing supervision from the senior study clinician to ensure fidelity to the material
- *economic information*: USD 125 for completing the trial
- *theoretical basis*: sessions followed the Williams LifeSkills Workshop manual and video (Riley 2017); draws on cognitive-behavioural techniques and stress reduction approaches

Control: TAU (minimally enhanced) (n = 46)

- *delivery*: brochure (self-help materials)
- *providers*: self-help/self-guided
- *duration of treatment period and timing*: not specified
- *description*: enhanced usual care: self-help materials for BP reduction and physician referral; brochure on BP control developed by National Heart, Lung, and Blood Institute, containing information about

Clemow 2018 *(Continued)*

hypertension and suggestions for making lifestyle changes to reduce BP; with participants' permission, their BP readings were sent to their physicians, along with the 2-page JNC 7 (joint national committee on prevention, detection, evaluation, and treatment of high blood pressure; JNC 7 report) reference card summarising guidelines for the management of high BP; no group meetings

- *compliance*: not specified for TAU group; n = 41/46 completed follow-up assessments (i.e. considered in per-protocol analysis)
- *integrity of delivery*: not specified
- *economic information*: USD 125 for completing the trial
- *theoretical basis:* not specified

Outcomes

Outcomes collected and reported:

- SPB - automated device
- DBP - automated device
- hostility - Cook-Medley Hostility Scale
- burnout, emotional exhaustion - MBI
- burnout, depersonalization - MBI
- burnout, personal accomplishment - MBI
- work strain, skill discretion - Karasek Job Content Questionnaire
- work strain, decision-making authority - Karasek Job Content Questionnaire
- work strain, job demands - Karasek Job Content Questionnaire
- assertiveness, passive behaviour - PAA
- assertiveness, aggressive - PAA
- assertiveness, assertive - PAA
- social support, belonging - ISEL
- social support, appraisal - ISEL
- social support, tangible - ISEL
- ruminative responses, depressive rumination RRS
- ruminative responses, reflection - RRS
- ruminative responses, brooding - RRS
- John Henryism
- depression - CES-D
- perceived stress - Perceived Stress Scale **- not reported**

Time points measured and reported: 1) pre-intervention; 2) 2-month follow-up (i.e. 2 months/approximately 60 days post-intervention); BP also assessed at screening (to test eligibility)

Adverse events: not specified

Notes

Contact with authors: We contacted the authors to obtain the means and SDs for perceived stress in both groups at each time point. We also asked for the means and SDs for all outcomes at 2-month follow-up (instead of change scores); no response received to 2 inquiries

Study start/end date: start of data collection in 2003; see trial registration: until August 2006

Funding source: funding provided by NIH grant #HL67584 from the National Heart, Lung, and Blood Institute; funded with a Small Business Innovation Research (SBIR) grant from the National Institutes of Health (NIH) through Williams LifeSkills, Inc, Durham, North Carolina

Declaration of interest: Redford B. Williams and Virginia P. Williams are founders and major stockholders in Williams LifeSkills, Inc. Their involvement in the project, as noted in the Methods section, was limited to treatment fidelity and initial training and initial supervision in the intervention. They also assisted in the editing of the manuscript. Otherwise, the design and conduct of the study, the data collection and analyses, and interpretation of results occurred independently of the developers of the intervention. The other authors have no conflicts to disclose.

Ethical approval needed/obtained for study: approved by IRB at Columbia University Medical Center

Clemow 2018 *(Continued)*

Comments by study authors: trial is registered at clinicaltrials.gov (Identifier NCT01262066)

Miscellaneous outcomes by the review authors: not relevant

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Those who agreed to participate were randomly assigned to one of two groups: intervention (LifeSkills workshop) or minimally enhanced usual care." Quote: "Randomization was done by calling an off-site person holding the randomization envelopes, using random-sized randomization blocks provided by the study statistician (J.E.S.), in accordance with CONSORT (Consolidated Standards of Reporting Trials) guidelines [43]." Quote: "No significant differences were observed between the intervention and control groups on demographic and clinical characteristics at baseline (Table 1)." Quote: "Baseline psychosocial characteristics did not vary between treatment and control groups (Table 3)." Quote: "At baseline, SBP and DBP were similar between the two groups." Judgement comment: insufficient information about random sequence generation to permit judgement of 'Low risk' or 'High risk' (exact method of random sequence generation is not described); RCT and verified baseline comparability of groups for sociodemographic and clinical characteristics (Table 1; all Ps > 0.08) and outcome variables (Table 2: physiological outcomes: SBP, DBP: Ps > 0.35; Table 3, subjective outcomes) on the basis of analysis
Allocation concealment (selection bias)	Low risk	Quote: "Randomization was done by calling an off-site person holding the randomization envelopes, using random-sized randomization blocks provided by the study statistician (J.E.S.), in accordance with CONSORT (Consolidated Standards of Reporting Trials) guidelines [43]." Judgement comment: Participants and investigators enrolling participants could not foresee assignment (allocation by off-site person holding randomisation envelopes).
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Quote: "First, research staff were not blinded to participant group assignment." Judgement comment: no blinding of study personnel (also face-to-face intervention); blinding of participants unclear, but the review authors judge that the outcome is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "First, research staff were not blinded to participant group assignment." Judgement comment: no blinding of study personnel (also face-to-face intervention); blinding of participants unclear, but the outcome is likely to be influenced by lack of blinding

Clemow 2018 *(Continued)*

Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Quote: "First, research staff were not blinded to participant group assignment." Quote: "However, we attempted to mitigate the potential influence of this problem by using automated BP measurements, which are blinded to group assignment and less susceptible to bias than manual BP measurements." Judgement comment: research staff not blinded in general; therefore, probably also no blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Quote: "First, research staff were not blinded to participant group assignment." Judgement comment: research staff not blinded in general; therefore, probably also no blinding of outcome assessment, and the outcome measurement is likely to be influenced by lack of blinding
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Fig 1 | CONSORT diagram." Quote: "Eleven participants dropped out after randomization (six in the intervention group and five in the usual care control group). Two participants, both in the intervention group, were later found to have been ineligible because their average BP measurements were computed in error and were actually below the cutoff." Quote: "An intent-to-treat analysis was performed on all randomized participants. A multilevel, repeated-measures regression analysis was performed to generate full information maximum likelihood estimates of the group-specific average change in SBP and DBP between baseline and the 2-month posttreatment assessments and to estimate and test the differential change between the intervention and usual care groups. Consistent with intent-to-treat principles, all participants who were randomized, including two participants who were subsequently deemed ineligible (described below), were included in the analysis" Quote: "All 92 participants who were randomized were included in the analysis." Quote: "In secondary analyses, we repeated the previous analyses after restricting the sample to those who completed the protocol (i.e., those in the control group who completed the follow-up assessment [n = 41] and those in the intervention group who attended at least six sessions and completed the follow-up assessment [n = 39])." Judgement comment: reasons for missing outcome data are unlikely to be related to true outcome with relative balance in missing data between groups (dropouts: IG: n = 6, CG: n = 5); per-protocol analysis (i.e. only participants who attended at least 6 sessions in IG) and available-case analysis (i.e. only participants who completed follow-up assessment) as well as intention-to-treat analysis
Selective reporting (reporting bias)	High risk	Judgement comment: trial registration (NCT01262066) available; several reported outcomes (psychosocial variables) were not prespecified; PRESPECIFIED: change in mean office blood pressure, covarying hostility and hostility x time (hostility assessed via Cook-Medley questionnaire); REPORTED: (diastolic/systolic) blood pressure; hostility; depression; burnout (emotional exhaustion, depersonalisation, personal accomplishment), work strain (skill discretion, decision-making authority, job demands), assertiveness (passive behaviour, aggressive, assertive), social support (belonging, appraisal, tangible),

Clemow 2018 *(Continued)*

	ruminative response (depressive rumination, reflection, brooding); perceived stress is prespecified in the report, but not reported

Duchemin 2015

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified; small sample size as limitation **Imputation of missing data:** no missing data; intention-to-treat analysis
Participants	**Country:** USA **Setting:** large academic medical centre (SICU) **Age:** mean = 44.2 years **Sample size (randomised):** 32 **Sex:** 28 women, 4 men **Comorbidity (mean (SD) of respective measures in indicated, if available at baseline:** perceived stress (PSS): 12% of participants with low stress (< 10), 37% with high stress (> 16); stress scale: 37% with cut-off value of stress > 14; burnout-emotional exhaustion (MBI): 28% with cut-off score > 26; burnout-depersonalisation: 7.78 (5.53); burnout-personal accomplishment: 36.5 (7.449) **Population description:** personnel, 18 years or older, from the SICU of a large academic medical centre **Inclusion criteria:** 1) any personnel working in the SICU; 2) having contact with the patients or their families **Exclusion criteria:** 1) individuals practising mindfulness, yoga, or exercising more than 30 minutes a day; 2) individuals with third trimester pregnancy; 3) individuals with a history of recent surgery if it limited ability to perform the gentle yoga movements **Attrition (withdrawals and exclusions):** no withdrawals or exclusions **Reasons for missing data:** not applicable since no missing data
Interventions	**Intervention:** workplace-adapted mindfulness-based intervention (MBI) (n = 16) • *delivery*: face-to-face group sessions; CDs provided to participants to facilitate daily practice • *providers*: delivered by M. Klatt, trained mindfulness and certified yoga instructor, who developed the MBI to be pragmatically performed in a work setting • *duration of treatment period and timing*: 8 weekly sessions; all sessions of 1-hour length except for week 5 (2 hours) that includes mindful eating; participants asked to perform 20-minute daily individual practice if possible

Duchemin 2015 *(Continued)*

- *description*:
  - combination of didactic introduction/discussion and combination of mindfulness and yoga practices with music at each session; protocol combines elements of mindfulness meditation, yoga movements, and relaxation through music
  - CONTENT: after introduction of the weekly theme/prompt, participants are led through a body scan, gentle stretching, yoga, progressive relaxation, and/or an eating meditation (for the 2-hour session), and then into formal meditation; each week a different topic is highlighted; music is standardised to be the same background music in each session, and in the background of each meditation practice contained on CDs
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: intervention provided free of charge; work coverage assured for the participants during the time of the group sessions and assessments
- *theoretical basis*: intervention is 8 weeks in length, paralleling the mindfulness-based-stress-reduction (MBSR) traditional programme, with shortening of the group session duration for the setting; low-dose 8-week workplace adapted MBI (Klatt 2009; Malarkey 2013)

Control: wait-list control (n = 16)

Outcomes

Outcomes collected and reported:

- perceived stress - PSS
- stress - stress scale of DASS
- burnout, emotional exhaustion - MBI
- burnout, depersonalisation - MBI
- burnout, personal accomplishment MBI
- compassion fatigue - ProQOL **- only correlations between ProQOL total score and other outcome variables reported**
- secondary traumatisation - ProQOL -**only correlations between ProQOL total score and other outcome variables reported**
- risk of burnout - ProQOL - **only correlations between ProQOL total score and other outcome variables reported**
- mindfulness, observing - FFMQ
- mindfulness, describing - FFMQ
- mindfulness, acting with awareness - FFMQ
- mindfulness, non-judging of inner experience - FFMQ
- mindfulness, non-reactivity to inner experience - FFMQ
- salivary alpha-amylase - Salivette®

Time points measured and reported: 1) pre-intervention (1 week before intervention); 2) post-intervention (1 week after intervention)

Adverse events: not specified

Notes

Contact with authors: We contacted authors to ask for the means and SDs for all outcomes for the 2 groups at pre- and post-intervention and to inquire whether FFMQ and ProQOL were measured as outcomes or only correlates. Data for some outcomes were sent by the authors (perceived stress, DASS-21 stress, work stress, salivary alpha-amylase, work satisfaction) of which not all were specified in the report (work satisfaction) (Klatt 2018 [pers comm]).

Study start/end date: not specified

Funding source: funded in part by the OSU Harding Behavioral Health Stress, Trauma and Resilience program

Declaration of interest: none declared

Ethical approval needed/obtained for study: approved by the university IRB, and all participants provided signed informed consent

Duchemin 2015 *(Continued)*

Comments by authors: not specified

Miscellaneous outcomes by the review authors: conference abstract Klatt 2012 is a second reference to this study

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "The study adhered to the CONSORT guidelines for randomized trials 23. Eligible participants were randomized 1:1 using Graphpad software to intervention group or waiting list control group, with stratification by gender and type of work." Quote: "There were no significant differences between the two groups for age (p = 0.9496, t= 0.0638), years of experience (p = 0.9485, t = 0.06512), or years working in the SICU (p = 0.8702, t = 0.1648)." Quote: "On the PSS, only 12% of participants had a score < 10 (low stress), while 37% had a score > 16 (high stress). There was no significant difference between the two groups at baseline (p = 0.0910, t = 1.746)." Quote: "On the DASS stress subscale, 37% had score > 14, the cut-off value for stress, with no significant difference between the two groups (p = 0.1552, t = 1.458)." Quote: "On the Maslach's burnout inventory, the average emotional exhaustion subscale score was 23.12±10.1 with 28% of participants having scores > 26 and no difference between intervention and control groups (p = 0.3185, t = 1.0124)." Quote: "The scores were 7.78±5.53 for depersonalization and 36.5±7.449 for personal accomplishment with no significant difference between the groups (p = 0.685, t = 0.4909 and p = 0.3508, t = 0.9477 respectively)." Quote: "The average value for all participants was 93.6 ±15.9 units/ml (mean ± SEM) with no difference between the two groups (p = 0.6812, t = 0.4152)." (salivary α amylase) Quote: "Participants scored the stress level of their work at 7.15 ± 1.89 on a scale of 1 to 10 (with 10 being most stressful) at baseline with no significant difference between the two groups (p=0.8833, t= 0.1480)." Judgement comment: The investigators describe a random component in the sequence generation process (randomisation via software) and there is verified baseline comparability between groups for sociodemographic characteristics (age, years of experience, years working in SICU) and some outcomes of interest for the review on the basis of analysis.; baseline comparability between groups in mindfulness and burnout (ProQOL) unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention), but the review authors judge that the outcome is not likely to be influenced by lack of blinding

Duchemin 2015 *(Continued)*

Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Judgement comment: insufficient information about blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "There was no drop-out and all participants completed the 2 sets of assessments." Quote: "Intention to treat “analyses which included all subjects randomized were performed." Judgement comment: no missing outcome data
Selective reporting (reporting bias)	High risk	Judgement comment: no study protocol available, but not all of the study's prespecified outcomes have been reported (for ProQOF and FFMQ only correlations with other outcomes reported but no intervention effects in contrast to other outcomes)

Fei 2019

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** China **Setting:** training sessions performed in a classroom of the hospital's teaching department **Age:** mean = 32.21 (SD = 6.48) years **Sample size (randomised):** 122 **Sex:** not specified (unclear if male nurses included) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** perceived stress (PSS): IG = 45.38 (5.15), CG = 45.13 (4.19); both groups above cut-off for high stress **Population description:** nurses from 3 Chinese tertiary hospitals **Inclusion criteria:** 1) full-time nurses; 2) signature of the employee's agreement with the hospital; 3) understanding of the objective of the intervention and voluntary participation in the study

Fei 2019 *(Continued)*

Exclusion criteria: 1) nursing student; 2) not wishing to participate; 3) severe organic disease; 4) taking medication for mood regulation; 5) have suffered major traumatic events in the last 6 months; 6) having experience in emotional resilience or similar training

Attrition (withdrawals and exclusions): not specified

Reasons for missing data: not specified

Interventions	**Intervention:** emotional resilience training (n = 61)
	• *delivery:*
	  ○ face-to-face group sessions: CHAT GROUP training based on talks, combined with variety of methods; researchers, experts and nurses participated in group
	  ○ training methods: e.g. experiential communication, role playing, cognitive behavioural correction methods, staging; individual interventions when, according to emotional records and chat group, particular psychological problems arose in a nurse
	• *providers:* not specified (see chat groups)
	• *duration of treatment period and timing:* 8 weekly 60 - 90-minute sessions (meetings on Tuesday afternoons); DAILY: participants asked to register their emotions
	• *description:*
	  ○ CHAT GROUP: composed of researchers, experts and nurses organized to strengthen the emotional communication between them, understand the needs of nurses and suggestions for training, and recognise and quickly improve problems in the research process
	  ○ SESSION 1: conceptualisation of emotions; content: understand emotions, interpret the secrets of emotions
	  ○ SESSION 2: recognition and evaluation of one's emotions; content: interpret the secrets of emotions and the effects of emotions on behaviours; positive and negative emotions involve mental and physical reactions
	  ○ SESSION 3: Rational Emotional Therapy I; content: Introduce the characteristics of irrational beliefs, describe and discuss irrational beliefs, challenge 11 irrational beliefs
	  ○ SESSION 4: Rational Emotional Therapy II; content: Introduce ABCDE theory (Activating event, Belief, Consequences, Dispute, Effects), the operational mechanism and emotional regulation method
	  ○ SESSION 5: stress management I; content: Implement the role-playing to experiment and understand the difficulties of the roles
	  ○ SESSION 6: stress management II; content: prioritise and classify issues, say “no” to some people or things, and overcome anger and depression through different methods
	  ○ SESSION 7: stress management III; content: achieve a reasonable catharsis adjustment, confidentiality of the consultation and 'perfect' adjustment
	  ○ SESSION 8: stress management IV; content: implement expiration relaxation method and pleasant meditation method
	  ○ DAILY: participants asked to register their emotions daily; researchers collected, reviewed and corrected the daily records weekly, and provided suggestions, encouragement and guidance during the process
	• *compliance:* not specified
	• *integrity of delivery:* not specified
	• *economic information:* not specified
	• *theoretical basis:* not specified
	Control: no intervention (n = 61)

Outcomes	**Outcomes collected and reported:** • perceived stress - PSS • perceived stress, tension - PSS • perceived stress, loss of control - PSS • positive affect - PANAS • negative affect - PANAS

Fei 2019 *(Continued)*

- sleep quality total score - PSQI
- sleep quality, sleep latency - PSQI
- sleep quality, sleep duration - PSQI
- sleep quality, sleep disorders - PSQI
- sleep quality, hypnotics - PSQI
- sleep quality, sleep efficiency - PSQI
- sleep quality, subjective sleep quality - PSQI
- sleep quality, daytime dysfunction - PSQI

Time points measured and reported: 1) pre-intervention; 2) post-intervention

Adverse events: not specified

Notes	**Contact with authors:** We contacted the authors to get the information whether N = 122 (61 in each group) were also analysed for sleep quality and the respective subscales. We also asked if there had been any dropouts/losses to follow-up in the study or if there were no missing data at all, but received no response to 2 inquiries. **Study start/end date:** not exactly specified; recruitment in December 2018 **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** approval of the ethics committees obtained **Comments by study authors:** not specified **Miscellaneous outcomes by the review authors:** article in Spanish (translated) **Correspondence:** Yang Fei, Yangtze University, Jingzhou, Hubei Province, 434023, China; cjdxhlx@sohu.com

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Lot 122 enfermeros incluidos el estudio fron ditidos en el grupo experimental y el grupo control segúnmé to do aleatorio de ta bla numérica, con 61 miembros en da da grupo." [The 122 nurses included in the study were divided into the experimental group and the control group according to a random numerical table method, with 61 members in each group.] Quote: "Como se muestra en la Tabla 2, los 61 enfermeros del grupo control tienen entre 22 y 46 años, con un promedio de 31,74±6,11 años, mientras que los del grupo experimental tienen entre 22 y 45 años, con un promedio de 32,67±6,85. No hay diferencias estadísticamente significativas de la información general entre ambos grupos." [As shown in Table 2, the 61 nurses in the control group are between 22 and 46 years old, with an average of 31.74 ± 6.11 years, while those in the experimental group are between 22 and 45 years old, with an average of 32.67 ± 6.85. There are no statistically significant differences in general information between the two groups.] Quote: "Como se observa en la Tabla 3, no hay diferencia significativa en tensión, pérdida de control y puntaje total en el estrés percibido entre el grupo control y el experimental antes de la intervención (t=-0,099, P=0,921)." [As seen in Table 3, there is no significant difference in tension, loss of control and total score on perceived stress between the control and experimental groups before the intervention (t = -0.099, P = 0.921).]

Fei 2019 *(Continued)*

		Quote: "Como puede verse en la Tabla 4, no hay una diferencia significativa en las puntuaciones en las emociones positivas y negativas entre el grupo experimental y el grupo de control antes de la intervención (P> 0,157)." [As can be seen in Table 4, there is no significant difference in the scores on positive and negative emotions between the experimental group and the control group before of the intervention (P> 0.157).] Quote: "Se puede observar en la Tabla 5 que no hay diferencias significativas en la calidad del sueño entre el grupo experimental y el de control antes de la intervención (P>0,05)" [It can be seen in Table 5 that there are no significant differences in sleep quality between the experimental and the control group before the intervention (P> 0.05)] Judgement comment: The investigators describe a random component in the sequence generation process (random-number table) and there is verified baseline comparability of groups for sociodemographic characteristics (Table 2) and outcomes of interest (Table 3 - 5) on the basis of analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (N = 122 analysed for perceived stress and positive/negative affect; number of participants analysed for sleep quality not specified; unclear if there were no missing data at all or if missing data were imputed)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Gelkopf 2008

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified, relatively small sample size **Imputation of missing data:** no imputation of missing data; per-protocol analysis (only participants who took part completely in allocated intervention)
Participants	**Country:** Sri Lanka

Gelkopf 2008 *(Continued)*

Setting: local, nongovernmental, grassroots organisation called Sumithrayo

Age: mean = 48.65 (SD = 12.77) years

Sample size (randomised): 62

Sex: 46 women, 14 men (in analysed sample)

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified

Population description: education and mental health volunteer workers who working with disaster survivors; had been working on-site giving immediate physical help (ranging from recovering and burying bodies to building camps and providing makeshift kitchens) as well as providing emotional support and counselling to survivors and their families

Inclusion criteria: not specified

Exclusion criteria: not specified

Attrition (withdrawals and exclusions): 2/37 (5.4%) dropouts in IG

Reasons for missing data: personal reasons (n = 2)

Interventions

Intervention: 'Training the trainer' course based on ERASE (Enhancing Resiliency Among Students Experiencing Stress) Stress programme (n = 37)

- *delivery*: face-to-face; group sessions; experiential exercises around traumatic experiences, skills training practices, simulations
- *providers*: ERASE Stress workshop hosted by a local nongovernmental grassroots organisation (Sumithrayo); providers of 'training the trainer' course not specified
- *duration of treatment period and timing*: 4-day, 30-hour intensive course over 2 weekends
- *description*:
  - provides participants with opportunity to experience the 12 sessions of ERASE as if they were children themselves, as well as to explore ways to effectively deliver the programme to children
  - based on 4 COMPONENTS: 1) processing the volunteer workers' personal and tsunami relief experiences; 2) enhancing trainers' coping skills and strengthening the group cohesiveness of the trainers; 3) providing trainers with trauma-related psychoeducational knowledge and techniques to enhance children's coping skills and resiliency strategies; 4) teaching trainers how to disseminate the knowledge and to apply the learned techniques within the school system and providing them with the opportunity to practise their training skills
  - relies on several EDUCATIONAL MODALITIES: 1) experiential exercises that demonstrate the same procedures that are to be implemented in the classroom with the students; 2) lectures that present the rationale of the entire programme to the participants and the explanations for each topic to be presented to the students; 3) skills training practices that require the teachers to apply the skills themselves they would later deliver to students; 4) simulations of teaching by the participants
- *compliance*: n = 2 dropouts for personal reasons
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: ERASE Stress programme (universal school-based intervention aimed at enhancing students' coping skills and resiliency strategies for dealing with traumatic stress); developed in Israel to help children cope with ongoing terrorism; incorporates psychoeducational materials, skills training, meditative practices, bioenergetic exercises, art therapy, and narrative techniques for reprocessing traumatic experiences (Berger 2007)
  - SESSION 1 – GETTING STARTED: introducing group leaders, participants and the programme; presenting an overview of the programme
  - SESSION 2 – STRENGTHENING YOUR PERSONAL RESOURCES: identifying students' personal resource profiles and providing them with new coping skills; learning a model (the M-O-S-T B-A-S-I-C model) for enhancing their coping repertoire

Gelkopf 2008 *(Continued)*

- SESSION 3 – INHABITING YOUR BODY: learning the role of the body and its function during stress, becoming aware of somatic reactions pertaining to stress, and developing sensory–motor strategies to control the body during stressful situations
- SESSION 4 – KNOWING YOUR FEELINGS: enhancing students' emotional awareness, identifying and clarifying feelings, and becoming aware of the connections between sensations and feelings; learning various modalities to express feelings
- SESSION 5 – CONTROLLING YOUR EMOTIONS WITH YOUR MIND: exploring relationships between sensations, thoughts, and feelings, and learning cognitive coping skills
- SESSION 6 – DEALING WITH FEARS: normalising fears and learning new ways to deal with them and to create an inner sense of safety
- SESSION 7 – DEALING WITH ANGER AND RAGE: confronting anger and rage and expressing them in a controlled manner; learning and practising assertiveness
- SESSION 8 – COPING WITH GRIEF AND LOSS: exploring grief and loss experiences and providing an opportunity to express these feelings within a safe context
- SESSION 9 – BUILDING A SOCIAL SHIELD: exploring social needs and ways to strengthen our support system; learning to ask for help and to become more emphatic
- SESSION 10 – BOOSTING YOUR SELF-ESTEEM: exploring self-image and the way it affects our coping styles; learning to accept deficits and acknowledge strengths
- SESSION 11 – TURNING CRISIS INTO OPPORTUNITY: becoming aware of negative thought patterns and learning how to reframe them positively
- SESSION 12 – SEEKING A BETTER FUTURE: exploring future dreams and fantasies and learning how to build a plan toward achieving them; reviewing the programme and providing an opportunity for closure
- ERASE Stress found to be efficacious in reducing stress-related symptoms of children exposed to war and terrorism

Control: active control (Befriending seminar) (n = 25)

- *delivery*: face-to-face; psychoeducational procedure (lectures and discussions, rather than experiential exercises, skills training practices and simulations in IG)
- *providers*: administered by the same local organisation that had sponsored the ERASE Stress programme; led by local psychologists and social worker
- *duration of treatment period and timing*: 32-hour seminar conducted over 2 weekends
- *description*:
  - aims at giving tools for emotional support to volunteers working at Sumithrayo; includes lectures and interactive discussions on providing emotional support and emphatic listening, conflict resolution, processing traumatic experiences, parenting, drug abuse, and suicide prevention; experiential exercises aimed at enhancing group cohesiveness and empowering the participants; throughout the seminar, the precepts of co-operation, communication, affirmation and acceptance are explained and exercised
  - compared to IG: NO focus on personal tsunami relief experience of participants; NO provision of specific trauma-related knowledge and techniques for enhancing children's resiliency; addressed issues such as drug abuse and suicide prevention (in contrast to IG)
- *compliance*: no dropout
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: standard seminar given to many of Sumithrayo volunteers; Ellawala 2004

Outcomes

Outcomes collected and reported:

- personal optimism - single item modified from Children's Future Orientation Scale
- personal sense of self-efficacy - single item
- professional self-efficacy - Disaster-Helper Self-Efficacy Scale
- sense of mastery - Mastery Scale
- cognitive coping strategy, self-blame - CERQ
- cognitive coping strategy, acceptance - CERQ
- cognitive coping strategy, rumination - CERQ

Gelkopf 2008 *(Continued)*

- cognitive coping strategy, positive refocusing - CERQ
- cognitive coping strategy, refocusing on planning - CERQ
- cognitive coping strategy, positive reappraisal - CERQ
- cognitive coping strategy, putting into perspective - CERQ
- cognitive coping strategy, catastrophising - CERQ
- cognitive coping strategy, blaming others - CERQ

Time points measured and reported: 1) pre-intervention; 2) post-intervention

Adverse events: not specified

Notes	**Contact with authors:** We contacted authors to get the information on whether the mental health volunteers included in the study were healthcare professionals and if the authors could provide the summary outcome data for this subgroup only (Gelkopf 2019 [pers comm]). **Study start/end date:** not specified **Funding source:** financial support by the Silverton Foundation **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by authors:** not specified **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Marc Gelkopf; Lev Hasharon Mental Health Center, POB 9000, Netanya 42100, Israel; emgelkopf@013.net.il

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Quote: "From the list of 62 participants, 37 were randomly chosen 2 weeks before the training (using the Excel computer application random number generator) to participate in the ERASE Stress training program." Quote: "Except for a nonsignificant tendency for a higher income level in the experimental group, results suggest no difference between the experimental and control groups on the demographic and exposure variables. This suggests that the groups were of similar backgrounds (see Table 2)." Quote: "Differences between the experimental and control groups showed more personal optimism in the control group, $t(68) = 3.4$, $p < .001$; the experimental group showed more rumination, $t(68) = 5.2$, $p < .001$, and catastrophizing, $t(68) = 4.3$, $p < .001$." Judgement comment: The investigators describe a random component in the sequence generation process (computer random-number generator) and there is verified baseline comparability of groups for most sociodemographic characteristics except for income (different results in table 2 and text); significant baseline differences in some outcomes of interest (optimism, rumination, catastrophising) on the basis of analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias)	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding

Gelkopf 2008 *(Continued)*

Subjective outcomes		
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Of those registered for the ERASE Stress training program, 35 completed the entire 4-day, 30-hr workshop that was given over 2 weekends. Two participants dropped out for personal reasons. All participants who registered for the Befriending seminar completed it." Judgement comment: reasons for missing outcome data unlikely to be related to true outcome with relative balance in missing data between groups (IG: n = 2 for personal reasons; CG: n = 0); per-protocol analysis (only participants who took part completely in allocated intervention)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Hosseinnejad 2018

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** a priori sample size calculation (95% CI, 80% power) revealed required sample size of 40 in each group **Imputation of missing data:** not specified
Participants	**Country:** Iran**Setting:** nursing personnel from Shafa Hospital; training setting not specified**Age:** range = 24 - 45 years**Sample size (randomised):** 80**Sex:** 73 women, 7 men**Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** nursing personnel from Shafa Hospital **Inclusion criteria:** 1) male and female nurses working in Shafa Hospital in Rasht; 2) with work experience of between 1 and 30 years; 3) with a minimum undergraduate degree; 4) 22 – 60 years old (see also trial registration) **Exclusion criteria:** 1) nurses who did not have the opportunity to take part in the research; 2) persons who could not attend at least 2 sessions of resilience training; 3) nurses with a high resilience score (CD-RISC) (see also trial registration) **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** resiliency skills training course (n = 40) • *delivery*: face-to-face; group setting • *providers*: researcher

Hosseinnejad 2018 *(Continued)*

- *duration of treatment period and timing*: 10 sessions (each 45 minutes); 2 weekly sessions (overall 5 weeks); each session repeated in the same week to ensure that participants who could not attend main meeting (e.g. due to shift work) were able to participate in the training session
- *description*:
  - SESSION 1: a) providing information, explaining study objectives and familiarising participants with each other; b) target: 1. introducing the presenter and participants; 2. statement of purpose, rules and framework of the group 3. completion of questionnaire; providing definition of resilience and importance and presenting related tasks
  - SESSION 2: a) strengthening self-confidence and self-reliance; b) target: 1. simple and clear definition of self-awareness; 2. expressing the components of self-awareness; 3. identifying the strengths and weaknesses; 4. introduction to the concept of optimism and its effect on self-esteem; 5. clear understanding of self-confidence; 6. effective on strengthening self-esteem; 7. importance and effect of self-esteem in life; 8. techniques to increase self-confidence; 9. pre-session review assignments and presenting new assignments
  - SESSION 3: a) managing emotions and emotions; b) target: 1. recognise their emotions; 2. awareness of their emerging performance; 3. ability to change emotions through changing beliefs; 4. assessment of prior assignments and presentation of new assignments
  - SESSION 4: a) coping with stress; b) target: 1. express the concept of stress; 2. stress coping methods; 3. assessment of pre-assignments and presenting new assignments
  - SESSION 5: a) anger management; b) target: 1. expressing the concept of anger; 2. presenting the causes and consequences of anger; 3. recognising the feeling of anger in itself; 4. anger management and anger management techniques; 5. assessment of pre-assignments and new assignments
  - SESSION 6: a) effective communication; b) target: 1. familiarity with the communication process; 2. correct and incorrect communication with colleagues and clients
  - SESSION 7: a) problem-solving; b) target: 1. understanding problem-solving steps; 2. how to apply and applying problem solving; 3. pre-assessment assignments and presenting new assignments
  - SESSION 8: a) decision-making; b) target: 1. the right criteria for a good decision; 2. the importance and value of a right decision; 3. predicting the consequences and consequences of the decisions
  - SESSION 9: a) targeting and how to achieve the goal and the future; b) target: 1. express a simple concept of purpose and its types; 2. importance of goal-setting and planning for success in life; 3. training and practical training of goal-setting and planning; 4. assignment
  - SESSION 10: a) review and summary; b) target: 1. summarising the content of all sessions; 2. responding to participants' questions; 3. completing the questionnaire
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: not specified

Control: TAU (n = 40)

- *description*: routine programme
- no other information specified

Outcomes

Outcomes collected and reported:

- satisfaction with future career - COPSOQ
- satisfaction with physical working conditions - COPSOQ
- satisfaction with use of empowerment -COPSOQ
- job satisfaction - COPSOQ
- satisfaction with job as whole - COPSOQ

Time points measured and reported: 1) pre-intervention; 2) 1-month follow-up (1 month post-intervention)

Adverse events: not specified

Notes

Contact with authors: We contacted the authors about potential missing data (withdrawals/exclusions) in the study and if the assessment took place at pre-intervention and at 1 month after end of

Hosseinnejad 2018 *(Continued)*

treatment, or also at 3-month follow-up (as specified in trial registration). We also asked for the means and SDs of job satisfaction in the 2 groups at each time point with the number of participants analysed and more details about the content of the routine programme in the CG.; no response to 2 inquiries

Study start/end date: see trial registration: expected recruitment start date: 23 October 2017; expected recruitment end date: 22 November 2017
Funding source: see trial registration: University of Social Welfare and Rehabilitation as sponsor
Declaration of interest: no conflict of interest declared
Ethical approval needed/obtained for study: ethics committee license obtained from University of Social Welfare and Rehabilitation Sciences
Comments by study authors: trial registration: IRCT2017091636207N1 (Registered in Guilan University of Medical Sciences Healing Hospital and for co-operation with Nursing Officers and Practitioners)
Miscellaneous outcomes by the review authors: article in Persian (translated)
Correspondence: Fatemeh Hosseinnejad (MSc); corresponding author: Narges Arsalani (PhD), Department of Nursing, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran; nargesarsalani@gmail.com

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Eighty nursing personnel from Shafa Hospital in Rash were recruited and randomly assigned to experimental and control groups." Quote: "Results showed no difference between the two group of intervention and control in terms of demographic characteristics." Judgement comment: insufficient information about random sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for sociodemographic characteristics (e.g. age, gender, marital status) on the basis of analysis; baseline comparability for outcomes not specified
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "این مطالعه از نوع کارآزمایی بالینی دو گروهی دربرگیرنده گروه آزمون و گروه شاهد بود." [This study was a double-blind clinical trial that included experimental and control groups] Quote: see also trial registration: blinding: not blinded Judgement comment: according to publication, double-blind clinical trial; however, according to trial registration no blinding occurred; face-to-face intervention, i.e. blinding probably broken and the outcome is likely to be influenced by the lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (e.g. n = 40 participants randomised to each group; but number of participants analysed not stated for each group; unclear if there were any missing data and if missing data were imputed)
Selective reporting (reporting bias)	High risk	Quote: "(IRCT2017091636207N1)"

Hosseinnejad 2018 *(Continued)*

	Judgement comment: trial registration available (IRCT2017091636207N1); and the study's prespecified outcomes seem to have been reported in the prespecified way; however, in the trial registration the second assessment is specified for a 3-month follow-up (i.e. 3 months after the intervention), whereas the publication reports a 1-month follow-up

Ireland 2017

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified; sample size was a weakness of the current study and possibly precluded several simple effects from reaching conventional levels of significance **Imputation of missing data:** not applicable since there were no withdrawals or exclusions
Participants	**Country:** Australia **Setting:** medical interns from large hospital ED; exact training setting not specified **Age:** mean = 26.88 (SD = 4.79, range = 22 - 48) years **Sample size (randomised):** 44 **Sex:** 28 women, 16 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** burnout (CBI): IG = 2.55 (0.52), CG = 2.65 (0.75) **Population description:** intern doctors completing their practicum rotation in the ED of a major metropolitan hospital **Included criteria:** not specified **Excluded criteria:** not specified **Attrition (withdrawals and exclusions):** information received from authors (Ireland 2019 [pers comm]): no withdrawals or exclusions; all participants stayed in the trial for the full length of time **Reasons for missing data:** not applicable since there were no withdrawals or exclusions

Interventions	**Intervention:** Mindfulness training programme (for participants named as "resiliency and mindfulness program") (n = 23)
	
	• *delivery*: face-to-face; training workshops, probably group setting
	• *providers*: not specified
	• *duration of treatment period and timing*: 10 weekly 1-hour sessions
	• *description*:
	  ◦ mix mindfulness education and practice; adapted from well-validated psychological treatment programmes (MBSR, MBCT, and ACT); adaptations necessary to make material applicable for non-clinical population
	  ◦ 10 SESSIONS: (1) introducing mindfulness, (2) everyday awareness and automatic pilot, (3) barriers to being mindful, (4) mindfulness of breathing theory and activities, (5) staying present at work

Ireland 2017 *(Continued)*

and daily life, (6) letting go of sensations and emotions, (7) the nature of thoughts, (8) self-care, (9) applying what has been taught, and (10) review
    - Each session covered theoretical content of other intervention programmes (MBSR; MBCT, ACT) and, when time permitted, included common mindfulness exercises (mindfulness of breathing, mindfulness of the body, mindfulness of eating, etc.)
    - participants encouraged to practise regularly outside the sessions
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: adapted from well-validated psychological treatment programmes (MBSR, MBCT, ACT)

Control: active control (n = 21)

- *duration of treatment period and timing*: 1 hour a week for 10 weeks
- *description*: extra hour break time in the middle of the day
- *compliance*: not specified

Outcomes

Outcomes collected and reported:

- perceived stress - PSS
- burnout - CBI

Time points measured and reported: 1) pre-intervention; 2) during intervention (week 5 of 10-week intervention); 3) post-intervention (in final session, i.e. week 10)

Adverse events: not specified

Notes

Contact with authors: We contacted the authors to get the information about possible withdrawals/exclusions in the 2 groups and the number of participants analysed in each group (Ireland 2019 [pers comm]).

Study start/end date: not specified

Funding source: not specified

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

Ethical approval needed/obtained for study: ethics approval through the host institution

Comments by study authors: not specified

Miscellaneous outcomes by the review authors: information received from authors (Ireland 2019 [pers comm]): There were no withdrawals or exclusions.; number of participants analysed in each group: full sample as reported in the article; all participants stayed in the trial for the full length of time

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Following the provision of signed consent and the completion of the first testing session, participants were randomly assigned to the intervention (n = 23) or control group (n = 21)." Quote: "A randomized control trial methodology (with 44 intern doctors) was utilized to test this hypothesis."

Ireland 2017 *(Continued)*

		Quote: "Conditions were equivalent pretest in prior with regards to experience with meditation/mindfulness (F = 0.08, p = 0.776, g 2 < 0.01), the appeal of meditation/ mindfulness (F = 0.73, p = 0.401, g 2 = 0.02), and expectations of the potential helpfulness of meditation/mindfulness (F < 0.01, p = 0.963, g 2 < 0.01)." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability for experience with meditation/mindfulness, appeal of meditation/mindfulness and expectations of mindfulness; insufficient information about baseline comparability (statistical significance) for sociodemographic characteristics (e.g. age, sex) and outcomes of interest (see T1 in Table 1)
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Judgement comment: information received from authors: no withdrawals or exclusions; all participants stayed in the trial for the full length of time
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

ISRCTN69644721

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified in trial registration **Imputation of missing data:** not specified
Participants	**Country:** UK **Setting:** 4 Mind sites: Peterborough and Fenland, Tyneside, Wirral, or London (City, Hackney and Waltham Forest) **Age:** not specified **Sample size (randomised):** 255 (targeted) **Sex:** not specified

ISRCTN69644721 *(Continued)*

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified

Population description: adults aged 18 to 67 years old who work in 1 of the 4 emergency services: police, fire and rescue, ambulance, and search and rescue

Inclusion criteria: 1) adults aged 18 to 67 years old; 2) fluent in English; 3) work in 1 of the 4 emergency services: police, fire and rescue, ambulance, and search and rescue

Exclusion criteria: Participants who were depressed or suffering from post-traumatic stress disorder and who required treatment for these conditions.

Attrition (withdrawals and exclusions): not specified

Reasons for missing data: not specified

Interventions

Intervention 1: new resilience intervention (n not specified)

- *delivery*: online (digital modules) and face-to-face (group sessions); individual and group setting
- *providers*: group sessions provided at local Mind centres
- *duration of treatment period and timing*:
  - 4 weeks in total
  - each week participant completes 1 x 15/20-minute digital module
  - 4 weekly 2-hour group sessions with break
- *description*:
  - DIGITAL MODULES: 4 digital modules covering 4 main topics linked to maintaining resilience (attention training, dwelling, dealing with difficult emotions, transforming worry)
  - GROUP SESSIONS: cover experiential exercises, work in pairs and group discussion; cover main topics linked to maintaining resilience
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: no theoretical foundation specified

Intervention 2: digital-only intervention (n not specified)

- *delivery*: online (reading material)
- *providers*: self-guided
- *duration of treatment period and timing*: 4 weeks; weekly 30-minute online modules a week
- *description*: reading material about mental health and well-being
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: not specified

Control: wait-list control (n not specified; received new resilience intervention 4 months later)

Outcomes

Outcomes collected and reported:

Primary outcome

- well-being - Warwick Edinburgh Mental Wellbeing scale and ONS (Office for National Statistics) well-being questions (item 1)
- mindful attention - Mindful Attention and Awareness Scale

Secondary outcome

- general health - General Health Questionnaire-12
- resilience - statements about resilience
- life satisfaction - statements about life satisfaction

ISRCTN69644721 *(Continued)*

- awareness of mental health management tools - questions about knowledge of mental health management tools
- rumination - statements about dwelling
- depression - Patient Health Questionnaire-9
- anxiety - Generalized Anxiety Disorder 7

Outcomes reported not specified

Time points measured and reported: 1) pre-intervention; 2) post-intervention; 3) 3-month follow-up (3 months post-intervention); **time points reported not specified**

Adverse events: not specified

Notes

Contact with authors: We contacted the authors for the dates the trial was completed and published and if the authors could provide the summary outcome data for the 2 groups (Wild 2018 [pers comm]).

Study start/end date: October 2016 – April 2017

Funding source: University of Oxford; Mind, the mental health charity (UK)

Declaration of interest: not specified

Ethical approval needed/obtained for study: approved by Medical Sciences Inter-Divisional Research Ethics Committee, 14 October 2016, ref: R47862/RE001

Comments by authors: not specified

Miscellaneous outcomes by the review authors: information received from authors (Wild 2018 [pers comm]): trial completed but unpublished; study conducted at 4 Mind centres in Peterborough and Fenland, Tyneside, Wirral, or London

Correspondence: Dr Jennifer Wild (primary contact), Department of Experimental Psychology, University of Oxford, South Parks Road, Oxford, OX1 3UD, United Kingdom; Jennifer.wild@psy.ox.ac.uk

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote (see trial registration): "Participants are then randomly allocated to one of three groups." Quote (see trial registration): "Emergency workers will be randomly allocated to receive one of the following three interventions: 1. The new resilience intervention (...), 2. The digital-only intervention (...), 3. The wait-list condition (...)" Judgement comment: based on trial registration, insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; no judgement on baseline comparability in sociodemographic and outcome variables possible based on trial registration
Allocation concealment (selection bias)	Unclear risk	Judgement comment: based on trial registration, insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: based on trial registration, blinding of participants and personnel probably not done (1 group includes face-to-face group sessions) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: based on trial registration, insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the

ISRCTN69644721 *(Continued)*

		participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: no judgement possible based on trial registration
Selective reporting (reporting bias)	Unclear risk	Judgement comment: no judgement possible based on trial registration

Khoshnazary 2016

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** no imputation of missing data; per-protocol analysis (i.e. only participants who completed the study, excluding the 3 withdrawals in the IG)
Participants	**Country:** Iran **Setting:** nurses in a psychiatric department; training setting not specified (probably at home, in part, due to written training) **Age:** range = 24 - 55 years **Sample size (randomised):** 76 **Sex:** 51 women, 22 men (after 3 withdrawals) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** nurses in psychiatric department **Inclusion criteria:** 1) providing consent to take part in the study; 2) having a bachelor's degree or higher; 3) working morning, evening or night shifts at Roozbeh Psychiatric Hospital; 4) having at least 1 year's experience at Roozbeh Psychiatric Center; 5) no emotional-intelligence training experience **Exclusion criteria:** 1) failure to participate or to participate appropriately in emotional intelligence training; 2) boredom or illness that prevented participation or continued collaboration at the time of the study; 3) moving to another centre; 4) incomplete completion of questionnaire or failure to return the questionnaire during the procedure; 5) psychosocial problems; 6) use of drugs **Attrition (withdrawals and exclusions):** 3 withdrawals in IG **Reasons for missing data:** not specified
Interventions	**Intervention:** emotional intelligence (EI) training (n = 38) • *delivery*: combination: face-to-face, probably group setting (workshop) + written training (educational pamphlets) • *providers*: not specified for workshop • *duration of treatment period and timing*: 1-day workshop of 7 hours + written training for 6 weeks with educational pamphlets

Khoshnazary 2016 *(Continued)*

- *description*:
  - 1-DAY WORKSHOP:
    - familiarising with history, defining emotional intelligence and how to apply it in the workplace, family environment and relations to people around
    - workshop teaches 3 skills out of 15 emotional intelligence-enhancing skills
  - 6-WEEK WRITTEN TRAINING to follow internalisation of skills through educational pamphlets about Bar-On emotional intelligence skills
    - each week: follow-up of 2 of the 15 EI skills (problem-solving, happiness, optimism, stress tolerance, impulse control, flexibility, realism/reality testing, independence, empathy, interpersonal relationships, social responsibility, emotional self-awareness, self-esteem/assertiveness, self-healing/self-actualisation, self-expression/self-regard) are given along with exercises to develop and reinforce these skills
- *compliance*: n = 3/38 withdrawals
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: not specified

Control: not specified (n = 38)

- *description*: In case of effective training, all training content should be presented to CG in 1 CD.

Outcomes

Outcomes collected and reported:

- emotional intelligence - BarOn Emotional Quotient Inventory
- resilience - CD-RISC

Time points measured and reported: 1) pre-intervention; 2) post-intervention

Adverse events: not specified

Notes

Contact with authors: no correspondence required
Study start/end date: not exactly specified; recruitment in 2014
Funding source: not specified
Declaration of interest: not specified
Ethical approval needed/obtained for study: approved by Ethics Committee of University of Social Welfare and Rehabilitation Sciences (code: 8.4931.IR.USWR.REC)
Comments by study authors: article is the result of a Master's Degree in Nursing at the University of Social Welfare and Rehabilitation Sciences
Miscellaneous outcomes by the review authors: article in Persian (translated)
Correspondence: S. Khoshnazary; corresponding author: M. A. Hosseini, PhD, Associate Professor, Nursing Department, University of Social Welfare & Rehabilitation Sciences, Tehran, Iran; mahmaimy2020@gmail.com

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The people divided two groups. Intervention and control groups in sample random method." Quote: "Results showed that no different between two group of intervention and control about demographic characteristics." Quote: "مرتبط اصلی ه ای ی افت ه در <b>329/72 ± 29/91 م د اخل ه گروه در م د اخل ه از قبل ه ی ج ان ی ه وش اخت ال ف آم ار ی ن ظر از ک ه ب ود 326/73 ± 36/55 .)p=0/501(ن د اشت وج ود گروه دو ک ن ت رل گروه در و اج رای از ب ع د ب ی ن م ع ن ادار ی" [In the main findings related to the purpose of the study, the mean score of emotional intelligence before intervention in the intervention group was 329.72 (29.91) and in the control group was 326.73 (36.55) which was not statistically significant (p = .501).]

Khoshnazary 2016 *(Continued)*

		Quote: "قبل از مداخله گروه در مداخله داشت وجود گروه دوبین آوری تاب نمره میانگین که بود 57/70 ± 15/14 شاهد گروه در و 61/71 ± 12/47 نداشت وجود گروه دوبین معنادار اختالف آماری نظر از گروه در آوری تاب نمره میانگین مداخله اجرای از بعد (p=0/098) 58/92 ± 13/71 به کنترل" [The mean pre-intervention resiliency score in the vention group was 61.71 (12.47) and in the control group was 57.70 (15.14) with no statistically significant difference between the two groups (p = 0.098).] Quote: "شامل شناختی: می زی رشرح به ،پژوهش جمعیت مختغیره ای داد نشان مطالعه نتایج (p=0/08 ،سن) (p=0/118 ،تاهل) (p=0/408 ،میزان) (p=0/369 ،کاری ساب قه) (p=0/501 ،پست) (p=0/09 ،تحصیالت) (p=0/25 ،استخدامی وضعیت) (p=0/82 ،اضافه دو) (p=0/77 ،دیگر حرلی در اشتغال) (p=0/194 ،در کاری شیفت نداشته وجود گروه دوبین" [The results showed that there were no cant differences between the two groups in demographic variables including sex (p = 0.08), age (p = 0.188), marital status (p = 0.408), educational level (p = 0.369), work experience (p = 0.501), organizational position (p = 0.25), employment status (p = 0.82), overtime (p = 0.09), shift work (p = 0.77) and other employment (p = 0.194).] Judgement comment: insufficient information about random sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for sociodemographic characteristics and outcomes of interest on the basis of analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: control group not further specified; blinding of participants and participants probably not done (face-to-face intervention) and the outcome is likely to be influenced by the lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "3 گروه از نفر سه که داشت نشرکت نفر 76 دوره 33 ه ای افته پژوهش این در 73 نه ای ت در و دادند انصراف پژوهش در مشارکت ادامه از مداخله بودن همسان بخش دو در ،تحقیق این ه ایی افته .م اندند فرضیه محوریت با اصلی ه ایی باقی نفر" [The study involved 76 ple, with three of the intervention group withdrawing from participation in the study, and 73 remained.] Judgement comment: reasons for missing data likely to be related to true outcome with slight imbalance in missing data between groups (IG: n = 3 withdrawals; CG: n = 0); no reasons specified; per-protocol analysis (i.e. only participants who completed trial, without n = 3 withdrawals in IG)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Klatt 2015

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** USA **Setting:** ICUs **Age:** see Population description; age not specified **Sample size (randomised):** 34 (information received from authors; Klatt 2019 [pers comm]) **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** employees at ICUs **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** Mindfulness in Motion (MIM) (n = 17; information received from authors; Klatt 2019 [pers comm]) • *delivery*: face-to-face (Modified mindfulness-based intervention (MBI) specific for onsite delivery, Yoga movement is done standing or seated, music in background); power-point presentation, mind-body relaxation; delivery at work • *providers*: M. Klatt (developer of MIM protocol in this study; trained yoga instructor (Yoga Alliance Certified) and attendee at a MBSR 9-day training for Health Professionals (M. Klatt has additionally designed a train-the-trainer programme for others with previous yoga/mindfulness training in order to scale its delivery) • *duration of treatment period and timing*: 8 x weekly 1-hour sessions + 1 x 2-hour "retreat"); 20 minutes daily homework

Klatt 2015 *(Continued)*

- *description*:
  - MIM teaches mindful awareness principles, rehearses mindfulness as a group, emphasises the use of gentle yoga stretches, uses unique relaxing music in the background of group sessions/individual practice, and requires daily individual mindfulness practice
  - The weekly session's content and structure follow that of the traditional MBSR, with an increased emphasis on bodily relaxation with the soft background music preceding the discussion of mindful awareness of cognitive habits
  - Participants receive 3 daily practice CDs (with 20-minute practice tracks) and 1 yoga DVD with the background music and similar meditations to the ones practised as a group, to be used for individual practice
  - same format for weekly 1-hour sessions:
    - 1. Begin each session by asking participants to count their respiration by placing their right hand on their chest and counting only inhales for 30 seconds as timed by the instructor. Ask each participant to record their breath count in a log provided
    - 2. Play relaxing music in the background to set the climate for MIM
    - 3. State that the intent of the didactic/experiential sessions is to encourage the explicitly-defined objective of the programme: resiliency building and stress reduction through mindful awareness of habitual patterns of stress reactivity
    - 4. Each week, deliver a prompt for contemplation during the next hour and assure the participants that the response to the prompt is personal and silent. Invite the participants to choose to share responses, without any pressure to verbalise personal reflections. The prompts directly relate to each weekly theme
    - 5. Deliver a 15-minute PowerPoint presentation on topics including stress and work-related stress, theoretical material related to mindfulness, the somatic mind/body connection, relaxation, yoga, meditation, self-awareness, and bodily cues relating to emotional reactivity and the relation of these topics to the specific workplace stressors
    - 6. Following the prompt, lead the participants through a mind-body relaxation relating to the weekly prompt
    - 7. End each session by asking each participant to count their respirations for 30 seconds and record their individual end-of-weekly-session breath count in the log provided; homework assignments
- *compliance*: intervention well received with 97% retention rate
- *integrity of delivery*: not specified
- *economic information (intervention cost, changes in other costs as result of intervention)*: Other shift nurses were paid to come in an hour before their normal start time so that the MBI participant's patients were cared for by experienced nurses
- *theoretical basis*:
  - MBSR: stress reduction intervention that can be used to retrain the mind to change its usual responses to stressful situations; teaches non-reactive awareness of one's affective response to external events and is presented as the key to changing one's internal experience of stress
  - Mindfulness is characterised by non-judgemental, sustained moment-to-moment awareness of physical sensations, perceptions, affective states, thoughts and imagery
  - MIM is offered as a modified, less time-intensive method to be delivered in the workplace, and intends to enable busy working adults to experience the benefits of mindfulness
  - Development of MIM protocol based on previous studies that suggest the efficacy of mindfulness interventions do not correlate with the length of time spent on the group didactic practice (Jha 2010; Klatt 2009; Carmody 2009) and yield similar results to the longer traditional MBSR
  - The self-reflection and awareness, and the shared experience of the emerging self-awareness, may contribute to a climate/culture change in a highly stressed work environment.
  - Bishop 2004 generated a functional definition of mindfulness for researchers concerning the role and essential elements of an MBI. Two critical components were determined to be (1) self-regulation of attention and (2) the adoption of an orientation toward one's experiences in the present moment (Bishop 2004). MIM, the onsite MBI protocol described in this report, was constructed to retain the essential elements of mindfulness, as it was conceived and has developed in traditional MBSR (Kabat-Zinn 1982; Kabat-Zinn 1990), while adapting it in a pragmatic way for working adults. It uses the operational definition of mindfulness, yet differs in the worksite location of the inter-

Klatt 2015 *(Continued)*

	vention, and the weekly time commitment of the group meeting and individual "homework" suggestion. **Control:** wait-list control (n = 17; information received from authors; Klatt 2019 [pers comm])
Outcomes	**Outcomes collected and reported:** • resiliency - CD-RISC • work engagement, vigor - UWES • work engagement, dedication - UWES • work engagement, absorption - UWES • breath counts (only in IG) **Time points measured and reported:** 1) pre-intervention (1 week before the intervention); 2) post-intervention (1 week after last session) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted authors to ask for the number of participants allocated to and analysed in each group, as well as the means and SDs for resiliency for the 2 groups at each time point. We also inquired whether the authors performed an intention-to-treat analysis. We received the information about the number of participants in each group from the authors (Klatt 2019 [pers comm]). **Study start/end date:** not specified **Funding source:** financial contributions to the project by the following entities at the Ohio State University: Stress, Trauma, and Resilience (STAR) Program, Health System Administration, Critical Care Nursing, and the Faculty Associates Program through the Women's Place **Declaration of interest:** Subsequent to the completion of this research conducted at the Ohio State University, Dr Klatt has served as a consultant to Mindful Management, Limited Liability Company to whom The Ohio State University has licensed the rights of the individual practice CD/DVD; all other authors have nothing to disclose. **Ethical approval needed/obtained for study:** IRB approval from The Ohio State University **Comments by authors:** not specified **Miscellaneous outcomes by the review authors:** information recevied from authors: 17 participants in each group (Klatt 2019 [pers comm]) **Correspondence:** Maryanna Klatt, Department of Family Medicine, The Ohio State University College of Medicine; Maryanna.Klatt@osumc.edu

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "To determine the intervention feasibility/efficacy, we conducted a randomized wait-list control group in Intensive Care Units (ICUs)." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; no information about comparability of groups at baseline or respective analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias)	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding

Klatt 2015 *(Continued)*

Subjective outcomes		
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information on blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires and the self-measurement of breath counts may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote: "The intervention is well received with 97% retention rate." Judgement comment: insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk'; information received from authors: n = 17 participants allocated to each group; for some results, n = 34 participants analysed; however the amount of potential missing data not stated
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were pre-specified (pre-specified paired t-tests were reported)

Lebares 2018

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** study was not powered to detect statistically significant inter-group differences and comprises a convenience sample; consistent with recommendations for pilot trials. No focus on statistical power but use of linear mixed-effects modelling (ANCOVA) for multivariate analysis, with baseline scores as a covariate; of relevance to future trials. Power calculations suggest that a sample size of 40 participants in a 2-group comparison will have 80% power to detect an effect size expressed as partial η2 of 0.17 **Imputation of missing data:** no imputation of missing data; no missing data reported for most outcomes; 2 excluded from fMRI analysis
Participants	**Country:** USA **Setting:** postgraduate year 1 surgery residents at University of California, San Francisco; training setting not specified **Age:** mean = 28.3 (SD = 2.4) years **Sample size (randomised):** 21 **Sex:** 8 women, 13 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** burnout (abbreviated MBI): IG = 23.92 (6.83), CG = 25.33 (7.62); depression (PHQ-9): IG = 1.67 (1.56), CG = 0.89 (0.93) **Population description:** first-year surgery residents **Inclusion criteria:** 1) postgraduate year 1 surgery residents at University of California, San Francisco (UCSF); 2) without a current mindfulness meditation practice; 3) who provided written and oral informed consent **Exclusion criteria:** 1) previous experience with mindfulness practice; 2) chronic inflammatory illness; 3) current pregnancy **Attrition (withdrawals and exclusions):** 0 lost to follow-up in IG and 0 withdrew from CG; 1 participant initially assigned to CG mistakenly attended first IG sessions and finally participated in IG. 2 excluded from fMRI analysis **Reasons for missing data:** implanted metal, protocol glitch (n = 2 exclusions from fMRI analysis)

Lebares 2018 *(Continued)*

Interventions	**Intervention:** Modified MBSR (modMBSR) (n = 11; after participant assigned to CG mistakenly attended first IG session and finally participated in IG; n = 12)
	• *delivery:* face-to-face; group setting (classes of 9 - 12 participants)
	• *providers:* instructor formally trained in MBSR by John Kabat-Zinn; with more than 10,000 hours of personal meditation practice, and more than 10 years of experience as an MBSR teacher
	• *duration of treatment period and timing:*
	  ◦ 8 weekly 2-hour classes (orientation and week 1 combined; preserved in-class experiential time, shortened discussions and didactics, no break compared to traditional MBSR)
	  ◦ 2 x 2- to 3-hour "mindfulness hike" (replaced mindfulness retreat in traditional MBSR) offered in weeks 6 and 7
	  ◦ daily practice of 20 minutes; debrief dinner at 12-month follow-up
	• *description:*
	  ◦ AS IN TRADITIONAL MBSR: focus of sessions on experiential training including formal (body awareness, yoga, and sitting meditation), and informal (walking meditation, transition breathing, momentary) mindfulness practices; remaining time filled with didactics and group activities embodying principles discussed in class; "mindfulness hike" in local nature
	  ◦ CLASS CONTENT: shorter group discussion and didactics; EMPHASIS: building a skill set for stress resilience in medicine
	  ◦ CONTEXTUALISATION: specific application of concepts and skills to professional situations (i.e. mindful communication with nurses and consults, breathing techniques for operating-room stress and mindful walking on rounds)
	  ◦ EXPECTATION: daily practice as a matter of ritual and discipline; it may be partly or largely informal due to reality of daily obligations
	• *compliance:* n = 0 withdrew; n = 12 received intervention with MBSR as randomised
	• *integrity of delivery:* not specified
	• *economic information:* no financial compensation for participants
	• *theoretical basis:*
	  ◦ Mindfulness-based stress reduction (MBSR; Kabat-Zinn 2013)
	  ◦ mindfulness meditation training involves cultivation of moment-to-moment awareness of thoughts, emotions, and sensations (also known as interoception; Johnson 2014; Kok 2017), development of nonreactivity in response to stimuli (also known as emotional regulation), and the enhancement of perspective-taking in oneself and others (Hölzel 2011; Ricard 2014)
	  ◦ the most scientifically-studied form of mindfulness training is the secular MBSR; MBSR is used because it is secular, codified, and the most scientifically-studied mindfulness-based intervention to date
	
	Control: attention control (n = 10; after 1 participant assigned to CG mistakenly attended first IG session and finally participated in IG; n = 9)
	• *delivery:* face-to-face; group setting
	• *providers:* not specified
	• *duration of treatment period and timing:* similar protected class time, home practice requirements and retreat-hike format to IG
	• *description:*
	  ◦ different content, same structure; shared reading and listening model used in WEEKLY DISCUSSIONS: of articles on topics such as perseverance, complications, honesty, and death, exploring self-care and the ethos of surgery
	  ◦ DAILY PRACTICE: any self-determined self-care activity
	  ◦ RETREAT HIKE: focus on the relaxing properties of nature
	• *compliance:* n = 0 withdrew; n = 9 received CG as randomised; n = 1 did not receive intervention as randomised (attended incorrect training class and finally participated in IG)
	• *integrity of delivery:* not specified
	• *economic information:* no financial compensation for participants
	• *theoretical basis*: not specified

Lebares 2018 *(Continued)*

Outcomes	**Outcomes collected and reported:** • perceived stress - PSS • mindfulness - Cognitive and Affective Mindfulness Scale–Revised • resilience - Block Ego-Resilience scale • Grit - Short Grit Scale • burnout - aMBI • depression - PHQ-9 • executive function, working memory - National Institutes of Health Executive Abilities (NIH-EXAMINER) • executive function, executive composite- NIH-EXAMINER • executive function, cognitive control - NIH-EXAMINER • executive function, fluency - NIH-EXAMINER • motor skills, peg transfer - Fundamentals of Laparoscopic Surgery (FLS) • motor skills, circle cutting - FLS • changes in neutral substrates in emotion regulation task (cognitive reappraisal) (blood oxygen level–dependent fMRI) **Time points measured and reported:** information in part received from authors (Lebares 2019 [pers comm]): 1) pre-intervention (before start of internship/intern year; always mid-June); 2) post-intervention (information from authors: within 1 week of the end of training/3½ months after baseline, i.e. 8-week training approximately 1½ months after baseline during internship); 3) approximately 8½-month follow-up (approximately 12 months after baseline in May of the following year; i.e. 8½ months after end of training which took place at 3½ months after baseline) **Adverse events:** no adverse patient events reported for study participation
Notes	**Contact with authors:** We contacted the authors to get more information about the assessments (time 2 immediately post-intervention, but 1½ months after training/3½ months after baseline; time 3 at 10 months after end of training/12 months after baseline?) and the number of participants analysed for the psychological outcomes (see different information in 2 flow diagrams of reports) (Lebares 2019 [pers comm]). **Study start/end date:** data collection from June 2016 – June 2017; data analysis from June 2017 to December 2017 **Funding source:** LEBARES 2018: Ms Desai was supported by National Institutes of Health grant R25#125451-03 Short Term Research Education Program to Increase Diversity in Health-Related Research (The National Institutes of Health had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication); LEBARES 2019: Dr Staffaroni supported by grants from the National Institutes of Health and grants from Larry L. Hillblom Foundation during the conduct of the study **Declaration of interest:** LEBARES 2018: no disclosures were reported; LEBARES 2019: Dr Staffaroni reported grants from the National Institutes of Health and grants from Larry L. Hillblom Foundation during the conduct of the study. No other disclosures were reported **Ethical approval needed/obtained for study:** all aspects of the intervention and assessment were approved in full by the UCSF IRB **Comments by study authors:** LEBARES 2018: this article was presented at the American College of Surgeons 104th Annual Clinical Congress, Scientific Forum; October 24, 2018; Boston, Massachusetts; trial registration: ClinicalTrials.gov identifier: NCT03141190 **Miscellaneous outcomes by the review authors:** acronym: Mindful Surgeon; information concerning time points in part received from authors (Lebares 2019 [pers comm]); LEBARES 2018 reports the feasibility results of the pilot, longitudinal, randomised clinical trial to investigate the feasibility of modified MBSR for use by surgical interns; LEBARES 2019 reports an additional analysis of this trial including findings for psychological outcomes, executive functioning, motor skills and neural substrates activated in emotion regulation **Stated purpose of the study:** LEBARES 2018: to test the feasibility and acceptability of modified Mindfulness-Based Stress Reduction (MBSR) training during surgical residency; LEBARES 2019: to explore

Lebares 2018 *(Continued)*

potential benefits to stress, cognition, and performance in postgraduate year 1 (PGY-1) surgery residents receiving modified mindfulness-based stress reduction (modMBSR)

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "pilot randomized clinical trial of modified MBSR vs an active control was conducted" Quote: "We randomized 21 PGY-1 surgery residents (8 [38%] women) using Wesleyan University's Research Randomizer 54 to either the modMBSR arm (n = 11; 4 [36%] women) or control arm (n = 10; 4 [40%] women), blocking for sex and surgical subspecialty designation." Quote: "Balancing for sex and subspecialty designation, we randomized participants to modified MBSR (n = 12) or an active control (n = 9) using third-party block randomization following described operationalized methods." Judgement comment: The investigators describe a random component in the sequence generation process (computer-generated randomisation: Wesleyan University's Research Randomizer), but there is no information about comparability of groups at baseline or respective analysis (e.g. for sociodemographic characteristics in Table 1 no statistical (non-)significance specified)
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Quote: "Eligible participants were postgraduate year 1 (PGY-1) surgery residents at UCSF, without a current mindfulness meditation practice who provided written and oral informed consent and were blinded to assignment." Judgement comment: blinding of participants ensured; blinding of personnel probably not done (face-to-face intervention), but the review authors judge that the outcome is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "Eligible participants were postgraduate year 1 (PGY-1) surgery residents at UCSF, without a current mindfulness meditation practice who provided written and oral informed consent and were blinded to assignment." Judgement comment: blinding of participants ensured; blinding of personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Judgement comment: insufficient information about blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	Unclear risk	Judgement comment: insufficient information about blinding of outcome assessment to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "One participant was initially allocated to the active control but did not receive the intervention owing to inadvertently attending the modMBSR training class during week 1. She was therefore reassigned to the modMBSR intervention group." Quote: "Two participants did not have functional magnetic resonance imaging (fMRI) scans analyzed. One was never scanned owing to implanted metal, and

Lebares 2018 *(Continued)*

		the other was scanned but data were incomplete (protocol glitch) and could not be analyzed." Quote: "We randomized 21 PGY-1 surgery residents (8 [38%] women) using Wesleyan University's Research Randomizer 54 to either the modMBSR arm (n = 11; 4 [36%] women) or control arm (n = 10; 4 [40%] women), blocking for sex and surgical subspecialty designation. A participant assigned to the control group mistakenly attended the first modMBSR session, resulting in final participation and analysis of modMBSR (n = 12; 5 [42%] women) and control (n = 9; 3 [33%] women) (Table 1 and Figure 1)." Judgement comment: no missing outcome data for psychological assessment, executive function testing and motor skills testing reported; overall: 1 participant initially allocated to CG did not receive allocated active control due to mistakenly attending an IG session; n = 2 excluded from fMRI, but reasons for missing data are unlikely to be related to true outcome (see reasons for missing data: implanted metal, protocol glitch)
Selective reporting (reporting bias)	Low risk	Judgement comment: trial registration (NCT03141190) available and all of the study's pre-specified (primary and secondary) outcomes that are of interest in the review have been reported in the prespecified way

Lin 2019

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** no imputation of missing data; per-protocol analysis (i.e. without 11 participants in IG who missed more than 2 sessions) and available-case analysis (i.e. only participants who completed (valid) questionnaires)
Participants	**Country:** mainland China **Setting:** nurses from general hospital; training setting not specified **Age:** mean = 31.50 (SD = 6.90) years **Sample size (randomised):** 110 **Sex:** 84 women, 6 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** nurses from 2 tertiary-level general hospitals **Inclusion criteria:** 1) being employed as a full-time nurse **Exclusion criteria:** 1) being a student nurse; 2) suffering from serious somatic disease; 3) taking mood-regulating drugs; 4) having suffered a major traumatic event in the past 6 months; 5) having participated in mindfulness training previously **Attrition (withdrawals and exclusions):** 20 (IG = 11 missed weekly sessions more than twice, CG = 9 did not complete questionnaire or submitted invalid questionnaires)

Lin 2019 *(Continued)*

Reasons for missing data: not specified

Interventions	**Intervention:** modMBSR (n = 55)

- *delivery*: face-to-face group setting (including guided practice, education, dialogues around participants' observations of their feelings, thoughts, and body sensations during practice) + online part: network Chatgroup (WeChat) on mobile phones
- *providers*: weekly group sessions facilitated by MBSR instructor (conducted by a researcher who has been practising mindfulness for 2 years and attended several MBSR courses, retreats, and other training activities related to mindfulness and meditation)
- *duration of treatment period and timing*: length of weekly group sessions and daily home-based practice modified to address time constraints of nurses (no half-day retreat compared to traditional MBSR programme); 8 x weekly 2-hour sessions; 20 minutes of formal mindfulness practice at home for 6 days/week for 8 weeks
- *description*:
  - WEEKLY GROUP SESSIONS:
    - WEEK 1: a) theme: first experience of mindfulness; b) session content: 1. introduce to each other; 2. introduce mindfulness and mindfulness training; 3. introduce this programme; 4. practice and discussion; 5. assignment of homework; c) in-class exercises: mindful eating (raisin exercises); mindful breathing (awareness of breath); d) homework: 1. formal training: mindful breathing (10 minutes) at least twice a day, 6 days a week; 2. informal training: mindful eating at least once a week
    - WEEK 2: a) theme: concentration: the beginning of mindfulness; b) session content: 1. discuss the stress response and the mechanism of MBSR; 2. introduce recent research on mindfulness; 3. practice and discussion; 4. assignment of homework; c) in-class exercises: mindful breathing; mindful walking; d) homework: 1. formal training: mindful breathing (10 minutes) at least twice a day, 6 days a week; 2. informal training: mindful walking at least once a week
    - WEEK 3: a) theme: pay attention to your body; b) session content: Introduce and teach the body scan technique; c) in-class exercises: mindful breathing; mindful walking; body scan; d) homework: 1. formal training: body scan (20 minutes) at least once a day, 6 days a week; 2. informal training: self-selection
    - WEEK 4: a) theme: awareness in sports; b) session content: 1. introduce the origin and characteristics of mindfulness yoga; 2. practice and discussion; 3. assignment of homework; c) in-class exercises: body scan; mindfulness standing yoga; d) homework: 1. formal training: body scan (20 minutes) at least once a day, 3 days a week; standing yoga (20 minutes) at least once a day, 3 days a week; 2. informal training: self-selection
    - WEEK 5: a) theme: thought is not reality; b) session content: 1. discuss the importance and truth of thought; 2. practice and discussion; 3. assignment of homework; c) In-class exercises: mindfulness meditation (mindful sitting with choiceless awareness); standing yoga; d) homework: 1. formal training: mindfulness meditation (20 minutes) at least once a day, 3 days a week; standing yoga (20 minutes) at least once a day, 3 days a week; 2. Informal training: self-selection
    - WEEK 6: a) theme: emotional management by mindfulness; b) session content: 1. listen to your emotions; 2. understand the relationship between the body and emotions; 3. introduce RAINa ; 4. practice and discussion; 5. assignment of homework; c) in-class exercises: mindfulness meditation (mindful sitting with choiceless awareness); reclining yoga; d) homework: 1. formal training: mindfulness meditation (20 minutes) at least once a day, 3 days a week; reclining yoga (20 minutes) at least once a day, 3 days a week; 2. informal training: self-selection
    - WEEK 7: a) theme: love yourself, love others; b) session content: 1. discuss interpersonal communication skills; 2. games (seeing the good in people); 3. practice and discussion; 4. assignment of homework; c) in-class exercises: transposition exercise; mindful communication; love-kindness mediation; d) homework: 1. formal training: participant's choice of practice (20 minutes) and love-kindness mediation at least once a day, 6 days a week; 2. informal training: self-selection
    - WEEK 8: a) theme: new mindful life; b) session content: 1. retrospective practice; 2. introduce and teach 3-minute breathing space; 3. encouragement to continue practising mindfulness in daily life; c) In-class exercises: mindfulness meditation; mindfulness yoga; body scan; 3-minute breathing space; d) homework: participant's choice of practice
    - NETWORK CHATGROUP WeChat: sending of session PowerPoint slides and audio recordings of guided mindfulness exercises, which helped the participants to share their practice experience

Lin 2019 *(Continued)*

or to ask the MBSR instructor questions; through WeChat group, nurses urged to attend sessions on time, to complete home-based practice and to fill out questionnaire, but home-based practice not mandatory

- *compliance*: during 8 weeks, research assistants recorded attendance of members of IG; if participants absent more than twice, participant classified as dropout from intervention; n = 11/55 (20%) missed weekly sessions more than twice/did not complete the weekly sessions and most of them did not finish the homework as required, owing to lack of time (according to reports of learning experiences); this noncompliance reduces effectiveness of intervention to a certain extent
- *integrity of delivery*: not specified
- *economic information*: upon completion of the programme, the participants were incentivised with continuing education credits if they attended at least 50% of the group sessions
- *theoretical basis*: based on the principles and exercises of MBSR (Kabat-Zinn 1990) and MBCT (Teasdale 2000)

Control: wait-list control (n = 55)

- *description*: CG had also WeChat group for connection and sending of questionnaires
- *compliance*: no withdrawals/exclusions during waiting period specified

Outcomes

Outcomes collected and reported:

- perceived stress - PSS
- positive affect - PANAS
- negative affect - PANAS
- resilience - CD-RISC
- job satisfaction - McCloskey/Mueller Satisfaction Scale

Time points measured and reported: 1) pre-intervention; 2) post-intervention; 3) 3-month follow-up (3 months post-intervention)

Adverse events: not specified

Notes

Contact with authors: no correspondence required

Study start/end date: exact study dates not specified; group intervention for 8 weeks from 25 April 2017 to 16 June 2017

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Declaration of interest: no potential conflicts of interest with respect to the research, authorship, and/or publication of this article

Ethical approval needed/obtained for study: approval by Ethical Committee of Xiangya Nursing School (approval number 2015078)

Comments by study authors: funder played no role in the study design, data collection, data analysis, manuscript preparation, or decision to publish the report

Miscellaneous outcomes by the review authors: not relevant

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Risk of bias

Bias	Authors' judgement	Support for judgement

Lin 2019 *(Continued)*

Random sequence generation (selection bias)	Low risk	Quote: "This study utilized a randomized controlled design. Eligible participants were randomized 1:1 using a computer-generated random number table to the intervention group or the wait-list control group." Quote: "No significant differences were observed between the two groups for any of the demographic characteristics (see Table 2)." Quote: "No significant effect of group or time or the Group × Time interaction on job satisfaction was identified between the two groups (p > .05)" Quote: "The results of the simple effects analysis (independent- samples t tests and one-way ANOVA) were as follows: First, when the time points were fixed, no significant differences in perceived stress, positive affect, negative affect, or resilience were noted between the two groups at baseline (p > .05)" Judgement comment: The investigators describe a random component in the sequence generation process (computer-generated random-number table) and there is verified baseline comparability of groups for sociodemographic characteristics (see Table 2; all Ps > 0.07) and most outcome of interest (perceived stress, positive affect, negative affect, resilience; P > 0.05) on the basis of analysis; baseline comparability for job satisfaction not exactly specified, but no significant group effect on job satisfaction in repeated-measures ANOVA reported which provides some evidence for baseline comparability in this outcome
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment (online questionnaires); however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "In the intervention group, 11 participants missed the weekly sessions more than twice. In the control group, six participants did not complete the questionnaire, and three participants submitted invalid questionnaires." Quote: "Therefore, the effective sample size was 90, including 44 in the intervention group and 46 in the control group." Judgement comment: reasons for missing data unlikely to be related to true outcome with relative balance in missing data between groups (IG: n = 11 missed weekly sessions more than twice; CG: n = 9 did not complete questionnaires or submitted invalid questionnaires); no reasons for missing data in each group provided; per-protocol analysis (i.e. only participants who missed fewer than 2 weekly intervention sessions) and available-case analysis (only participants who provided (valid) questionnaires) with 90 participants
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Loiselle 2018

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** There is an effect size of 0.6225 when using change scores for treatment and control groups, and their respective standard deviations, from a recent study using the Transcendental Meditation (TM) technique as an intervention and measuring burnout with the MBI (Elder 2014). Applying Cohen's power tables for $P < 0.05$ to this effect size, means the number of participants needed per group is 12; recruiting 20 participants per group allows for 20% attrition **Imputation of missing data:** no imputation of missing data; available-case analysis (i.e. only participants who completed post-intervention assessments)
Participants	**Country:** USA **Setting:** conducted at a medical school hospital and affiliated VA hospital **Age:** mean = 45.1 (SD = 10.51) years **Sample size (randomised):** 40 **Sex:** 23 women, 17 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified; burnout and depression values at pre-intervention not reported **Population description:** academic physicians working at a medical school and hospital in a large midwestern metropolitan area **Inclusion criteria:** 1) being an academic attending physician at the Loyola Chicago School of Medicine or VA hospital; 2) commitment to attend all required sessions for learning the TM programme (intervention) and monthly follow-ups; 3) agreeing to practice it twice daily for 20 minutes and to complete both pre-and post-testing (at 1 month and 4 months), including both the entry and exit interviews; additional criterion in trial registration = having a medical doctor degree **Exclusion criteria:** see trial registration; 1) current suicidal ideation (adverse event of suicidal ideation reporting excluded from study until such time event was resolved); 2) previous instruction in the TM technique **Attrition (withdrawals and exclusions):** 7 lost to follow-up (i.e. did not complete post-test/post-test non-compliance; IG = 6, CG = 1) **Reasons for missing data:** not specified
Interventions	**Intervention:** TM technique (n = 21) • *delivery*: INSTRUCTION: face-to-face group setting (classes) + face-to-face individual instruction; DAILY PRACTICE OF TM TECHNIQUE: individual • *providers*: instruction in TM technique conducted by experienced certified instructors from the area; after instruction: self-guided practice • *duration of treatment period and timing*: total treatment duration: 4 months; INSTRUCTION: 5 initial class instructions in TM technique (approximately 5 hours 40 minutes) followed by 6 additional classes (Follow-up sessions) of 20 - 60 minutes each over 4-month period; DAILY PRACTICE: 2 x daily for 20 minutes

Loiselle 2018 *(Continued)*

- *description*:
  - TM technique = simple mental procedure; allows the mind and body to experience a unique state of restful alertness
  - categorised in the automatic self-transcending category of meditation practices: automatic in that it does not involve any concentration or control
  - allows the mental activity to settle down in a spontaneous and natural manner during a process called transcending, or going beyond, until it reaches a state beyond conscious thinking
  - correspondingly, the body settles down to a deep state of rest which allows stress to dissolve and the nervous system to rejuvenate
  - a) INSTRUCTION: 1) information session (1 hour); 2) personal interview with a certified instructor (5 - 10 minutes); 3) personal instruction – individual session with certified instructor (1½ hours); 4) group instruction – verifying the correctness of the practice and further instruction (1 hour); 5) group instruction – understanding the mechanics of the TM technique from personal experiences (1 hour); 6) group instruction – understanding the growth of higher stages of development through the regular practice of the TM technique (1 hour); 7) follow-up sessions (20 - 60 minutes) offered each month and participants reminded to attend by email or phone call, or both
  - b) DAILY PRACTICE: participants asked to practice 2/day for 20 minutes
- *compliance*:
  - n = 21/21 received allocated intervention; researcher oversaw all test administration and tracking of participant compliance
  - COMPLIANCE: participants asked for twice-daily practice of TM technique:
    - 1) 1-month assessment: number of participants practising the technique 2/day on average was 10 (67%); 1/day: 5 (33%); total compliance based on at least 1 session a day: 15 (100%)
    - 2) 4-month assessment: 6 (40%) reported practising 2/day, 8 (53%) 1/day and 1(6%) not practising; total compliance based on at least 1 session a day: 14 (93%)
    - Time and scheduling conflicts most often reasons cited for less than twice a day practice
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: categorised in automatic self-transcending category of meditation practices

Control: wait-list control (n = 19)

- *description*: asked to maintain a usual routine and not add any self-development programmes during the test period
- *compliance*: n = 19/19 received allocated intervention; researcher oversaw all test administration and tracking of participant compliance

Outcomes

Outcomes collected and reported:

- burnout - MBI – subscale for health professionals
- depression - BDI-II
- perceived stress - PSS
- insomnia - ISI
- resilience - Brief Resilience Scale

Time points measured and reported: 1) pre-intervention; 2) during intervention (1-month post-test of 4-month intervention period); 3) post-intervention (4-month post-test; i.e. at the end of 4-month intervention period)

Adverse events: if adverse event reported through testing/interviews, reported to principal investigator who would speak to this study participant and recommend that they be seen in Employee Health; in case of suicidal ideation as adverse event, participant would be excluded from study until event was resolved; no adverse events reported during the study period

Notes

Contact with authors: We contacted the authors to ask for the unadjusted means and SDs for all outcomes at 1- and 4-month assessment for both groups, but received no response to 2 inquiries.
Study start/end date: see trial registration: August 2015 to September 2016
Funding source: not specified

Loiselle 2018 *(Continued)*

Declaration of interest: not specified
Ethical approval needed/obtained for study: approved by IRB at Maharishi University of Management in March 2015; followed by IRB for the chosen medical school approval in July 2015
Comments by study authors: trial registration: NCT03714204
Miscellaneous outcomes by the review authors: dissertation
Correspondence: Marie Ellen Loiselle; principal investigator of study (NCT03714204): Carla L Brown, PhD, Strich School of Medicine; Gregory Gruener, MD (study director), Loyola University Medical Center, 2160 S. First Ave; Maywood, IL 60153

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Random assignment was to the experimental (TM) group (n=21) or the wait-list control group (n=19)." Quote: "Forty academic physicians completed their informed consent, baseline testing and entry interview and were randomly assigned to either the TM (experimental) group (immediate intervention start; n=21) or control group (delayed intervention start; n=19)." Quote: "Analysis of the data did not show any significant difference between the experimental or control groups in either their baseline testing or demographics (all p values >.05)." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for sociodemographic characteristics (see Table 1; all Ps > 0.123) and outcomes (i.e. baseline testing) on the basis of analysis (see Table 1)
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment (questionnaires administered in person by the researcher or as online survey); however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Six of the TM group and one of the control group subjects dropped out of the study before the one- month posttest." Quote: "A total of 33 physicians completed both the 1-month and 4-month posttests (TM = 15; control = 18)." Judgement comment: reasons for missing data likely to be related to true outcome with imbalance in amount of missing data between groups (lost to follow-up: IG: n = 6; CG: n = 1, i.e. did not complete post-test); available-case analysis (only participants for whom outcomes were obtained at all assessments)

Loiselle 2018 *(Continued)*

Selective reporting (reporting bias)	Low risk	Judgement comment: trial registration available (NCT03714204); and all of the study's prespecified (primary and secondary) outcomes that are of interest in the review have been reported in the prespecified way

Luthar 2017

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** Based on a power analysis, the study authors set out to include 40 women in the study; with this number and assuming α = 0.05, power was 0.80 to detect an effect size of partial η^2 of 0.17, and 0.65 to detect η^2 of 0.12 **Imputation of missing data:** 1 participant missing for parenting stress at time 2 and time 3 but all participants analysed in ANOVAs/ANCOVAs; no imputation specified; available-case analysis for cortisol analysis (only participants for whom outcomes were obtained)
Participants	**Country:** USA **Setting:** Mayo Clinic **Age:** mean = 39.06 (SD = 5.49) years **Sample size (randomised):** 40 **Sex:** 40 women **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** depression (BDI): IG = 8.76 (6.34), CG = 8.58 (4.10); burnout, emotional exhaustion (MBI): IG = 32.7 (13.72), CG = 33.37 (10.21); burnout, depersonalisation: IG = 10.0 (7.78), CG = 9.58 (7.43); burnout, personal accomplishment: IG = 39.8 (5.14), CG = 37.32 (5.62); global symptoms: IG = 0.52 (0.47), CG = 0.43 (0.26) **Population description:** physician mothers at Mayo Clinic (physicians, PhD's (doctor of philosophy) in clinical practice, NPs, and PAs) **Inclusion criteria:** having at least 1 child aged 18 years or younger **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** PSYCHOLOGICAL MEASURES (parenting stress; information received from authors; Stonnington 2017 [pers comm]): post-intervention: CG = 1/19 (5.3%); 3-month follow-up: CG = 1 (5.3%); BIOLOGICAL MEASURES (unclear if IG or CG): pre-intervention: 1; post-intervention: 1; 3-month follow-up: 7 **Reasons for missing data:** unclear (reasons for missing data in CG on parenting stress); cortisol: pregnancies and maternity leaves (n = 3), time schedules (n = 2), exclusions due to statistical outliers (n = 2; > 2 SDs from the mean)
Interventions	**Intervention:** ACG (n = 21) • *delivery*: face-to-face; group sessions (5 - 7 participants); clear topics and exercises but nondidactic sessions; guided discussions and role plays • *providers*: sessions led by female psychiatrist; led by a skilled female group facilitator trained in the manualised procedures; received training beforehand; weekly supervision meetings with the principal investigator were conducted to ensure fidelity to manual procedures

Luthar 2017 *(Continued)*

- *duration of treatment period and timing*: 12 weekly 1-hour sessions (brief version)
- *description*:
  - Structured, relational supportive intervention; central goal is to facilitate authentic, supportive relationships among mothers. ACG meetings were based on respect, empathy, and empowerment.
  - SESSION 1 - INTRODUCTION: who tends you, the caregiver?; authentic connections are vital for mothers' well-being; through these, there are benefits to work and parenting
  - SESSION 2 - MINIMISING RUMINATION: when we feel stressed, we can ruminate and "pile" 1 concern after another; helpful strategies include thought stopping, relaxation exercises, reaching out for support
  - SESSION 3 - CHILDREN'S PAIN AND GO-TO COMMITTEES: it's very hard to watch our children in pain; we all need "go-to" committees
  - SESSION 4 - OBSTACLES TO CONNECT AUTHENTICALLY: we each have our own reasons to avoid reaching out for help; explore these, and understand how they constrain closeness with others
  - SESSION 5 - ANGER/HURT: behind anger is usually pain; it is important to express hurts clearly and directly, not indirectly through such behaviours as nagging or being critical
  - SESSION 6 - SUPPORT WALLETS: positive features of each woman are captured in messages written by each for all others; kept in "support wallets"
  - SESSION 7 - ASSERTIVENESS MENTORSHIP AT WORK: women often have trouble asserting themselves when treated poorly; speak up; proactively support each other inthe workplace
  - SESSION 8 - "GOOD ENOUGH" MOTHERING: kids model what they see in our behaviours; share insights from sessions with them; in tough moments, we often"know" what we should do but can't because of depletion; get support
  - SESSION 9 - CONTINUITY AFTER TERMINATION: continuity of authentic connections is essential for us
  - SESSION 10 - SHAME VS SELF-COMPASSION: keep shaming, global negative self-attribution at bay; practise gentleness toward selves
  - SESSION 11 - LIMIT-SETTING AFFECTION: it's important to set developmentally appropriate limits; be consistent in enforcing; all children must have affection – conveyed directly
  - SESSION 12 - PRIORITISE TENDING: do stay connected!
- *compliance*: no dropouts across 12-week intervention; mean attendance: 10.4 of 12 sessions (87%)
- *integrity of delivery*: group participants also rated the clinician after the intervention to gauge fidelity
- *economic information*: not specified
- *theoretical basis:* based on the structured (RPMG programme previously shown to be effective in 2 x 5-year trials (Luthar 2000b; Luthar 2007). Originally developed for low-income women at risk for parenting difficulties, RPMG encompasses 24 sessions for women facing multiple stressors (including single motherhood and mental illness). Resilience research has established that the most important protective factor in helping at-risk mothers is the receipt of regular support (Luthar 2015; Luthar 2017a), especially from others facing similar circumstances.

Control: no intervention (12 weekly hours of protected time to be used as desired) (n = 19)

Outcomes

Outcomes collected and reported:

Primary outcome

- global symptoms - BSI
- depression - BDI
- self-compassion - Self-Compassion Scale
- feeling loved - 4 items
- physical affection - 3 items
- parenting stress - PSI
- burnout, emotional exhaustion - MBI

Secondary outcome

- burnout, personal accomplishment - MBI
- burnout, depersonalisation - MBI

Luthar 2017 *(Continued)*

- plasma cortisol - blood sample

Time points measured and reported: 1) pre-intervention; 2) post-intervention; 3) 3-month follow-up (3 months post-intervention)

Adverse events: not specified

Notes	**Contact with authors:** We contacted the authors to ask for the means and SDs for outcome measures in the 2 groups at each time point (Stonnington 2017 [pers comm]). **Study start/end date:** February 2015 to November 2015 (actual completion date according to trial registration: December 2016) **Funding source:** supported by a seed fund from Arizona State University to Luthar; Mayo Clinic funded and supported medical-care professionals' time to participate in study activities **Declaration of interest:** no conflict of interest with respect to publication of this article. **Ethical approval needed/obtained for study:** approved by the Mayo Clinic IRB **Comments by authors:** trial registration: ClinicalTrials.gov NCT02540473 URL: clinicaltrials.gov/show/NCT02540473 **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Suniya S. Luthar, PhD, Arizona State University, 950 S. McAllister Drive, Tempe, AZ 85281; Suniya.Luthar@asu.edu; Phone: 914-310-1102; Trial registration: Cynthia Stonnington, MD, Associate Professor of Psychiatry, Mayo Clinic, Stonnington.Cynthia@mayo.edu

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The first 40 eligible women were enrolled in the study. Participants were assigned randomly to the ACG intervention group (n = 21) or to the control group (n = 19)" Quote: "With blinded random assignment, of the 21 intervention women, 17 were physicians, and 4 were NP/PAs; among the 19 control mothers, 8 were physicians, 1 was a PhD, and 10 were NP/ PAs. Other than the difference in proportion of NP/PAs and physicians, the intervention and control groups did not differ in demographics, baseline adjustment or cortisol levels." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for sociodemographic variables and outcome variables
Allocation concealment (selection bias)	Unclear risk	Quote: "With blinded random assignment,..." Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk' (exact method is not described, unclear if allocation was concealed from personnel and/or participants)
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention), but the review authors judge that the outcome is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias)	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding

Luthar 2017 *(Continued)*

Subjective outcomes		
Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Judgement comment: insufficient information about blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "On psychological measures, one participant was missing data on parenting stress at follow-up. On biological measures, pregnancies and maternity leaves precluded draws from one woman throughout, and from two at the follow-up. An additional two could not schedule times to provide samples at follow-up, and two were statistical outliers and removed from the analysis (>2 SD from the mean). Thus, at baseline and after the intervention, there were 39 of 40 the women who had cortisol levels measured at baseline and after the intervention, and 35 of 40 at follow-up." Judgement comment: reasons for missing data unlikely to be related to true outcome (see reasons for missing data): psychological outcomes: IG: n = 0; CG: n = 1 in parenting stress (information received from authors; here no reasons for missing data reported, but relative balance between IG and CG); biological outcomes: n = 7 missing (due to pregnancy/maternity leave, schedule problems, n = 2 outliers removed from analysis); missing data in biological outcomes not reported for each group separately; available-case analysis for cortisol (only participants for whom outcomes were obtained at 3 time points)
Selective reporting (reporting bias)	High risk	Judgement comment: trial registration is available (NCT02540473); not all of the prespecified (secondary) outcomes were reported and several reported outcomes were not prespecified: PRESPECIFIED: Primary outcome: level of depression (BDI); Secondary outcomes: Biomarker of stress C-reactive protein, biomarker of stress nerve-growth factor, professional functioning (MBI), perceived social support (Quality of Social Support Scale), parenting stress (PSI); REPORTED: level of depression (BDI); professional functioning (MBI); parenting stress (PSI); Global symptoms (BSI); self-compassion (Self-Compassion Scale); feeling loved (4 items); physical affection (3 items); plasma cortisol (secondary outcome)

Mache 2015a

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** no imputation of missing data
Participants	**Country:** Germany **Setting:** clinic departments specialising in surgical medicine

Mache 2015a *(Continued)*

Age: mean = 27 (SD = 2.5) years

Sample size (randomised): 69 (according to authors: 69 randomised, but after randomisation, 1 was excluded in IG and 68 were analysed)

Sex: 39 women, 29 men

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: perceived stress (PSQ): IG = 59.3 (18.5), CG = 56.7 (18.7); both groups above cut-off for moderate stress level; IG near cut-off for high stress

Population description: surgeons in their first year of work from 4 clinic departments specialising in surgical medicine

Inclusion criteria: 1) employment as a surgeon in a hospital department; 2) working full-time; 3) working experience of less than a year; 4) being able and willing to participate; 5) agreement to complete a survey at least 2 times

Exclusion criteria: not specified

Attrition (withdrawals and exclusions): 1 exclusion in IG

Reasons for missing data: health reasons (sickness absence)

Interventions

Intervention: multicomponent mental competency and stress management training (n = 36)

- *delivery*: face-to-face; group sessions (3 groups; group size maximum of 10 participants); theoretical input, watching videos, oral discussions, experiential exercises, and home assignments
- *providers*: 2 qualified psychologists performed the training. Both were familiar with cognitive behavioural as well as solution-focused work in group settings.
- *duration of treatment period and timing*: 12 weekly 2-hour sessions
- *description*:
  - psychosocial skill training combined with cognitive-behavioural and solution-focused counselling
  - main focus was on coping strategies, support between the junior surgeons and solutions and goals for the future; main topics of the sessions focused on surgeons' actual work situation, but any kind of (work) topic was suitable; in each session, a topic was introduced and discussed
  - SESSIONS: (1) introduction: "day-to-day working life of a surgeon"; (2) first year as a surgeon; (3) and (4) psychosocial skills for surgeons, parts I and II (resilience, self-esteem, and self-awareness); (5) conflict handling; (6) goal-setting and cognitive-behavioural training; (7) relaxation techniques (progressive muscle relaxation and autogenic training); (8) organisational culture/dealing with mistakes; (9) communication; (10) dealing with difficult decisions and social support; (11) self-care and coping with work-related stress; (12) session evaluation; sessions also included: how to speak up to supervisors and senior physicians, questioning their professional actions, seeking guidance about one's own clinical performance, and reporting one's mistakes
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information (intervention cost, changes in other costs as result of intervention)*: not specified
- *theoretical basis:* designed on principles of cognitive-behavioural training and solution-focused group work (Bamberger 1999; Kim 2008; Lagerveld 2012; Tan 2014)

Control: no intervention (n = 33)

(control group did nothing related to the intervention topic: any other psychosocial skill training, counselling or therapy (according to contact with authors: possibility of a later participation was announced)

Outcomes

Outcomes collected and reported:

Primary outcome

- resilience - Brief Resilient Coping Scale

Mache 2015a *(Continued)*

- perceived stress - PSQ
- self-efficacy - SWOP-K9
- optimism - SWOP-K9
- job satisfaction - Copenhagen Psychosocial Questionnaire

Time points measured and reported: 1) pre-intervention; 2) post-intervention (after 3-month intervention); 3) 3-month follow-up (3 months post-intervention/6 months after baseline)

Adverse events: not specified

Notes

Contact with authors: We contacted authors to get the information about the number of participants randomised and potential per-protocol analysis. We also asked about the form of control group (no intervention or wait-list control) (Mache 2017a [pers comm]).

Study start/end date: inclusion of participants between March and August 2014; exact study dates not specified

Funding source: not specified

Declaration of interest: not specified

Ethical approval needed/obtained for study: ethical approval by the Free University Berlin

Comments by authors: not specified

Miscellaneous outcomes by the review authors: no intervention control group according to information from authors

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Surgeons were randomized into 2 groups (intervention and comparison group). Names of the surgeons were listed in alphabetical order. Random numbers had been assigned to each name. After this, the numbers had been allocated from random number tables to the intervention or control group." Quote: "Baseline data on gender, age, and perceived health indicate only small, insignificant differences between intervention and comparison group." Judgement comment: The investigators describe a random component in the sequence generation process (random-number tables) and there is verified baseline comparability of groups for sociodemographic variables and perceived health; baseline comparability for outcome variables unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment (online questionnaires); however, due to potential performance bias (no blinding of participants), the review authors judge that the partici-

Mache 2015a *(Continued)*

		pants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Of the 36 participants in the intervention group, 1 surgeon was excluded owing to health reasons (sickness absence). In summation, 35 physicians participated in the intervention group and 33 participated in the comparison group." Judgement comment: reasons for missing data unlikely to be related to true outcome (only 1 exclusion in IG due to health reasons)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available, but it is clear that the published report includes all expected outcomes, including those that were prespecified

Mache 2015b

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** A sample size of a minimum of 40 physicians was selected for this pilot study after weighing statistical considerations along with logistical and resource constraints. A sample size of 40 provides a statistical power (2-tailed, α = 0.05) of > 85%. **Imputation of missing data:** no imputation of missing data; per-protocol analysis (only participants who took part in allocated intervention) and available-case analysis (only participants for whom outcomes were obtained at 3 time points)
Participants	**Country:** Germany **Setting:** several clinic departments specialising in different medical specialties (e.g. internal medicine, paediatrics, neurology, and gynaecology) **Age:** mean = 28 years **Sample size (randomised):** 90 (according to information from authors; Mache 2017b [pers comm]) **Sex:** 51 women, 34 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** perceived stress (PSQ): IG = 58.1 (19.3), CG = 56.7 (19.8); both groups above cut-off for moderate stress level **Population description:** hospital physicians from several clinic departments specialising in different medical specialties (e.g. internal medicine, paediatrics, neurology, and gynaecology); junior physicians in their first year after graduation **Inclusion criteria:** 1) employment as a hospital doctor; 2) working at least full-time; 3) working experience of less than a year; 4) being able and willing to participate; 5) agreement to complete a survey at least twice **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** 5 (IG = 3/45 (6.7%) exclusions, CG = 2/45 (4.4%) did not complete follow-up questionnaires)

Mache 2015b *(Continued)*

	Reasons for missing data: health reasons such as operation, accident (IG = 3), did not respond to follow-up questionnaires, reasons not specified (CG = 2)

Interventions	**Intervention:** psychosocial resilience training (n = 45; according to information from authors; Mache 2017b [pers comm])
	• *delivery*: face-to-face; group sessions (maximum 12 participants (4 groups)); sessions involve: psycho-education (theoretical input), watching videos, discussions, experiential exercises, and home assignments
	• *providers*: 2 psychologists delivered the intervention. Both of them were familiar with cognitive behavioural and solution-focused work in group settings.
	• *duration of treatment period and timing*: 12 weekly 2-hour sessions
	• *description*:
	  ○ resilience training in this study focused on a number of objectives: for example, instructing and promoting fundamental communication, goal-setting, improving emotional problems, increasing motivation, self-efficacy, etc.
	  ○ .focus of the group work was the work situation, but any kind of topic was acceptable; main focus was on coping strategies, support between the participants, and solutions and goals for the future
	  ○ objectives: instructing and promoting fundamental communication, goal-setting, improving emotional problems, increasing motivation, self-efficacy, etc.
	  ○ 12 sessions: (1) Introduction: "Day-to-day working life of a hospital physician," (2) self-esteem and self-awareness, (3) resilience, (4) positive thoughts and emotions, (5) cognitive behavioural training, (6) goal setting, (7) social support, (8) communication, (9) conflict handling, (10) dealing with difficult decisions, (11) coping with work-related stress and relaxation, and at the end (12) session evaluation; Sessions also included how to speak up to supervisors and senior physicians, questioning their professional actions, seeking guidance about one's own clinical performance, and reporting one's mistakes
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis*: based on principles of cognitive behavioural training and solution-focused group work (Bamberger 1999)
	
	Control: no intervention (n = 45; according to information from authors; Mache 2017b [pers comm]) (received no training but answered the questionnaire at baseline and follow-up)

Outcomes	**Outcomes collected and reported:** ***Primary outcome*** • resilience - Brief Resilient Coping Scale • perceived stress - PSQ • self-efficacy - SWOP-K9 • optimism - SWOP-K9 • job satisfaction - German version Copenhagen Psychosocial Questionnaire **Time points measured:** 1) pre-intervention; 2) post-intervention (after 3-month intervention); 3) 3-month follow-up (3 months post-intervention/6 months after baseline) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted authors for the number of participants randomised and potential per-protocol analysis (Mache 2017b [pers comm]) **Study start/end date:** 96 junior physicians included between February and August 2014; exact study dates not specified **Funding source:** not specified **Declaration of interest:** not specified

Mache 2015b *(Continued)*

Ethical approval needed/obtained for study: not specified if approved; all procedures in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975

Comments by authors: not specified

Miscellaneous outcomes by the review authors: not relevant

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "physicians were randomized into an intervention and control group." Quote: "Baseline data on gender, age, and perceived health indicate only small, insignificant differences between the control and the intervention group." Judgement comment: insufficient information about random sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for sociodemographic characteristics and perceived health; baseline comparability for outcome variables unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment (online questionnaires); however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Of the 45 participants in the intervention group, three were excluded due to health reasons (operation, accident). In addition, two participants of the control group did not respond to the follow-up questionnaires. In sum, 42 physicians took part in the intervention group, and 43 participated in the control group." Judgement comment: 90 randomised (according to information received from authors); in part, reasons for missing data unlikely to be related to true outcome with relative balance in missing data between groups (IG: 3 exclusions due to health reasons), CG: 2 did not complete follow-up (reasons not specified); available-case analysis (only participants for whom outcomes were obtained at 3 time points) and per-protocol analysis (only participants who took part in allocated intervention)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available, but it is clear that the published report includes all expected outcomes, including those that were prespecified

Mache 2016

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified; small sample size **Imputation of missing data:** no imputation of missing data; information received from authors (Mache 2018 [pers comm]): per-protocol analysis (only participants who took part in allocated intervention and were not excluded)
Participants	**Country:** Germany **Setting:** psychiatric clinics/hospital departments specialising in psychiatric medicine **Age:** mean = 33 (SD = 2.3) years **Sample size (randomised):** 76 **Sex:** 51 women, 21 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** perceived stress (PSQ): IG = 61.2 (18.9), CG = 59.8 (17.7); IG with high level of stress, CG with moderate level of stress **Population description:** physicians working in psychiatric units from 12 hospital departments in the North of Germany specialising in psychiatric medicine **Inclusion criteria:** 1) employment as a psychiatrist in a psychiatric department; 2) working full-time; 3) being able and willing to take part in the study; 4) agreement to complete a survey at least 3 times **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** 4 exclusions (information received from authors; Mache 2018 [pers comm]): IG = 1/38 (2.6%), CG = 3/38 (7.9%)) **Reasons for missing data:** health reasons (sickness absence)

Interventions	**Intervention:** self-care skills training/psychosocial skills training combined with cognitive behavioural and solution-focused counselling (n = 38 according to information received from authors; after exclusions: n = 37)
	
	• *delivery*: face-to-face; group sessions (maximum 10 psychiatrists); psycho-education (theoretical input, watching videos, oral group discussions, self-awareness with experimental exercises, homework assignments)
	• *providers*: 2 psychotherapists; registered and accredited as psychotherapists and clinical supervisors; qualifications in cognitive behavioural therapy, systemic therapy and solution-focused brief therapy in individual and group settings
	• *duration of treatment period and timing*: 12 weekly 1½-hour sessions
	• *description*:
	  ○ focus on actual work situations and problems, coping strategies and support between colleagues and future goals
	  ○ same structure in each session: 1) welcome scenario, 2) reflecting and discussion of the last session; 3) theoretical input; 4) preparing experiential exercise; 5) group discussion; 6) homework assignments; 7) learning process and solutions; 8) summary, feedback and checkout
	  ○ main topics during sessions planned into modules entitled 'self', 'patient' and 'work environment'; in each session, a topic was introduced and discussed: 1) introduction: theoretical input and discussion on the theme – working in psychiatry, personal and professional balance; 2) self-care and

Mache 2016 *(Continued)*

	coping with work-related stressors; 3) relationship to patients, conflict-handling in the work setting; 4) communication in the hospital; 5) how to speak up to supervisors and senior physicians; 6) team work and social support; 7) seeking guidance about one's own clinical performance; 8) organisational culture in the hospital setting, reporting one's mistakes and dealing with mistakes; 9) dealing with difficult decisions; 10) emotion regulation (cognitive and relaxation techniques), 11) training evaluation • *compliance*: not specified • *integrity of delivery*: performance checklist created and signed by the trainers to ensure that intervention protocol was followed; not reported • *economic information*: not specified • *theoretical basis*: content designed on principles of self-care techniques (i.e. mindfulness- and acceptance-based), cognitive behavioural training and solution-focused group work (Wise 2012) **Control:** no intervention (n = 38 according to information received from authors; after exclusions: n = 35)
Outcomes	**Outcomes collected and reported:** • perceived stress - PSQ • resilience - Brief Resilient Coping Scale • self-efficacy - Questionnaire of Self-Efficacy, Optimism and Pessimism • job satisfaction - CPQ • relationships to patients, support - QRI • relationships to patients, conflict - QRI • relationships to patients, depth - QRI **Time points measured:** 1) pre-intervention; 2) post-intervention (after 3-month intervention); 3) 3-month follow-up (3 months post-intervention) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted authors for the number of participants randomised and potential per-protocol analysis (Mache 2018 [pers comm]). **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** no conflicts of interest reported **Ethical approval needed/obtained for study:** not specified **Comments by authors:** not specified **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Stefanie Mache, Institute for Occupational and Maritime Medicine (ZfAM), University Medical Center Hamburg-Eppendorf, Seewartenstraße 10, 20459 Hamburg, Germany; s.mache@uke.de

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "The study was designed as a controlled trial." Quote: "Seventy-six psychiatrists gave their consent to join the self-care training. These physicians were randomised into two groups through a computer-generated algorithm."

Mache 2016 *(Continued)*

		Quote: "Only small, insignificant differences between intervention and control group have been found in baseline data on gender, age and working experience." Judgement comment: The investigators describe a random component in the sequence-generation process (computer random-number generator) and there is verified baseline comparability between groups for sociodemographic characteristics.; baseline comparability for outcome variables unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "single-blind trial" Judgement comment: only participants were blinded; no blinding of personnel (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	Unclear risk	Judgement comment: insufficient information about blinding of outcome assessment to permit judgement of 'Low risk' or 'High risk' (online questionnaires)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Of the 76 participants participants four needed to be excluded due to health reasons (sickness absence). In sum, 37 physicians took part in the intervention group (IG) and 35 participated in the control group (CG)." Judgement comment: reasons for missing data unlikely to be related to true outcome (4 exclusions due to health reasons, IG: 1, CG: 3); information received from authors: per-protocol analysis (only participants who took part in allocated intervention and were not excluded)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Mache 2017

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** statistical power analysis performed and showed that a sample size of 80 would provide statistical power (2-tailed, $\alpha = 0.05$) of > 85%; therefore, size of the included study groups was considered sufficient for this pilot study, after weighing statistical considerations along with logistical and resource constraints **Imputation of missing data:** no imputation of missing data; per-protocol analysis (i.e. without 2 participants in IG who participated in < 80% of training sessions) and available-case analysis (i.e. only participants for whom outcomes were obtained at follow-up assessments)
Participants	**Country:** Germany **Setting:** junior physicians in gynaecology and obstetrics; exact training setting not specified (training sessions performed off duty) **Age:** mean = 27.5 (SD = 2.2) years **Sample size (randomised):** 80 **Sex:** 54 women, 26 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** emotional exhaustion (subscale of MBI): IG = 4.10 (0.63), CG = 4.19 (0.71)

Mache 2017 *(Continued)*

Population description: junior physicians in gynaecology and obstetrics

Included criteria: 1) employment in gynaecology/obstetrics; 2) being employed full-time; 3) a maximum of 2 years of work experience in gynaecology or obstetrics; 4) participation in the study during the next 9 months; 5) access to the internet and e-mail

Excluded criteria: not specified

Attrition (withdrawals and exclusions): exclusions (from follow-up analyses): n = 2 in IG; withdrawals (losses to follow-up at follow-ups 1 to 3): follow-up 1: 6 (IG: 1, CG: 5); follow-up 2: 5 further losses to follow-up (IG: 4, CG: 1); follow-up 3: 7 further losses to follow-up (IG: 2, CG: 5)

Reasons for missing data: for 2 exclusions: participation in < 80% of training sessions; reasons for losses to follow-up at assessments in 2 groups not specified

Interventions

Intervention: coping skills training/psychosocial skills training (n = 40)

- *delivery*: face-to-face group setting; modules of training sessions: psycho-education, theoretical input, watching videos, group discussions, experiential exercises, role plays
- *providers*: certified occupational health psychologists with expertise in several stress management techniques, cognitive behavioural therapy as well as solution-focused training
- *duration of treatment period and timing*: 12 weekly 1½-hour sessions over 3 months; sessions performed off duty
- *description*:
  - performed to promote job performance and well-being in physicians and to reduce perceived distress
  - METHODOLOGICAL ELEMENTS: discussion groups organised around a curriculum including elements of reflection, shared experience, and small-group learning among the physicians; training modules enclosed well-established problem-solving and emotion regulation strategies according to Lazarus' transactional model of stress; training modules mainly focused on situations and problems experienced at work; practical implication including coping strategies (cognitive, emotional, external, support systems, etc.) were integrated
  - SESSIONS: each session with a special work-related topic:
    - (1) introduction: opening and discussion on the theme ''working as a gynaecologist in the clinical setting'
    - (2) and (3) experienced work-related problems
    - (4) and (5) coping skills training (cognitive strategies, emotion regulation, and stress management techniques, self-awareness and resilience
    - (6) and (7) conflict management, analysing conflict types and conflict handling in daily work routines
    - (8) receiving and giving feedback, asking for supervision and feedback
    - (9) communication training
    - (10) learning from mistakes, reporting, dealing with consequences, organisational hospital culture
    - (11) handling difficult medical decisions, creating a support system, how to speak up to supervisors and senior physicians
    - (12) overall training evaluation
- *compliance*: 38 of 40 in IG participated in ≥ 80% of training sessions; overall training satisfaction (range: 1 - 5) mean = 4.58; satisfaction with training design: mean = 4.34; atmosphere during training: mean = 4.21; gynaecologists would recommend skills training programme (mean = 4.58); 4 levels of Kirkpatrick's training criteria demonstrated to be fulfilled
- *integrity of delivery*: not specified
- *economic information*: not specified; training sessions were performed off duty
- *theoretical basis:* based on Lazarus' transactional model of stress (Malouff 2007); problem- and emotion-focused coping skills and cognitive behavioural as well as solution-focused counselling

Control: no intervention (n = 40)

Mache 2017 *(Continued)*

- *description*: CG received neither coping-skills training nor any other comparable intervention (i.e. any other psychosocial-skills training, counselling or therapy)

Outcomes	**Outcomes collected and reported:** • perceived stress - PSQ • emotional exhaustion - emotional exhaustion subscale of MBI • emotion regulation skills, comprehension - Emotion Regulation Skills Questionnaire (ERSQ-27) • emotion regulation skills, acceptance - ERSQ-27 • emotion regulation skills, self-support - ERSQ-27 • resilience - BRCS • job satisfaction - job satisfaction scale of CPQ **Time points measured and reported:** 1) pre-intervention; 2) post-intervention (after final session of training; follow-up 1); 3) 3-month follow-up (3 months after final session of training; follow-up 2); 4) 6-month follow-up (6 months after final session of training; follow-up 3) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors to ask whether they performed available-case analysis with participants for whom outcomes were obtained at follow-up assessments (Mache 2019b [pers comm]). **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** no conflict of interest declared **Ethical approval needed/obtained for study:** approved by IRB of the Free University Berlin **Comments by study authors:** not specified **Miscellaneous outcomes by the review authors:** information received from authors (Mache 2019b [pers comm]): correct that available-case analysis only with participants for whom outcomes were obtained at follow-up assessments for outcomes reported in Table 2 of the publication (e.g. assessment II: n = 37 in IG and n = 35 in CG) **Correspondence:** Stefanie Mache; Institute for Occupational and Maritime Medicine (ZfAM), University Medical Center Hamburg-Eppendorf, Seewartenstrasse 10, 20459 Hamburg, Germany; Institute of Occupational Medicine, Social Medicine and Environmental Medicine, Goethe-University, Theodor-SternKai 7, 60590 Frankfurt Am Main, Germany; s.mache@uke.de

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "In a two-arm randomized controlled trial junior physicians working in clinic departments of Gynecology and Obstetrics were divided into two groups: (1) intervention group (IG) and (2) control group (CG)." Quote: "second the participants were randomized into two groups (intervention and control group). This procedure was supported by a computer generated list of numbers." Quote: "The demographic variables including gender, age, years of working experiences are shown in Table 1. 69 % of the physicians in the intervention group were women (n = 26) and 31 % were men (n = 12). The comparison group include 70 % female physicians (n = 28) and 30 % male physicians (n = 12). The average age in the intervention group was 27 years (SD 2.1) with an average time of working experience as a physician of 1 year (SD 1.8). All the gynecologists were employed full- time. Comparing both groups (IG and CG) baseline data on socio-demographic differences indicate insignificant differences." Judgement comment: The investigators describe a random component in the sequence-generation process (computer-generated list of numbers)and there

Mache 2017 *(Continued)*

		is verified baseline comparability of groups for sociodemographic characteristics (age, gender, relationship status, work characteristics, place of work); baseline comparability for outcome variables (see T0 in Table 2) unclear (i.e. statistical significance not specified)
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk' (method of concealment is not described)
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment (online surveys); however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Fig. 1 Flow chart of the study design" Quote: "Of the 80 junior physicians enrolled, all completed the baseline measures. Two physicians of the IG were excluded for the follow-up analyses because they participated in less than 80 % of the training sessions." Quote: "As illustrated in Fig. 1, during follow-up 1, 37 of the participants in the IG (98 %) gave responses, and 33 (n = 87 %) gave responses for follow-up 2. Finally, 31 physicians of the IG (82 %) answered the last survey (follow-up 3). Participants who failed to complete the follow-up surveys did not differ in their baseline responses from those who complied with the study protocol." Judgement comment: reasons for missing data likely to be related to true outcome with slight imbalance in missing data between groups (n = 2 excluded in IG due to < 80% participation in training sessions; follow-up 1: IG: n = 1, CG: n = 5; follow-up 2: IG: n = 5, CG: n = 6; follow-up 3: IG: n = 7, CG: n = 11); per-protocol analysis (i.e. exclusion of physicians participating in < 80% of training sessions); available-case analysis (only participants for whom outcomes were obtained at follow-up assessments)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Mealer 2014

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not done because the intent was to determine feasibility and acceptability; recruitment was not based on a power calculation

Mealer 2014 *(Continued)*

	Imputation of missing data: no imputation of missing data for 2 participants withdrawn before intervention; per-protocol analysis (only participants who took part in allocated intervention); missing data in scales inferred by mean of remaining items
Participants	**Country:** USA **Setting:** academic institution, ICU **Age:** see Population description; age not specified **Sample size (randomised):** 29 **Sex:** 24 women, 5 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** 100% of the ICU nurses (n = 27) were positive for symptoms of anxiety (HADS, score ≥ 8) and 77% were positive for symptoms of depression (HADS score ≥ 8); high rate of burnout syndrome (MBI): 81% were positive for emotional exhaustion, 77% were positive for depersonalisation, and 77% were positive for a decrease in personal accomplishment; median resilience score (CD-RISC) was 73 (range = 67 - 77); 44% of the ICU nurses met the diagnostic criteria for post-traumatic stress disorder **Population description:** ICU nurses from an academic institution; medical, surgical, burn, and cardiac ICUs **Inclusion criteria:** 1) currently working 20 hours a week at the ICU bedside; 2) had no underlying medical condition that would be a contraindication to exercise; 3) scored 82 or less on the CD-RISC **Exclusion criteria:** 1) were unable to participate in a 2-day educational workshop or 2) had a medical condition that would limit exercise **Attrition (withdrawals and exclusions):** 2 withdrawn before start of the training period (IG = 1/14 (7.1%), CG = 1/15 (6.7%)) **Reasons for missing data:** not specified

Interventions	**Intervention:** multimodal resilience training programme (n = 14)
	
	• *delivery*: face-to-face (educational workshop, written exposure therapy, MBSR practices, exercise, event-triggered counselling sessions); guided CD for MBSR practices
	• *providers*: writing sessions led by expressive-writing experts trained in motivational interviewing and resilience; MBSR practices: experienced professional formally trained in MBSR; event-triggered counselling: experienced licensed clinical social worker trained in traumatic stress and working with a variety of healthcare professionals
	• *duration of treatment period and timing:* 12 weeks (2-day educational workshop; 2 x 2-hour guided mindfulness exercise sessions; variable number of sessions in event-triggered counselling during the 12 weeks, each session approximately 30 to 60 minutes)
	• *description*: 5 components
	  ◦ 1) 2-DAY EDUCATIONAL WORKSHOP: introduction to resilience training and the types of psychological distress experienced in the ICU; self-care topics and CBT introduced; MBSR practices: 2 x 2-hour guided mindfulness exercise sessions during educational workshop, provision of guided CDs for use during the 12-week intervention, 4-hour introduction to written exposure as a guide for the following written exposure sessions
	  ◦ 2) WRITTEN EXPOSURE THERAPY: participants receive weekly writing prompts based on Pennebaker's expressive writing framework and the written exposure therapy protocol developed by Sloan and colleagues, participants asked to write 12 x 30-minute sessions based on the e-mailed prompts that were delivered by our writing experts, writing sessions included topics such as challenges faced at work, feeling incapacitated, feeling conflicted, and ruminating about sensitive topics; writing experts provide feedback to each participant that would encourage resilience-building
	  ◦ 3) MBSR TECHNIQUES: body scan and sitting meditation, guided CD (step-by-step audio guide to the MBSR techniques) to assist with the techniques when participants returned home. Each participant asked to practice these techniques for 15 minutes at least 3 times a week during the 12-week

Mealer 2014 *(Continued)*

intervention period. The actual length of time spent entered into electronic diary in the REDCap database

- 4) EXERCISE: 3-month membership of the institution's wellness centre provided at no cost or the participant could choose to use a personal gym; participants asked to engage in 30 to 45 minutes of aerobic exercise at least 3 days a week, time spent exercising entered into the database. Exercising by using the treadmill, elliptical machine, stair-climbing, stationary bicycle, or rowing machine suggested
- 5) EVENT-TRIGGERED COUNSELLING SESSIONS: each participant asked to participate in an event-triggered CBT session; events that triggered these therapy sessions included: a patient's death, participating in end-of-life family discussions, performing cardiopulmonary resuscitation, performing futile care with a terminal patient, caring for a patient with massive bleeding, or caring for a patient with traumatic injuries; each session approximately 30 to 60 minutes, used a cognitive behavioural approach to challenge negative thoughts and promote resilience through cognitive flexibility and restructuring

- *compliance*: 100% attendance at the 2-day workshop; 100% of the participants completing all of their weekly written exposure sessions (12 writing sessions per participant); 66% of the MBSR sessions completed with a mean of 65 (95% CI 59 - 65) minutes per week; 88% of the expected exercise sessions completed with a mean of 210 (95% CI, 177 to 244) minutes of exercise per week; each participant attended a mean of 2 event-triggered CBT sessions, and only 2 participants did not require an event-triggered session; no participants dropped out of the study
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: CBT, MBSR, written exposure therapy based on Pennebaker 1986 and Sloan 2012; CBT bolsters modifiable resilient characteristics such as the ability to engage the support of others, optimism, faith, cognitive flexibility, and self-care. Self-care behaviours that promote coping with the physical and emotional consequences of stress include MBSR, expressive writing and exercise; these coping mechanisms integrated into mulitimodal resilience intervention

Control: no intervention (but assessment of exercise) (n = 15)

Outcomes

Outcomes collected and reported:

- resilience - CD-RISC
- posttraumatic stress symptoms - Post-traumatic Diagnostic Scale
- depression - HADS
- anxiety - HADS
- burnout, emotional exhaustion - MBI
- burnout, depersonalization - MBI
- burnout, reduced sense of personal accomplishment - MBI

Time points measured and reported: 1) pre-intervention; 2) post-intervention (within 1 week post-intervention)

Adverse events: not specified

Notes

Contact with authors: We contacted the authors for the means and SDs for outcome measures in the 2 groups at each time point (Mealer 2017 [pers comm]).

Study start/end date: recruited from October 2012 to December 2012; exact study dates not specified

Funding source: funded by a grant from the National Institutes of Health (grant number K24 HL-089223-07)

Declaration of interest: not specified

Ethical approval needed/obtained for study: approved by the Colorado Multiple IRB

Comments by authors: not specified

Miscellaneous outcomes by the review authors: not relevant

Mealer 2014 *(Continued)*

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Of the 29 remaining ICU nurses, 14 were randomized to the intervention arm and 15 were randomized to the control arm." Quote: "Measures of PTSD, burnout syndrome, resiliency, and symptoms of anxiety or depression did not differ significantly between the 2 groups" Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for outcome variables; baseline comparability for sociodemographic variables (statistical (non)significance of differences, see Table 1) unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment (blinding for data assessed within the intervention via REDCap data management system (e.g. time spent exercising, MBSR practices) and for data analysis, but unclear who delivered the questionnaires to the participants); however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Two participants withdrew from the study before the start of the 12-week training period: 1 from the intervention arm and 1 from the control arm. Therefore, 27 participants participated in the 12-week trial (intervention arm, n = 13; control arm, n = 14)." Quote: "No participants dropped out of the study." Quote: "Missing items on scales were inferred by using the mean of the remaining items on the scale." Judgement comment: reasons for missing data unlikely to be related to true outcome with balance in missing data between groups (IG: n = 1; CG: n = 1 before start of intervention period); reasons not specified; per-protocol analysis (only participants who took part in allocated intervention)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available, but it is clear that the published report includes all expected outcomes, including those that were prespecified

Medisauskaite 2019

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** appropriate sample size was calculated using G*Power software: repeated measures, within-between subject interaction (α error probability = 0.05; power = 0.95; 2 groups; measured at 2 time points; 0.5 correlation between repeated measures; medium effect size F of 0.25) (Faul 2007); calculated actual power was 0.95 for sample of 54 participants, 27 participants in each group **Imputation of missing data:** no imputation of missing data; per-protocol analysis (i.e. main comparison: without 23 participants in IG4 who did not complete the intervention; identical to remaining 3 trial groups in overall analysis) and available-case analysis (i.e. only participants for whom outcomes were obtained and who completed questionnaires; i.e. excluding participants lost to follow-up)
Participants	**Country:** UK **Setting:** doctors; training; setting not specified **Age:** for all 5 groups, mean = 47.88 (SD = 11.21) years **Sample size (randomised):** 381 (randomised) to 5 groups; 150 participants in the main comparison (IG4 vs CG) **Sex:** 42 women, 49 men (out of 91 analysed from IG4 and CG) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** burnout, emotional exhaustion (MBI): IG = 3.26 (1.41), CG = 3.2 (1.4); burnout, depersonalisation: IG = 1.98 (1.49), CG = 1.68 (1.29); burnout, personal accomplishment: IG = 4.42 (0.83), CG = 4.41 (0.84); anxiety (GAD-7): IG = 0.96 (0.81), CG = 0.88 (0.74); psychiatric morbidity (GHQ): IG = 2.14 (0.57), CG = 2.17 (0.61); alcohol dependence (AUDIT): IG = 7.5% (3), CG = 10.6% (5) **Population description:** doctors who currently practice medicine **Inclusion criteria:** see trial registration; 1) medical doctors across all specialties and professional grades who have regular contact with patients and work in the UK **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** 154 overall. IG1 = 33 (15 = did not complete intervention, 16 = lost to follow-up, 2 = came back after more than 23 days (also excluded from analysis)); IG2 = 31 (14 = did not complete intervention, 17 = lost to follow-up); IG3 = 31 (15 = did not complete intervention, 15 = lost to follow-up, 1 = came back after more than 23 days (also excluded from analysis)); IG4 = 36 (23 = did not complete intervention, 11 = lost to follow-up, 2 = came back after 23 questionnaires (also excluded from analysis)); CG = 23 (4 = did not complete questionnaire, 19 = lost to follow-up) **Reasons for missing data:** not specified
Interventions	In total, 5 trial groups: • IG1: module 1 of IG4: n = 80 • IG2: module 2 of IG4: n = 73 • IG3: module 3 of IG4: n = 78 • IG4: all 3 modules): n = 75 • CG: n = 75 **Intervention:** induction programme (see trial registration; trial group 4) (n = 75) • *delivery*: setting not specified • *providers*: not specified • *duration of treatment period and timing*: not exactly specified; eventually 1 week

Medisauskaite 2019 *(Continued)*

- *description*:
  - combination of content of 3 modules (trial groups 1 - 3)
  - MODULE 1, STRESS AT WORK:
    - teaching about psychology of stress and burnout, and impact of work on stress or burnout
    - covers the General Adaptation Syndrome (Selye 1965), Maslach burnout theory (Maslach 1981), Job Demands-Resources model (Bakker 2005; Bakker 2007)
    - gives doctors information about prevalence rates among doctors and other healthcare professionals; quiz and open-ended reflection exercise asking doctors to consider what they have learnt from the module and how they would use it
  - MODULE 2, DEALING WITH A PATIENT'S DEATH:
    - teaching about dealing with patient's death and the Kubler Ross stages of grief (Kübler-Ross 1997), a theoretical perspective on how healthcare professionals experience loss when patients die and information about ways of coping with a patient's death (Papadatou 2000)
    - quiz and open-ended reflection exercise
  - MODULE 3, MANAGING STRESS AT WORK:
    - teaching about managing distress; doctors taught about how to develop resilience, cognitive emotional regulation, relationships, work-family balance, time for hobbies and recreation (Carver 1989; Fusz 2008; Garnefski 2007; Graham 2001; Huggard 2016; Netemeyer 1996; Ramirez 1995)
    - quiz and open-ended reflection exercise
- *compliance*: trial group 4: 23/75 did not complete the intervention
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis:* not specified (see different literature cited for content in different modules)

Control: no intervention (n = 75)

- *compliance*: not specified; 4 did not complete questionnaire

Outcomes

Outcomes collected and reported:

- burnout, emotional exhaustion - MBI
- burnout, depersonalization - MBI
- burnout, low personal accomplishment - MBI
- anxiety - GAD-7
- psychiatric morbidity - GHQ
- grief - Texas Revised Inventory of Grief
- alcohol dependence - Patient Health Questionnaire
- alcohol use/drinking habits - AUDIT
- legal/illegal drug use - self-developed drug use items
- insomnia - ISI
- binge-eating - Binge Eating Scale from EDDS
- physical symptoms - Physical Symptom Inventory
- coping mechanisms, active coping - CMS
- coping mechanisms, substance use - CMS
- coping mechanisms, use of emotional support - CMS
- coping mechanisms, use of instrumental support - CMS
- coping mechanisms, positive reframing - CMS
- coping mechanisms, humor - CMS
- coping mechanisms, self-blame - CMS
- effort - ERS
- reward - ERS
- over-commitment - ERSwork engagement, dedication - WES
- work engagement, absorption - WES
- work-family imbalance - WFCS

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	Time points measured and reported: 1) pre-intervention; 2) post-intervention **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors to check if the treatment duration was 1e week and if the time 2 assessment took place immediately post-intervention or at 1-week follow-up.; no response to 2 inquiries **Study start/end date:** see trial registration: July 2016 to November 2016 **Funding source:** see trial registration: Birkbeck College, University of London; RCT was not funded or determined by Focus Games or any organisation involved with the app/board game **Declaration of interest:** After the RCT was completed, the authors and Focus Games transformed the intervention into an app that is currently being trialled in several NHS hospitals for use by doctors and other clinicians. The authors, Focus Games and the National Health Service Practitioner Health Programme also developed a board game for healthcare professionals. The RCT was not funded or determined by Focus Games or any organisation involved with the app/board game. The RCT was conducted for PhD research and it took place a year before Focus Games got in touch with the authors **Ethical approval needed/obtained for study:** approved by BEI (School of Business, Economics and Informatics) Ethics Committee at Birkbeck, University of London in May 2016; institutional ethics approval covering all data sources, and NHS local approval covering NHS trusts that agreed to invite their doctors to take part in the trial **Comments by study authors:** study protocol registered before the study began at the US National Institute of Health (Identifier: NCT02838290; ClinicalTrials.gov, 2016) **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Dr Asta Medisauskaite, Research Department of Medical Education, UCL Medical School, London, UK; a.medisauskaite@ucl.ac.uk

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "This was a randomized controlled trial comprising of two independent variables: time and trial group." Quote: "Blindly to the researchers, Qualtrics software randomly assigned doctors to one of 5 trial groups" Quote: "doctors were randomly and blindly assigned to one of 5 trial groups." Quote: "Table 1 shows that there were no significant differences between the two trial groups at baseline, (p > .05; see table 1)." Judgement comment: The investigators describe a random component in the sequence-generation process (Qualtrics software); baseline comparability reported for control group vs trial group 4 (main focus of our review) and comparison control group and all experimental groups, respectively; MAIN COMPARISON (control group vs trial group 4): verified baseline comparability of groups for sociodemographic characteristics and outcome variables of interest on the basis of analysis (see Table 1; P > 0.05; see Supplement 2 Table 1 for secondary outcome variables in all groups; P > 0.12); CONTROL GROUP & ALL EXPERIMENTAL GROUPS: verified baseline comparability for most sociodemographic characteristics (except for gender, P = 0.03) and outcome variables on the basis of analysis (Supplementary material 1, Table 1 and 2)
Allocation concealment (selection bias)	Unclear risk	Quote: "Blindly to the researchers, Qualtrics software randomly assigned doctors to one of 5 trial groups" Quote: "doctors were randomly and blindly assigned to one of 5 trial groups." Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk' ("blindly assigned"; but method

Medisauskaite 2019 *(Continued)*

		of concealment is not described in sufficient detail; unclear if random-sequence generation was also concealed from participants)
Blinding of participants and personnel (performance bias) Subjective outcomes	Unclear risk	Judgement comment: insufficient information about blinding of participants and personnel to permit judgement of 'Low risk' or 'High risk' (e.g. unclear if online intervention or face-to-face)
Blinding of outcome assessment (detection bias) Subjective outcomes	Unclear risk	Judgement comment: insufficient information about blinding of outcome assessment to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	High risk	Judgement comment: reasons for missing outcome data likely to be related to true outcome, with imbalance in numbers for missing data across groups (IG4: 23 did not complete intervention, 11 lost to follow-up, 2 questionnaire came back after more than 23 days; CG 3 did not complete the questionnaire, 19 lost to follow-up); per-protocol analysis (i.e. only participants who completed the intervention(s) and available-case analysis (only participants for whom outcomes were obtained, i.e. who completed questionnaires)
Selective reporting (reporting bias)	Low risk	Quote: "The study protocol was registered before the study began at the US National Institute of Health (Identifier: NCT02838290; ClinicalTrials.gov, 2016)." Judgement comment: trial registration available (NCT02838290) available and all of the study's prespecified (primary and secondary) outcomes that are of interest in the review have been reported in the prespecified way (secondary outcomes for all groups reported in Supplementary material 2)

Mirzaeirad 2019

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** according to a priori sample size calculation at least 34 persons required in each group according to similar studies **Imputation of missing data:** not specified
Participants	**Country:** Iran **Setting:** hospital (intervention performed in the place of hospital training courses) **Age:** 42 (52.5%) < 31 years, 28 (35%) > 31 years **Sample size (randomised):** 80 (after exclusions) **Sex:** 66 women, 14 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** nurses **Inclusion criteria:** 1) undergraduates with at least 1 year of hospital experience and specialty areas (operating room, children and emergency); 2) lack of physical disabilities or mental stress; 3) failure to receive interventions or classes related to stress reduction during the past year in the workplace; 4) absence of severe stress and emotional crisis (e.g. death of first-degree relatives during last year) **Exclusion criteria:** 1) participants stating that they had any disabling physical and psychological problems; 2) unwillingness to co-operate or continue participating in the study

Mirzaeirad 2019 *(Continued)*

Attrition (withdrawals and exclusions): 4 (IG = 2, CG = 2)

Reasons for missing data: IG = lack of full participation in the workshop (n = 2); CG = change of location (n = 1), unwillingness to continue co-operation (n = 1)

Interventions

Intervention: resilience-skills training (n = 40; after exclusions)

- *delivery*: face-to-face group setting; included lecture, question and answer method, skill group; training aids: film, slides, pamphlets, case sessions
- *providers*: not specified (information that 2 nursing doctoral lecturers, 1 lecturer from psychology department at University of Social Welfare and Rehabilitation Sciences and 2 nursing staff of the hospitals evaluated and finalised the intervention content)
- *duration of treatment period and timing*: 4 sessions
- *description*:
  - theoretical/educational content: communication skills training, confidence-building, problem-solving, decision-making, anger management
  - SESSION 1:
    - a) target: referrals from participants, introduction to workshop goals, introduction to the principles of resilience skills, pre-test assessment
    - b) session details and activity description: 1. participants' references, 2. understand the goals and methods of intervention, 3. principles and introduction of resilience skills
  - SESSION 2:
    - a) target: communication skills and its application, anger-management skills
    - b) session details and activity description: 1. principles of communication, factors affecting therapeutic and professional communication, 2. anger-management principles and procedures and anger-management strategies
  - SESSION 3:
    - a) target: confidence-building skills, problem-solving skills in the workplace
    - b) session details and activity description: 1. self-esteem site, provide ways to increase self-esteem, 2. concepts and principles of problem-solving, steps to using problem-solving
  - SESSION 4:
    - a) target: ability to make decisions in the workplace, summary and conclusion, how to follow the training process, post-intervention assessment
    - b) session details and activity description: 1. define decision-making, decision-making methods and procedures, 2. design a position and make decisions
- *compliance*: 2 excluded due to lack of full participation in the workshop
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: no theoretical foundation specified; content of intervention extracted from sources of nursing management and existing papers (Antonovsky 1987; Dehghan 2012; Henderson 2007; McDonald 2013; Rezaeiian 2002)

Control: not specified (n = 40; after exclusions)

Outcomes

Outcomes collected and reported:

- perceived stress, i.e. nursing stress - NSS

Time points measured and reported: 1) pre-intervention; 2) post-intervention; 3) 1-month follow-up (1 month post-intervention)

Adverse events: not specified

Notes

Contact with authors: We contacted the authors for the number of participants randomised to each group and to ask for the means and SDs for the outcome of nursing stress in the 2 groups at each time point. We also asked for the treatment duration in weeks/months and whether the authors performed a per-protocol analysis, but received no response to 2 inquiries.

Study start/end date: not specified

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Funding source: not specified
Declaration of interest: not specified
Ethical approval needed/obtained for study: approved by Ethics Committee of the University of Social Welfare and Rehabilitation Sciences
Comments by study authors: article is taken from the dissertation of Seiedeh Zahra Mirzaeirad at the University of Social Welfare and Rehabilitation Sciences (Moral Code 144.1394.REC.USWR.IR)
Miscellaneous outcomes by the review authors: article in Persian (translated)
Correspondence: Seiedeh Zahra Mirzaeirad; corresponding author: Narges Arsalani, Associate Professor, Department of Nursing, Faculty of Rehabilitation, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran; nargesarsalani@gmail.com

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Quote: "The present study is quasi-experimental. Participants included nurses working in hospitals in Golestan province who were randomly selected and randomly assigned to participate in the study." Quote: "جدول 4 توزیع برابر عوامل ، متغیرهای گردد. یافته ها نشان شناختی جمعیت می دهد که گروه دو به همگن توزیع با متغیرها سایر جنسیت متغیر از بغیر یافت تفاوت اختصاص داد و مداخله (1 / 15 -ed P) . نشان 3 جدول" ["In Table 2, in addition to the distribution of mographic variables, it is shown that except for gender, other variables were homogeneously distributed between the intervention and control group (p > .05)."] Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for sociodemographic characteristics (see Table 2; except for gender) and outcome variable nursing stress on the basis of analysis (see Table 3)
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be related to true outcome
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "پایان مداخله ، ۴۰ پرسشنامه تکمیل شده مورد بررسی قرار گرفت. " [At the end of the intervention, 40 completed questionnaires were evaluated.] Quote: "از این تعداد در گروه آزمون ۴ نفر به سبب عدم شرکت کامل در کارگاه آموزشی ، در گروه شاهد یک نفر به علت تغییر محل خدمت و یک نفر به علت عدم تمایل به ادامه همکاردن. -xe [Four participants were cluded, 2 from the study group due to lack of full participation in the workshop, one in the control group due to change of location and one due to unwillingness to continue cooperation.] Judgement comment: reasons for missing data likely to be related to true outcome (see reasons for exclusions in both groups); per-protocol analysis

Mirzaeirad 2019 *(Continued)*

Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Mistretta 2018

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** according to report, clusters based on schedule availability; additional information received from authors (Mistretta 2018 [pers comm]): not multiple groups/clusters for each treatment; judged as misnamed study with individual randomisation stratified for schedule availability **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified; intention-to-treat analysis
Participants	**Country:** USA **Setting:** Mayo Clinic (major tertiary healthcare institution) **Age:** mean = 46.0 (SD = 12.6, range = 22-80) years **Sample size (randomised):** 60 **Sex:** 52 women, 8 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** average stress scores (DASS-21) suggested mild levels of stress (7.9 (3.5)); average scores for depression (DASS-21; 4.8 (3.7)) and anxiety (DASS-21; 4.0 (2.9)) fell within range, suggesting relatively little depression and anxiety; mean well-being WHO (Five) Well-Being Index**,** WHO-5) scores at baseline were 12.9 (4.1) indicating moderate levels of well-being; mean baseline score for the burnout subscales (MBI-HSS) suggest moderate level of emotional exhaustion (23.9 (11.8)) above normative levels, a low level of depersonalisation (5.5 (5.1)), and a moderate level of personal accomplishment (37.1 (6.4)) **Population description:** employees at the Mayo Clinic in Arizona, a large research hospital and medical centre **Inclusion criteria:** 1) being an employee working at Mayo Clinic, Arizona; 2) aged 18 years or older; 3) owning a smartphone; 4) scoring at least 5 on the DASS-21 stress subscale **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** post-intervention: 6 provided no post-intervention data; 3-month follow-up: 16 provided no follow-up data with similar attrition rates across groups (IG1 = 6/22 (27.2%); IG2 = 5/23 (21.7%), CG = 5/15 (33.3%)) **Reasons for missing data:** not specified
Interventions	**Intervention 1:** Mindfulness-Based Resilience Training (MBRT) (n = 22) • *delivery*: face-to-face sessions; CDs and/or links to MP3 (MPEG Audio Layer-3) audio files containing guided mindfulness exercises to practise throughout the week; participants asked to complete MBRT daily logs on the frequency and type of mindfulness practice they engaged in • *providers*: facilitated by clinical psychologist/developer of MBRT; certified yoga instructor for mindful movement component

Mistretta 2018 *(Continued)*

- *duration of treatment period and timing*: 6 weekly 120-minute sessions; scheduled from 4:30 pm to 6:30 pm, which for many participants began during paid working hours (typically 8 am to 5 pm)
- *description*:
  - incorporates 2 practices: learning mindfulness skills to deal effectively with unpleasant/unwanted thoughts or experiences; and learning resilience skills to foster positive growth and behaviour in keeping with one's intentions and values
  - sessions consisted of educating participants about the core concepts in mindfulness and resilience training, followed by experiential practice and group discussion
  - All classes included a mindful movement component taught by a certified yoga instructor.
  - SESSION 1: resilience – core concepts and research, attentional training – awareness of breath, informal practice
  - SESSION 2: awareness of breath – 10 minutes, mindfulness – core concepts and research, compassionate body scan
  - SESSION 3: coping with difficult physical sensations – core concepts, awareness of bodily pain/discomfort, compassion meditation
  - SESSION 4: coping with difficult emotions – core concepts, ABC's of MBRT, naming emotions meditation
  - SESSION 5: coping with unwanted thoughts/narratives – core concepts, fusion and diffusion, practising with difficult thoughts/narratives meditation
  - SESSION 6: self-criticism and self-compassion, personalised resilience plan Incorporating intentions, mindfulness skills and resilience skills
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: USD 2,500 per 6-week programme (USD 100 to USD 180 per person, depending on the size of the group); participants were offered USD 50 for completion of pre-, post-, and follow-up questionnaires
- *theoretical basis*: incorporates aspects of MBSR and ACT, but differs from both approaches, in that it includes shorter meditation practices and deeper discussion of the neurobiology of stress and resilience; training has been studied previously in transplant patients with positive results (Stonnington 2016) although in the current study we eliminated the initial session of Stress Management Resilience Training for logistical reasons

Intervention 2: Smartphone Resilience Training (n = 23)

- *delivery*: smartphone app
- *providers*: app provided by Soma Analytics (London, UK)
- *duration of treatment period and timing*: every 7 - 10 days participants were prompted to select 1 of 4 possible topics that they wanted to focus on for the next week
- *description*:
  - app designed to provide users with data on their sleep and emotions so as to increase awareness of current levels of well-being as well as provide targets for potential change to individuals
  - topics users can choose: sleep, happiness and positivity, energy and focus, and productivity; topics aligned with the goals of falling asleep faster or feeling more refreshed, being happier, boosting energy and focus, or getting things done, respectively. Feeling less stressed served as an additional goal that contained a mixture of interventions from all topics.
  - TOPIC SLEEP: goal: fall asleep faster, feel more refreshed; content: pre-sleep routine, sleep environment, use of stimulants, exposure to natural light, impact of artificial light, physical exercise, rumination, nutrition
  - TOPIC HAPPINESS POSITIVITY: goal: be happier; content: 3 good things, gratitude letter, signature strengths, negativity bias, going for a walk, physical exercise
  - TOPIC ENERGY FOCUS: goal: boost my energy and focus; content: mindfulness meditation, mindful rating, mindful email, post-lunch dip, willpower is a limited resource, no multitasking, physical exercise
  - TOPIC PRODUCTIVITY: goal: get things done; content: eat your frog, Eisenhower matrix, mindful email, no multitasking, Pareto's law, SMART goals (abbreviation not explained)
  - TOPIC MIXTURE OF TOPICS: goal: feel less stressed; content: mixture of interventions from all topics
- *compliance*: not specified

Mistretta 2018 *(Continued)*

- *integrity of delivery*: not specified
- *economic information*: estimated cost of USD 20 to USD 100 per user, depending on the product and level of personalisation; participants were offered USD 50 for completion of pre-, post-, and follow-up questionnaires
- *theoretical basis*: all topics except sleep included some concepts related to mindfulness; smartphone application tested in an earlier pilot study with Mayo Clinic employees to evaluate its functionality

Control: no intervention (were offered training at the conclusion of trial) (n = 15)

Outcomes

Outcomes collected and reported:

Primary outcome

- depression - DASS-21
- anxiety - DASS-21
- stress - DASS-21
- well-being - WHO-5

Secondary outcome

- burnout, emotional exhaustion - MBI-HSS
- burnout, depersonalization - MBI-HSS
- burnout, personal accomplishment - MBI-HSS
- self-compassion - Self-Compassion Scale
- compassion for others - Compassion for Others Scale
- daily affect - EMA
- relationship to quality - EMA
- valued action - EMA
- sleep monitoring - EMA

Time points measured and reported: 1) pre-intervention; 2) post-intervention; 3) 3-month follow-up (3 months post-intervention)

Adverse events: not specified

Notes

Contact with authors: We contacted authors to get more information about the cluster randomisation (Mistretta 2018 [pers comm]).

Study start/end date: not specified (April 2015 - March 2016 according to trial registration)

Funding source: Mayo Clinic Arizona-Research Funds and Horizon 2020

Declaration of interest: Christopher Lorenz is a Director of Soma Analytics.

Ethical approval needed/obtained for study: approved by Mayo Clinic IRB

Comments by authors: trial registration: ClinicalTrials.gov Registration number: NCT02419430; URL: clinicaltrials.gov/ct2/show/study/NCT02419430

Miscellaneous outcomes by the review authors: information received from authors (Mistretta 2018 [pers comm]) that there were no multiple groups for each treatment and that ICCs could not be calculated.

Correspondence: Erin G. Mistretta, Department of Psychology, Arizona State University, 950 S. McAllister Ave., Room 237, P.O. Box 871104, Tempe, AZ 85287; egmistretta@asu.edu; Trial registration: Cynthia Stonnington, MD, Associate Professor of Psychiatry, Mayo Clinic, Stonnington.Cynthia@mayo.edu

Risk of bias

Bias	Authors' judgement	Support for judgement

Mistretta 2018 *(Continued)*

Random sequence generation (selection bias)	Unclear risk	Quote: "Eligible participants were randomized using a cluster randomization procedure based on schedule availability." Quote: "Once participants agreed upon a time, they were then randomized to either the Mindfulness Based Resilience Training (MBRT) intervention (n = 22), the smartphone resilience intervention app (n = 23), or the control group (n = 15)." Quote: "Results of ANOVA and chi-square analyses (adjusted with Bonferroni correction) comparing groups on demographic characteristics and baseline levels of functioning showed that the groups were comparable on all measures. Furthermore, there were no significant differences in baseline MBI scores when comparing participants based on job roles (data not shown). Thus, randomization was successful in creating groups that were equivalent at baseline." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for sociodemographic variables and outcome variables on the basis of analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Judgement comment: blinding of participants and personnel probably not done for MBRT intervention (face-to-face intervention); blinding of participants and personnel for smartphone resilience intervention app unclear; review authors judge that the outcome (sleep monitoring via actigraphy) is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done for MBRT intervention (face-to-face intervention); blinding for smartphone resilience intervention app unclear; outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Judgement comment: insufficient information on possible blinding of outcome assessment, but the review authors judge that the outcome measurement (sleep monitoring via actigraphy) is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias for MBRT intervention (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Rates of Attrition. Of the 60 participants randomized to groups, 54 (90%) provided post-intervention data, 44 (73%) provided three-month follow-up data, and 74% of participants completed measures at all three time points. The rates of attrition were similar across groups with 27.2% attrition for MBRT, 21.7% attrition for smartphone resilience training, and 33.3% attrition for the control group (p = .76)." Quote: "There were no significant differences in baseline measures or demographics between those who completed the intervention and those who did not." Quote: "One-way ANOVA's [pre-treatment, post-treatment, 3-month follow-up] using intent-to-treat analyses for each group separately revealed that both

Mistretta 2018 *(Continued)*

		the MBRT and the Smartphone groups showed improvements over time in key outcomes, whereas the control group showed no evidence of change" Judgement comment: reasons for missing outcome data unlikely to be related to true outcome with balance in missing data between groups (IG1: 27.2% attrition, IG2: 21.7%, CG: 33.3%, P = 0.76); intention-to-treat analysis
Selective reporting (reporting bias)	High risk	Judgement comment: trial registration available (NCT02419430); several reported outcomes were not prespecified; follow-up period prespecified was not reported; PRESPECIFIED: DASS-21 from baseline to 6 months; REPORTED: WHO-5, DASS-21, MBI-HSS, SCS, compassion to others, daily affect, relationship quality, valued action, and sleep monitoring via smartphone app at baseline, post-intervention and 3-month follow-up

NCT02603133

Study characteristics

Methods	**Study design:** RCT **Study grouping:** sequential assignment **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified in trial registration **Imputation of missing data:** not specified
Participants	**Country:** USA **Setting:** NICU **Age:** not specified **Sample size (randomised):** 2650 (actual enrolment) **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** NICU healthcare professionals **Method of recruitment:** not specified **Inclusion criteria:** 1) age: 18 - 85 years; 2) location: newborn centre, i.e. the NICU or a step-down unit; 3) provider: a) primary work place is the Newborn Center, b) full-time equivalent of ≥ 40%, c) date of hire more than 4 weeks before start of the intervention; 4) provider groups: a) attendings that identify your newborn centre as their primary site of work (not physicians from satellite NICUs), b) NICU fellows, c) nurse practitioners, d) physician assistants, e) nurses, including nurse leadership (managers, educators), f) nurse assistant, g) respiratory-care providers, h) transport specialists if primarily neonatal transport team, i) newborn centre social worker, j) newborn centre clerks, k) newborn centre pharmacists, l) newborn centre physical, occupational, speech, and developmental therapists, m) newborn centre nutritionists, n) newborn centre lactation consultants **Exclusion criteria:** 1) location: labour and delivery or the newborn nursery; 2) provider: work is delivered mostly outside the newborn centre (this may affect providers who deliver services across the hospital such as residents, surgeons, anaesthetists, consultants, nutritionists, physical therapists/occupational therapists (these are included if they are mostly dedicated to the newborn centre); 3) float personnel; 4) those who do not speak English; 5) those who cannot operate computer or smart phone

NCT02603133 *(Continued)*

Attrition (withdrawals and exclusions): not specified

Reasons for missing data: not specified

Interventions

Intervention: web-based implementation for the science of enhancing resilience (WISER 2.0) (n not specified)

- *delivery*: online (participants receive messages); individual
- *providers*: self-guided
- *duration of treatment period and timing*:
  - IG receives 10-day sequential (Seq) and 10-day non-sequential (NSeq) rollout of resilience tools; however, contradicting information in trial registration if cohort 1 receives both version of the intervention or either the Seq or NSeq version
  - Seq: tools are obtained on 10 consecutive days
  - NSeq: messages are received daily with exception of Thursdays, Fridays, and Saturdays
- *description*:
  - resilience tools Three Good Things, Gratitude, Random Acts of Kindness, Awe, 1 Good Chat
  - Three Good Things (3GT Tool): Participants reflect on "good things" that happened that day during evenings across 10 days. Participants are also able to voluntarily share their good things and read other participants' good things through the nightly anonymous log. By savouring good moments from earlier that day, participants are thought to shift from the natural focus on "what went poorly" due to negativity bias1 to an appreciation of what went well. This shift in focus is thought to reduce rumination and depression symptoms. In prior research, 3GTs was found to increase happiness and decrease depression in internet participants.2 In prior cohorts of 3GTs, we saw improvements in burnout, depression symptoms, work-life balance, and happiness. Participants also report benefiting from viewing nightly Three Good Things logs of others.
  - Gratitude (Grat Tool): Participants are offered the opportunity to cultivate gratitude toward others through a guided gratitude letter writing exercise.2 Through expressing gratitude, we learn more about our vital connections to others, often in surprising and meaningful ways. Previous research has found that gratitude interventions increase well-being in a number of ways, particularly in boosting positive affect.
  - Random Acts of Kindess (RAK Tool): Participants report kind acts that they have committed, received, and/or witnessed, each day. By committing random acts of kindness participants experience a boost of positive emotions, and report lower negative affect. Recipients of acts of kindness benefit as well.
  - Awe (Awe Tool): This tool provides participants the opportunity to recount in detail one of their own experiences of awe, and encourages them to be on the lookout for new ones (even minor examples) over a few days. When we experience awe, our sense of time expands, we are kinder to others, we experience higher life satisfaction, and we prefer experiences over material things.
  - 1 Good Chat (Good Chat Tool): This tool uses the latest research on cultivating relationships and increasing social connection. Feeling socially connected is linked to health and well-being outcomes, including longevity.6 The 1 Good Chat tool asks participants to reflect on good conversations and to note the prosocial behaviors that he/she and the other person engaged in.
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: no theoretical foundation specified

Control: wait-list control (n not specified); however, contradicting information in trial registration whether cohort 2 serves as wait-list control for cohort 1 vs receives lecture on safety culture (unrelated to burnout intervention) or both

Outcomes

Outcomes collected and reported:

Primary outcome

- NICU health professional resilience (burnout-emotional exhaustion) - shortened 4-item version of emotional exhaustion subscale of MBI

NCT02603133 *(Continued)*

Secondary outcome

- work-life balance - Work-Life Balance items adopted from College Activities and Behavior Questionnaire
- depressive symptoms - Center for Epidemiological Studies Depression Scale-10-item version (positive screen: score ≥ 10)
- happiness - Subjective Happiness Scale

Other outcome

- safety and teamwork climate - safety and teamwork climate scales of SAQ (at 6 months, 12 months)
- clinical delays in patient care - single question; response scale matching the SAQ (at 6 months, 12 months)
- any healthcare-associated infection - standardised Vermont Oxford Network data definitions for all clinical data during the birth hospitalisation (at 12 months)
- voluntary nursing turnover - 3-item intention to leave index (at 12 months)
- conflicts with co-professionals - disruptive behaviour index assessing prevalence of 15 distinct types of disruptive behaviours and extent to which they are managed well in given work setting (at 6 months, 12 months)

Outcomes reported not specified

Time points measured and reported: 1) pre-intervention; 2) 10 days; 3) 1 month; 4) 6 months; 5) 12 months; **time points reported not specified**

Adverse events: not specified

Notes

Contact with authors: We contacted the authors for the status of the trial (which changed from ongoing study to completed but unpublished study during the review process) (Profit 2018 [pers comm]). We also asked for more information about the study design and the form of control group (1 inquiry), but did not receive a response at the time of writing the review

Study start/end date: July 2016 to August 2018 (actual study completion date)

Funding source: Stanford University; Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD); Duke University

Declaration of interest: not specified

Ethical approval needed/obtained for study: not specified

Comments by authors: not specified

Miscellaneous outcomes by the review authors: information received from authors: trial completed but unpublished (Profit 2018 [pers comm]; based on information in trial registration not clearly enough if 2 or 3 cohorts and if wait-list or active control (see lecture on safety culture), due to different information provided

Correspondence: primary investigator: 1) Jochen Profit MD, Associate Professor of Pediatrics, Director of Perinatal Health Systems Research, Stanford University, USA; profit@stanford.edu; 2) J. Bryan Sexton, PhD; Duke University, USA

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote (see trial registration): "The investigators will test the efficacy of the WISER Program in the NICU setting using a stepped-wedge mixed-methods randomized controlled trial (swRCT) at six tertiary care NICUS." Quote (see trial registration): "Two blocks with 3 NICUS will be randomly assigned to one of two intervention cohorts."

NCT02603133 *(Continued)*

		Quote (see trial registration): "Participants are individually randomized to one of two cohorts." Judgement comment: based on trial registration, insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; no judgement on baseline comparability for sociodemographic and outcome variables possible based on trial registration
Allocation concealment (selection bias)	Unclear risk	Judgement comment: based on trial registration, insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Quote (see trial registration): "Masking: None (Open Label)" Judgement comment: open-label study; based on trial registration probably no blinding of participants and personnel, but the review authors judge that the outcome is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote (see trial registration): "Masking: None (Open Label)" Judgement comment: open-label study; based on trial registration probably no blinding of participants and personnel and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Quote (see trial registration): "Masking: None (Open Label)" Judgement comment: based on trial registration, insufficient information about blinding of outcome assessment (unclear if 'no masking' refers to outcome assessment), but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Quote (see trial registration): "Masking: None (Open Label)" Judgement comment: based on trial registration, insufficient information about blinding of outcome assessment (unclear if 'no masking' refers to outcome assessment); however, due to performance bias (no masking), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: no judgement possible based on trial registration
Selective reporting (reporting bias)	Unclear risk	Judgement comment: no judgement possible based on trial registration

NCT03645798

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** sample size calculation conducted with statistical software; effect size was 0.67, power was 0.80, and margin of error type I was 0.05; accordingly, sample size was 64

NCT03645798 *(Continued)*

	Imputation of missing data: not specified in trial registration
Participants	**Country:** China**Setting:** nurses; online/mobile-based intervention (Wechat-based)**Age:** not specified **Sample size (randomised):** probably 102**Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** nurses **Inclusion criteria:** 1) registered nurses or licensed practical nurses; 2) who provide direct care to residents; 3) whose MBI-GS scores are no less than 1.5; 4) who do not take any hormone therapy; 5) are Chinese speakers **Exclusion criteria:** 1) student nurses; 2) those who suffer from diseases that influence their hormone levels; 3) those who participated in similar studies; 4) those who have no interest in this study **Attrition (withdrawals and exclusions):** 102 nurses who met inclusion criteria and were randomly selected for study; only 73 participants completed the study (IG = 33; CG = 40) **Reasons for missing data:** not specified

Interventions	**Intervention:** Wechat-based "Three good things" positive psychotherapy (after dropouts: n = 33)
	
	• *delivery*: online-/mobile-based (Wechat intervention); combined setting (Wechat friends cycle; participants' records of 3 good things can be open to others or only to researchers)
	• *providers*: probably mostly self-guided intervention (Wechat); researchers with responsibility to supervise the implementation of intervention and explain confusion of participants during intervention period
	• *duration of treatment period and timing*: 6 months (August 2015 – January 2016)
	• *description*:
	  ◦ participants directed to record 3 good things that went well each day in the Wechat friends cycle to maintain emphasis on the positive experience
	  ◦ Three good things can be minor, ordinary or important.
	  ◦ next to each good things, participants required to answer the question "Why did this good thing happen?"
	  ◦ record can be open to others or only open to researchers
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis*: Positive psychotherapy
	
	Control: TAU (after dropouts: n = 40)
	
	• *delivery*: not specified
	• *providers*: psychologists
	• *duration of treatment period and timing*: not specified
	• *description*:
	  ◦ normal psychological instruction from the hospital
	  ◦ convenient method set by the hospital; nurses who have stress or psychological problems can find help through this intervention
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis:* not specified

Outcomes	**Outcomes collected and reported:** **Primary outcome:** • burnout (emotional exhaustion, cynicism, reduced professional efficacy) – MBI-GS

NCT03645798 *(Continued)*

Secondary outcomes:

- resilience – CD-RISC
- self-efficacy – General Self-Efficacy Scale
- coping styles/trait coping – Trait Coping Styles Scale

Other outcomes:

- turnover intention – Turnover Intention Scale
- job satisfaction – Job Satisfaction Scale
- job performance – Job Performance Scale
- blood cortisol – blood samples

Outcomes reported not specified

Time points measured and reported: 1) pre-intervention; 2) post-intervention (i.e. immediately after 6-month intervention); **time points reported not specified**

Adverse events: not specified in trial registration

Notes

Contact with authors: We contacted the authors to see if the trial was published in the meantime, but received no response to 2 inquiries.
Study start/end date: see trial registration: July 2015 to January 2016
Funding source: Central South University
Declaration of interest: not specified
Ethical approval needed/obtained for study: approval by IRB of Xiangya Nursing School, Central South University
Comments by study authors: not specified
Miscellaneous outcomes by the review authors: no information about publication status received from authors; corresponding study protocol and statistical analysis plan: clinicaltrials.gov/ProvidedDocs/98/NCT03645798/Prot_SAP_000.pdf
Correspondence: Jingping Zhang (study director), Central South University, Changsha, Hunan, China, 410013; jpzhang1965@163.com

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote (see trial registration): "A randomized, controlled trial was conducted for 73 Chineses nurses from The Second Xiangya Hospitcal of Central South University (33 in the experimental group, 40 in the control group)." Judgement comment: based on trial registration, insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; no judgement on baseline comparability for sociodemographic and outcome variables possible based on trial registration
Allocation concealment (selection bias)	Unclear risk	Judgement comment: based on trial registration, insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Quote: "Masking: Single (Investigator)" Judgement comment: online intervention (Wechat group) vs normal psychological instruction from hospital; based on trial registration, single-blinded study (i.e. investigators blinded), but the review authors judge that the outcome is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "Masking: Single (Investigator)" Judgement comment: online intervention (Wechat group) vs normal psychological instruction from hospital; based on trial registration, single-blinded

NCT03645798 *(Continued)*

		study (i.e. investigators blinded) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Judgement comment: based on trial registration, insufficient information about blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: based on trial registration, insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote (see trial registration): "102 nurses who met the inclusion criteria were randomly selected for the study. However, only 73 completed the study, with 33 in the experimental group and 40 in the control group." Judgement comment: no judgement possible based on trial registration (number of participants randomised to each group not stated; number of dropouts not specified for each group; n = 73 completed the study, but unclear if only n = 73 were analysed)
Selective reporting (reporting bias)	Unclear risk	Judgement comment: no judgement possible based on trial registration

Poulsen 2015

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** Working from these bases, a medium effect size (f = 0.4), with α = 0.05 and β = 0.95 was chosen because of the exploratory nature of this study and the clinical significance of even relatively moderate effects from training. With 2 groups of participants (IG and CG), a total sample of 64 was required, and therefore 80 participants were recruited to allow for dropouts and incomplete data sets. **Imputation of missing data:** no imputation of missing data; available-case analysis (only participants with complete data sets)
Participants	**Country:** Australia **Setting:** radiation oncology departments of 2 hospitals **Age:** 5 (7%) aged 25 years, 26 (37%) aged 25 - 35 years, 14 (20%) aged 36 - 45 years, 25 (36%) aged > 45 years (in analysed sample; after exclusion of 10 participants) **Sample size (randomised):** 80 **Sex:** 58 women, 12 men (in analysed sample; after exclusion of 10 participants) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** radiation therapists and oncology nurses

Poulsen 2015 *(Continued)*

Inclusion criteria: 1) being a radiation therapist or an oncology nurse; no gender, religious or racial restrictions

Exclusion criteria: not specified

Attrition (withdrawals and exclusions): 10/40 (25%) participants in IG only excluded from analysis

Reasons for missing data: incomplete data sets

Interventions

Intervention: written educational material + recovery training programme/workshop on recovery from job stress (n = 40)

- *delivery*: written educational material + face-to-face, interventional workshop with practical exercises and interactive discussions
- *providers*: not specified
- *duration of treatment period and timing*: 1 day
- *description*:
  - workshop on recovery self-care practices: recovery training programme developed by Hahn and colleagues was expanded and tailored for cancer-care workers
  - additional material about peer mentoring during goal-setting using mental contrasting with implementation intentions was provided to increase social support for uptake of healthy self-care practices
  - intervention expanded the 4 recovery pathways used by Hahn and colleagues to include a module on social support during goal-setting, using the vehicle of peer mentoring
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information:* not specified
- *theoretical basis*: recovery training programme developed by Hahn 2011 was expanded and tailored for cancer care workers (Hahn 2011; Kram 1985; Oettingen 2000)

Control: active control (written educational information only) (n = 40)

- *delivery*: written information
- *providers*: not specified
- *duration of treatment period and timing*: not specified
- *description*: educational material about recovery, self-care practices
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis:* not specified

Outcomes

Outcomes collected and reported:

- recovery - Recovery Experiences Questionnaire
- satisfaction with self-care practices - single item
- perceived sleep quality - single item

Time points measured and reported: 1) pre-intervention; 2) at the end of every week (during 6 weeks); 3) 6-week follow-up (6 weeks post-intervention: 1-day intervention; at the end of the 6-week period); time points during 6 weeks indirectly reported in MANOVAs and for REQ in figure

Adverse events: not specified

Notes

Contact with authors: no correspondence required

Study start/end date: not specified

Funding source: funded by the Princess Alexandra Hospital Research Foundation

Poulsen 2015 *(Continued)*

Declaration of interest: conflict of interest: Anne A. Poulsen is Director of Work Life Balance Solutions (Queensland).

Ethical approval needed/obtained for study: ethical clearance obtained from the Hospital Ethics Committee, which oversaw research at the 2 hospitals where the ONs and RTs worked

Comments by authors: not specified

Miscellaneous outcomes by the review authors: not relevant

Correspondence: Dr Anne A. Poulsen, Mater Medical Research Institute, 31 Raymond Tce, South Brisbane, Queensland 4101, Australia; a.poulsen@uq.edu.au

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Participants who completed consent forms and a pre-training questionnaire were randomised using computer-generated random integers to either the experimental (i.e. workshop plus written educational information) or control (i.e. written educational information-only) group" Quote: "Demographic data for experimental and control groups are presented in Table 1. There were no significant differences between the two groups for any background variables, allowing data analysis to proceed without their consideration as potential confounds." Quote: "Participants in both groups were proportionally equivalent for gender, age, marital status and caregiver responsibilities." Quote: "Figure 1a (REQ score) shows these data and indicates that, although they were not statistically significant, the mean scores for the experimental group were higher at baseline than those for the control group." Judgement comment: The investigators describe a random component in the sequence generation (computer-generated random integers)and there is verified baseline comparability of groups for sociodemographic variables and 1 outcome measure (REQ total score).; baseline comparability for other outcomes (perceived sleep quality, satisfaction with self-care practices) unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Quote: "A strength of the current study was the use of a randomised, controlled design with questionnaires that could not be identified by the staff directly involved in the programme trainings, or by others involved in data entry or analysis." Judgement comment: probably blinding of data entry and analysis, but insufficient information about blinding of outcome assessment (i.e. who delivered the questionnaires to participants); due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)

Poulsen 2015 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "There were 80 participants in total with 40 being randomised to the experimental arm and 40 in the control arm. There were 10 participants with incomplete datasets, leaving a total of 70 who were evaluable." Judgement comment: reasons for missing data likely to be related to true outcome with imbalance in missing data between groups (IG: n = 10, CG: n = 0); available-case analysis or even complete-case analysis (only participants with complete datasets)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Schroeder 2016

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** no imputation of missing data; per-protocol analysis (only participants who took part in allocated intervention) and available-case analysis (only participants for whom outcomes were obtained at 3 time points)
Participants	**Country:** USA **Setting:** family medicine and internal medicine departments at Providence Health and Services in Portland, Oregon **Age:** mean = 42.76 (SD = 8.43, range = 32-61) years **Sample size (randomised):** 33 **Sex:** 24 women, 9 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** MASL: burnout, emotional exhaustion: IG = 26.68 (8.48), CG = 24.52 (10.57); burnout, depersonalisation: IG = 20.87 (8.42), CG = 19.47 (7.90); burnout, personal accomplishment: IG = 40.25 (5.92), CG = 37.52 (6.43) **Population description:** primary care physicians from the family medicine and internal medicine departments at Providence Health and Services in Portland, Oregon **Inclusion criteria:** 1) employed as a primary care physician by Providence Medical Group (PMG); 2) working at least 30% time in direct patient care; 3) aged between 25 and 75 years; 4) willing to be randomised to the IG or CG; 5) no prior participation in the same mindfulness-based intervention (MBI) offered at PMG **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** after randomisation: 2 withdrawals (IG = 1/16 (6.3%), CG = 1/17 (5.9%)); post-intervention assessment: 2 withdrawals in CG only (2/17 (11.8%)); follow-up assessment: 3 withdrawals (IG = 2/16 (12.5%), CG = 1/17 (5.9%)) **Reasons for missing data:** after randomisation: lack of time or scheduling conflicts; at post-intervention assessment or at follow-up assessment: not specified

Schroeder 2016 *(Continued)*

Interventions	**Intervention:** Mindful Medicine Curriculum (MMC) (n = 16)
	• *delivery*: face-to-face; group setting (mindfulness retreat)
	• *providers*: Instructors have extensive experience in secular MBIs and familiarity with the culture of physicians.
	• *duration of treatment period and timing*: 13-hour weekend training programme + 2-hour follow-up sessions at 2 and 4 weeks after the weekend
	• *description*:
	  ○ modified version of MBSR, with added elements of compassion skills training, brief mindfulness techniques designed to be used at work, and "SLO conversation" exercises where participants practice applying mindfulness to the core clinical skills of speaking, listening, and observing (SLO)
	  ○ key to the MMC: introduction to mindfulness that is relevant to the professional contexts in which physicians work, hence emphasising the physicians' ability to incorporate mindfulness and compassion into interpersonal relationships
	• *compliance*: 1 of 16 allocated to IG did not receive allocated intervention due to scheduling conflict
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis:* similar to the protocol used by Fortney 2013; modified version of MBSR; Fortney 2013 developed a substantially abbreviated weekend immersion MBI with 2 brief follow-up sessions for primary care providers (already tested in uncontrolled pilot study, 30 primary care providers reported reduction in burnout, depression, anxiety, perceived stress; effects maintained over 9 months postintervention)
	Control: wait-list control (n = 17)

Outcomes	**Outcomes collected and reported:** • resilience - BRS • perceived stress - PSS • burnout, emotional exhaustion - MASL • burnout, depersonalization - MASL • burnout, personal achievement - MASL • compassion - Santa Clara Brief Compassion Scale • mindfulness - MAAS • patient self-reported satisfaction with primary care physician - Doctor Communication Composite and Overall Doctor Rating • meditation practice (only in IG at 3-month follow-up) - Meditation Practice Questionnaire **Time points measured and reported:** 1) pre-intervention; 2) post-intervention (within 1 week after weekend-long intervention); 3) 3-months follow-up (3 months post-intervention) **Adverse events:** not specified
Notes	**Contact with authors:** no correspondence required **Study start/end date:** recruitment and data collection between December 2014 and May 2015 **Funding source:** funded by Providence Health System Clinical Transformation Council **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** approved by the Providence Health and Services IRB **Comments by authors:** not specified **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Michael S. Christopher, PhD, School of Professional Psychology, Pacific University, 190 SE 8th Avenue, Suite 260, Hillsboro, OR 97123; mchristopher@pacificu.edu

Schroeder 2016 *(Continued)*

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "After completing the baseline measures, participants were randomized 1:1 into the intervention or a waitlist control." Quote: "There were no significant differences between the intervention (n = 17) and waitlist control (n = 16) group on any demographic variables (all Ps >.05)." Quote: "The intervention and control groups did not differ on any outcome measures at baseline (all Ps >.05)." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for sociodemographic characteristics and outcome variables
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Figure 1 shows the participant flow. A total of 33 physicians provided written consent to enroll in the study, completed the baseline assessment, and were randomized to the MBI or waitlist control. Two participants (1 MBI and 1 waitlist control) withdrew (citing lack of time or scheduling conflicts) after randomization. Two waitlist control group participants withdrew from the study before postintervention assessment, and 2 MBI participants and 1 waitlist control group participant did not complete 3-month follow-up." Judgement comment: reasons for missing data unlikely to be related to true outcome with relative balance in missing data between groups (over study course: IG: n = 3; CG: n = 4; reasons for missing data unclear for most missing data); per-protocol analysis (only participants who took part in allocated intervention) and available-case analysis (only participants for whom outcomes were obtained at 3 time points)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified (MPQ only assessed in IG at 3-month follow-up)

Smith 2019

Study characteristics

Methods	**Study design:** RCT

Smith 2019 *(Continued)*

	Study grouping: parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** planned sample size was 40 (n = 29 in conference abstract) **Imputation of missing data:** not specified in conference abstract
Participants	**Country:** Canada**Setting:** critical care and trauma nurses at St Michael's (tertiary academic hospital in Toronto); exact training setting not specified**Age:** mean = 33 years**Sample size (randomised):** 29**Sex:** 26 women, 3 men**Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** nurses in critical care and trauma settings/acute care nurses **Inclusion criteria:** see trial registration; 1) nurse in the MSICU and TNICU and the medical/surgical floor; 2) full-time or part-time employment status; 3) approval of clinical leader manager; 4) receipt of written informed consent **Exclusion criteria:** see trial registration; 1) casual employment status; 2) inability to attend intervention days **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified

Interventions	**Intervention:** wellness intervention ARISE (n = 16)
	
	• *delivery*: face-to-face group setting (full-day and half-day interactive workshop) + online group setting (closed Facebook group and online mindfulness sessions via Zoom)
	• *providers*: full-day workshop facilitated by Employee Assistance Provider (EAP)
	• *duration of treatment period and timing*: 1½-day workshops (full-day 7½-hour workshop); half-day 3¾-hour workshop); 3 months peer support (Facebook group); five 90-minute mindfulness sessions
	• *description*:
	  ◦ 1) FULL-DAY INTERACTIVE WORKSHOP: resilience-focused seminar; resilience-focused activities and self-care techniques; introduction to self-care and self-care techniques including yoga and stretches, stress relief using the senses and mindfulness; reflective writing
	  ◦ 2) HALF-DAY WORKSHOP: reinforced/focused on the following self-care techniques: mindfulness, yoga and stretching, and creative and reflective reading and writing; introduction to hospital-based resources for wellness and employee and family assistance including EAP and health and wellness offerings
	  ◦ 3) PEER SUPPORT through social media engagement (closed Facebook group to bolster workshop content) for 3 months post-intervention participation
	  ◦ 4) 5 online, instructor-guided MINDFULNESS SESSIONS (Zoom)
	• *compliance*: not specified in conference abstract, but all ARISE group participants agreed the workshop content, tools, and techniques could be used to manage stress
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis*: multi-modal intervention according to trial registration
	
	Control: no intervention (n = 13)
	
	• *compliance*: not specified

Outcomes	**Outcomes collected and reported:** • resilience - CD-RISC **- reported in conference abstract** • acute occupational fatigue - Occupational fatigue and recovery (OFER) subscale • inter-shift recovery - OFER subscale • burnout - ProQOL5 scale **- reported in conference abstract** • compassion satisfaction - ProQOL5 scale **- reported in conference abstract**

Smith 2019 *(Continued)*

- secondary trauma - ProQOL5 scale **- reported in conference abstract**
- perceived stress - PSS
- occupational coping self-efficacy for nurses - Occupational Coping Self-Efficacy Questionnaire for Nurses
- mindfulness - MAAS

Time points measured and reported: 1) pre-intervention; 2) 1-month follow-up (1 month post-intervention); 3) 3-month follow-up (3 months post-intervention); **reported in conference abstract:** changes between pre-intervention and 1-month follow-up (resilience, burnout, compassion satisfaction, secondary trauma) and pre-intervention and 3-month follow-up (resilience)

Adverse events: not specified

Notes	**Contact with authors:** We contacted the authors to see if the study was already published (Smith 2019 [pers comm]). **Study start/end date:** according to trial registration: February 2017 to October 2017 **Funding source:** sponsor according to trial registration: St. Michael's Hospital, Toronto **Declaration of interest:** not specified in trial registration or conference abstract **Ethical approval needed/obtained for study:** not specified in trial registration or conference abstract **Comments by study authors:** trial registration: NCT03017469 **Miscellaneous outcomes by the review authors:** conference abstract; presented at 2019 48th Critical Care Congress of SSCM (Society of Critical Care Medicine), San Diego; manuscript in preparation according to authors **Correspondence:** Orla Smith, PhD, Li Ka Shing Knowledge Institute, St. Michael's Hospital, Toronto, Canada; SmithO@smh.ca; Tel: 416-864-6060 ext. 3179

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "We conducted a randomized controlled trial (NCT03017469)" Judgement comment: based on trial registration and conference abstract, insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; based on conference abstract, no information about comparability of groups at baseline or respective analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: based on trial registration and conference abstract, insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: based on trial registration and conference abstract, no blinding of participants and personnel (face-to-face intervention; see trial registration: no masking) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: based on trial registration and conference abstract, insufficient information about blinding of outcome assessment; however, due to performance bias (no masking), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote: "29 nurses participated (n=16 in the ARISE group and n=13 in the control group)." Judgement comment: based on conference abstract, insufficient information of attrition or exclusions to permit a judgement of 'Low risk' or 'High risk' (e.g. unclear if there were any missing data and if missing data were imputed)

Smith 2019 *(Continued)*

Selective reporting (reporting bias)	Unclear risk	Judgement comment: trial registration (NCT03017469) available; no judgement possible based on conference abstract

Sood 2011

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** A sample size of 40 was selected for this pilot study after weighing statistical considerations along with logistical and resource constraints. In general, for a continuous outcome variable, a sample size of 40 provides statistical power (2-tailed, α = 0.05) of > 85% to detect a difference of 1 SD between groups. **Imputation of missing data:** no imputation of missing data; per-protocol analysis with participants who complied with allocated intervention and for whom outcomes were obtained
Participants	**Country:** USA **Setting:** Department of Medicine Faculty, clinic **Age:** IG mean = 46.8 (SD = 8.3) years, CG mean = 50.2 (SD = 5.7) years (unclear for total sample as number of participants considered for baseline characteristics not specified) **Sample size (randomised):** 40 **Sex:** comparable gender distribution across 2 study arms (IG = 55% men; CG = 50% men) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** anxiety (SAS): IG = 55.2 (13.6), CG = 50.5 (23.0) **Population description:** physicians of Department of Medicine Faculty, all academic clinicians **Inclusion criteria:** 1) being a faculty member of the Department of Medicine; 2) being able and willing to participate **Exclusion criteria:** 1) a recent (within the past 6 months) psychotic episode; 2) clinically significant, acute, unstable neurological, psychiatric, hepatic, renal, cardiovascular, or respiratory disease that prevented participation in the study **Attrition (withdrawals and exclusions):** of the 40 enrolled, 32 (80%) physicians completed the study; 8/20 (40%) participants in the CG declined to participate after randomisation and prior to filling out any assessments **Reasons for missing data:** scheduling issues in CG
Interventions	**Intervention:** SMART (n = 20) • *delivery*: face-to-face; individual setting • *providers*: not specified • *duration of treatment period and timing*: single 90-minute session, optional 30 – 60-minute follow-up session depending on individual needs • *description*: attention training is instruction to help participants direct their interpretations away from fixed prejudices toward a more flexible disposition while cultivating skills such as gratitude, compassion, acceptance, forgiveness, and higher meaning; brief structured relaxation intervention (paced breathing meditation)

Sood 2011 *(Continued)*

- *compliance*: All 20 participants completed the 90-minute training; 4 participants participated in an additional 30-minute session.
- *integrity of delivery*: not specified
- *economic information:* not specified
- *theoretical basis*: adapted from Attention and Interpretation Therapy (AIT); AIT is a structured therapy developed at the Mayo Clinic to decrease stress and enhance resilience; addresses 2 aspects of human experience, attention and interpretation; AIT guides learners to delay judgement and pay greater attention to the novelty of the world

Control: wait-list control (n = 20)

- *compliance*: 8 participants declined to participate after randomisation; did not receive the intervention

Outcomes	**Outcomes collected and reported:** ***Primary outcome*** • resilience - CD-RISC • perceived stress - PSS • anxiety - SAS • quality of life - Linear Analog Self Assessment Scale • fatigue - Visual Analog Scale Fatigue **Time points measured and reported:** 1) pre-intervention; 2) 2-month follow-up (8 weeks after single session intervention) **Adverse events:** not specified
Notes	**Contact with authors:** no correspondence required **Study start/end date:** not specified **Funding source:** Department of Medicine, Mayo Clinic, Rochester, MN **Declaration of interest:** none disclosed **Ethical approval needed/obtained for study:** study protocol reviewed and approved by Mayo Foundation IRB **Comments by authors:** not specified **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Amit Sood, MD, Complementary and Integrative Medicine Program, Division of General Internal Medicine, Mayo Clinic, 200 First Street SW, Rochester, MN 55905, USA; sood.amit@mayo.edu

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "After obtaining the informed consent, physicians were randomly assigned to one of two groups an active arm or a wait-list control arm." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and no apparent baseline differences between randomised groups for mean age, gender, baseline stress and resilience measures; verified baseline comparability of groups for some sociodemographic variables (age, gender) and outcome measures

Sood 2011 *(Continued)*

		(stress, resilience); but statistical (non)significance not reported and baseline comparability for other variables also unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Figure 1. Flow diagram of the progress in a randomized clinical trial to assess the effect of resiliency training among physicians." Quote: "Of the 40 enrolled (all academic clinicians), 32 (80%) physicians completed the study. Eight participants (all in the control arm) declined to participate after randomization and prior to filling out any assessments because of scheduling issues (Fig. 1)." Judgement comment: reasons for missing outcome data likely to be related to true outcome with imbalance in numbers for missing data (only missing data in CG, n = 8); per-protocol analysis with participants who complied with allocated intervention and for whom outcomes were obtained
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available, but it is clear that the published report includes all expected outcomes, including those that were prespecified

Sood 2014

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** A sample size of 40 was calculated after weighing statistical and logistical considerations. To detect a difference between groups with a 2-sided, 5% significance level and power of 85% using continuous outcomes, a sample size of 20 participants per group was necessary; level of power achieved not specified **Imputation of missing data:** for 4 participants (IG = 2, CG = 2) who did not complete the week 12 assessments, baseline values were carried forward to week 12, to provide the most conservative estimate of efficacy; intention-to-treat analysis
Participants	**Country:** USA **Setting:** Department of Radiology, Mayo Clinic, Rochester **Age:** mean = 47.8 (SD = 7.09) years

Sood 2014 *(Continued)*

Sample size (randomised): 26

Sex: 11 women, 15 men

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified

Population description: faculty members of the Department of Radiology at Mayo Clinic (physicians or scientists)

Inclusion criteria: 1) staff members (physicians or scientists) within the Department of Radiology; 2) able and willing to participate in all aspects of the study; 3) able to understand and sign the informed consent

Exclusion criteria: 1) a psychotic episode within the previous 6 months; 2) clinically significant, acute, unstable neurological, psychiatric, hepatic, renal, cardiovascular, or respiratory disease that would prevent participation in the study

Attrition (withdrawals and exclusions): 4 (IG = 2/13 (15.4%), CG = 2/13 (15.4%)) completed the baseline questionnaires but did not complete the 12-week questionnaires

Reasons for missing data: scheduling issue

Interventions

Intervention: SMART (n = 13)

- *delivery*: face-to-face small-group session (with PowerPoint slide presentation); reading materials that covered the skills discussed; optional phone calls
- *providers*: not specified
- *duration of treatment period and timing*: single 90-minute session; brief structured relaxation intervention (practise deep diaphragmatic breathing once or twice a day); optional 30- to 60-minute follow-up session; 2 optional follow-up phone calls at weeks 4 and 8
- *description*:
  - SMART programme teaches learners to focus their attention on the external world and to defer unrefined judgements. Learners also are taught to cultivate and guide their interpretations by 5 higher-order principles: gratitude, compassion, acceptance, meaning, and forgiveness.
  - brief structured relaxation intervention (paced breathing meditation --> guided to practise deep diaphragmatic breathing at 5 breaths a minute for 5 or 15 minutes, once or twice a day)
  - optional 30- to 60-minute follow-up session and 2 follow-up phone calls
- *compliance*: all 13 participants completed the initial 90-minute group training; 8 participants had an additional 30-minute follow-up session and phone calls
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: abbreviated adaptation of AIT; AIT developed as a scientific and structured programme at Mayo Clinic Rochester to decrease personal stress and enhance resiliency. AIT and SMART focus on 2 aspects of human experience: attention and interpretation. Human attention prioritises focus on threats.These threats, in modern times, are often symbolic psychological threats (hurts, regrets, worries, and fears) that draw attention away from the present moment. This predisposes to ruminative thinking, avoidance, and ineffective thought suppression, all contributing to stress

Control: wait-list control (n = 13)

Outcomes

Outcomes collected and reported:

Primary outcome

- resilience - CD-RISC
- perceived stress - PSS
- anxiety - SAS
- quality of life - Linear Analog Self-Assessment Scale
- mindfulness - MAAS

Sood 2014 *(Continued)*

	Time points measured and reported: 1) pre-intervention; 2) 3-month follow-up (3 months after single-session intervention, at week 12)
	Adverse events: not specified
Notes	**Contact with authors:** no correspondence required
	Study start/end date: enrolment for the study ran from April 2010 to May 2011; end date not specified
	Funding source: supported by a Mayo Clinic Department of Radiology Small Grant No.94147001 and gift from Terrance D. and Judith A. Paul
	Declaration of interest: not specified
	Ethical approval needed/obtained for study: study protocol was reviewed and approved by the IRB
	Comments by authors: study methods overlap with those described in previously published studies
	Miscellaneous outcomes by the review authors: not relevant
	Correspondence: Varun Sharma, MD, Division of General Internal Medicine, Mayo Clinic, 200 First Street SW, Rochester, MN 55905; vdsharma.md@gmail.com

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Quote: "After obtaining informed consent, participants were assigned to one of two groups: an active arm or a wait-list control arm using a simple randomization schedule generated by the Department of Biomedical Statistics and Informatics." Quote: "Mean scores at baseline differed significantly between groups (two-sample t test, P = 0.021)." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk' (only "randomization schedule", exact method not described); RCT, but not verified baseline comparability of groups for outcome quality of life; baseline comparability for sociodemographic variables and other outcomes of interest unclear
Allocation concealment (selection bias)	Unclear risk	Quote: "The allocation sequence was available only to the study coordinator and concealed from the researchers involved in recruitment." Judgement comment: investigators enrolling participants could not foresee assignment; unclear if allocation was also concealed from participants; exact method not described
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "single-blind trial" Judgement comment: blinding of study personnel not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding; blinding of participants probably ensured (single-blind trial)
Blinding of outcome assessment (detection bias) Subjective outcomes	Unclear risk	Quote: "Subjects were de-identified and assigned a coded study identification number. This code was maintained by the statistician and unavailable to study investigators ensuring blinding of the investigators to the outcome measures." Judgement comment: insufficient information about blinding of outcome assessment to permit judgement of 'Low risk' or 'High risk' (unclear who provided the questionnaires to the participants, e.g. blinded investigators?)

Sood 2014 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Flow diagram of the progress in a randomized clinical trial to assess the effect of SMART program among radiologists." Quote: "Two subjects from each arm completed the baseline questionnaires but did not complete the 12-week questionnaires" Quote: "For the four subjects (two SMART and two Control) who did not complete the week 12 assessments, the baseline values were carried forward to week 12 to provide the most conservative estimate of efficacy." Judgement comment: reasons for missing data unlikely to be related to true outcome with balance in missing data between groups (IG: n = 2, CG: n = 2); baseline-observation-carried-forward (BOCF) for missing outcome data; intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available, but it is clear that the published report includes all expected outcomes, including those that were prespecified

Stetz 2007

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified for final report **Imputation of missing data:** not specified
Participants	**Country:** USA **Setting:** volunteers attending medical class at Fort Rucker, Alabama; Fort Drum, New York; or Fort Benning, Georgia (i.e. army); training in research laboratory **Age:** see Population description; 35 (60%) under the age of 30 years old **Sample size (randomised):** 63 **Sex:** 16 women, 47 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline** screening: none of the participants showed high rates of PTSD at baseline; 3 main PTSD symptoms reported as “moderately” or “quite a bit” (p. 243): “Repeated, disturbing dreams of a stressful military experience” (26%); “Repeated, disturbing memories, thoughts, or images of a stressful military experience?” (25%); “Feeling as if your future will somehow be cut short.”; about 10% to 20% of participants reported similar levels of stress across the remaining items **Population description:** volunteers who were attending a combat medical class (military medical personnel) **Inclusion criteria:** 1) only volunteers who showed normal oral temperature (e.g. temperature between 98.2 and 98.6 °F, see Shoemaker 1996); 2) only volunteers showing low stress symptoms on the PTSD Checklist– Military version (PCL-M scores less than 4 and 5 on each item) **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified

Stetz 2007 *(Continued)*

	Reasons for missing data: not specified

Interventions	**Intervention 1:** Virtual Reality-Stress Inoculation Training (VR-SIT) (n = 18)
	• *delivery*: virtual reality (VR) scenarios/games
	• *providers*: not specified
	• *duration of treatment period and timing*: 2 or 4 VR sessions
	• *description*:
	  ○ "Combat Medic" scenario: in this environment, "medics" have to decide when to shoot and when to treat; they only have about 3 minutes to triage, treat casualties on ground, administer intravenous fluids, morphine, chest seals, and call for MEDEVAC (medical evacuation) help
	  ○ "Flight Medic" scenario: participants have to treat a similar casualty but inside a helicopter that is facing turbulence and on its way to the next level of care (e.g. medical facility)
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis*: stress inoculation; VR scenarios/games were created by the Virtual Reality Medical Center (VRMC)
	
	Intervention 2: Coping training (CT) (n = 18)
	• *delivery*: participants sitting in noise-proof chamber in the dark and wear a head-mounted display while being guided
	• *providers*: research staff who monitor and guide participants outside of the chamber
	• *duration of treatment period and timing*: 2 or 4 CT sessions
	• *description*:
	  ○ participants instructed to either breathe or tense a body part per PMR and CB technique
	  ○ CB: individuals typically asked to inhale through their noses for a few seconds, hold momentarily, and then exhale slowly through their mouths
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information (intervention cost, changes in other costs as result of intervention)*: not specified
	• *theoretical basis*: PMR; CB
	
	Intervention 3: combination of VR-SIT and CT (n = 18)
	• *delivery*: See IG1 and IG2: VR scenarios/games; participants sitting in noise-proof chamber in the dark and wear a head-mounted display while being guided
	• *providers*: see IG1 and IG2: for VR part not specified; IG2: research staffer who monitors and guides participants outside of the chamber
	• *duration of treatment period and timing*: combination of a CT and a VR session
	• *description*:
	  ○ see IG1 and IG2
	  ○ "Combat Medic" scenario: in this environment, "medics" have to decide when to shoot and when to treat; they only have about 3 minutes to triage, treat casualties on ground, administer intravenous fluids, morphine, chest seals, and call for MEDEVAC help
	  ○ "Flight Medic" scenario: participants have to treat a similar casualty but inside a helicopter that is facing turbulence and on its way to the next level of care (e.g., medical facility)
	  ○ participants instructed to either breathe or tense a body part using PMR and CB technique
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis*: stress inoculation; VR scenarios/games were created by the VRMC; PMR; CB
	
	Control: no intervention (n = 9)

Outcomes	**Outcomes collected and reported:**

Stetz 2007 *(Continued)*

- psychological stress, depression - MAACL-R
- psychological stress, anxiety - MAACL-R **- reported**
- psychological stress, hostility - MAACL-R **- reported**
- psychological stress, positive affect - MAACL-R
- psychological stress, sensation seeking - MAACL-R **- reported**
- psychological stress, dysphoria - MAACL-R **- reported**
- presence - PQ; (also specified in Stetz 2007; preliminary data with 25 medics)
- biochemical stress, salivary amylase test - Salivary Amylase Kit (also specified in Stetz 2007; preliminary data with 25 medics) **- reported**
- physiological stress, body temperature - PhysioLab (also specified in Stetz 2007; preliminary data with 25 medics)
- physiological stress, breathing rate - PhysioLab (also specified in Stetz 2007; preliminary data with 25 medics)
- physiological stress, pulse rate - PhysioLab (also specified in Stetz 2007; preliminary data with 25 medics)

Time points measured and reported: presence (PQ) after each VR session; MAACL-R before and after each session; salivary amylase test before and after each exposure; PhysioLab monitoring throughout the session; **time points reported:** no single time points reported, only results from MANOVA

Adverse events: not specified

Notes

Contact with authors: We contacted the authors for the randomisation process and received the information that a list was generated and a number to randomly select was computed with SPSS (Stetz 2018 [pers comm]). We contacted the authors again to ask for the level of attrition in each group and the means and SDs for the outcome measures at each time point, but they had not responded to this inquiry at the time of writing

Study start/end date: January to June 2007

Funding source: funded through the Army Medical Department Advanced Medical Technology Initiative, Telemedicine and Advanced Technology Research Center, US Army Medical Research and Materiel Command, Fort Detrick, Maryland

Declaration of interest: not specified

Ethical approval needed/obtained for study: not specified

Comments by authors: not specified

Miscellaneous outcomes by the review authors: Stetz 2007 and Stetz 2008 are 2 reports on the same study; Stetz 2007 reports preliminary data on n = 25 medics

Correspondence: MAJ Melba Stetz, PhD, Research Director, Psychology Department, Tripler Army Medical Center, Hawaii; Melba.Stetz@us.army.mil; , Tel: +1/ 808-433-1651

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Since we depended on students' availability to participate in our study, we were only able to pseudo-randomly assign them to either the control or one of the experimental groups, as defined below." Judgement comment: additional information from author about randomisation: "Yes, we made a list and computed a number w [with]/SPSS to randomly select."; insufficient information about random sequence generation to permit judgement of 'Low risk' or 'High risk' (according to publication Stetz 2008 only pseudo-randomisation based on availability; according to information from

Stetz 2007 *(Continued)*

		author: SPSS-generated random numbers); no information about comparability of groups at baseline or respective analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk' (according to the Stetz 2008 publication only, pseudo-randomisation based on availability, which would mean high risk of bias)
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Judgement comment: blinding of participants unclear; blinding of study personnel for Virtual Reality training sessions unclear; blinding of personnel for coping training probably not done (staff ask participants to use relaxation techniques while participants are sitting in a chamber), but the review authors judge that the outcome is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants unclear; blinding of study personnel for Virtual Reality training sessions unclear; blinding of personnel for coping training probably not done (staff ask participants to use relaxation techniques while participants are sitting in a chamber); outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Judgement comment: insufficient information about blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	Unclear risk	Judgement comment: insufficient information about blinding of outcome assessment to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (e.g. number and reasons of potential missing data in 4 groups not stated; unclear how many participants were analysed)
Selective reporting (reporting bias)	High risk	Judgement comment: no study protocol available; not all of the study's prespecified outcomes have been reported (compare Stetz 2007 on preliminary results of sample to date: physiological outcomes and presence are prespecified and partly reported; Stetz 2008 on final results with 63 participants: no physiological outcomes are prespecified or reported; Stetz 2008: depression and positive affect subscale are not reported)

Strijk 2011

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** sample size calculation based on differences between the IG and CG in changes in mean vitality score, measured by the UWES. Based on a study among 10,000 Dutch and Belgian employees, the baseline mean vitality score (range = 0 - 6) was assumed to be 3.99 (SD = 1.11). For the sample size needed, a difference in the vitality mean score of 10% between the IG and CG after 6 months was considered relevant. This means an average difference in the vitality mean score of 0.4 (SD = 1.2) between both study groups. Assuming $\alpha = 0.05$, power = 0.90, and 2-sided tests, 189 participants per group were needed. Taking into account a loss of follow-up of 15%, a sample size of 446 employees (223 employees in each group) needed to be included

Strijk 2011 *(Continued)*

	Imputation of missing data: complete-case analysis with complete cases (Strijk 2013 (second reference to Strijk 2011)): 500 workers who completed questionnaire at baseline and at 12 months; Strijk 2012 (second reference to Strijk 2011): 575 workers who completed questionnaire at baseline and at 6 months); multiple imputation based on multivariate imputation by chained equations for intention-to-treat analysis (sensitivity analysis)
Participants	**Country:** The Netherlands **Setting:** academic hospitals **Age:** mean = 52.4 (SD = 4.85) years **Sample size (randomised):** 730 **Sex:** 551 women, 179 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** mental health (36-Item Short Form Survey Instrument): IG = 75.2 (14.8), CG = 77.6 (13.4) (score > 76.8 considered as good) **Population description:** all workers aged ≥ 45 years from 2 academic hospitals **Inclusion criteria:** workers were eligible if 1) aged ≥ 45 years; 2) worked ≥ 16 hours a week; 3) gave written informed consent; 4) had no risk of developing adverse health effects when becoming physically active (as assessed by the Physical Activity Readiness Questionnaire) **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** post-intervention (at 6 months) = 155 lost to follow-up (IG = 74/367 (20.2%); CG = 81/363 (22.3%)); 6-month follow-up = 230 lost to follow-up (IG = 117/367 (31.9%); CG = 113/363 (31.1%)) **Reasons for missing data:** post-intervention: no time (n = 25), no interest/motivation (n = 10), health problems (n = 9), change of job (n = 5), other (n = 13), unknown reasons (n = 93); 6-month follow-up (12 months after baseline): no time (n = 34), no interest/motivation (n = 17), health problems (n = 13), change of job (n = 6), other (n = 52), unknown (n = 108)

Interventions	**Intervention:** written information + Vital@Work intervention (Worksite lifestyle intervention (Vitality exercise programme, VEP)) (n = 367)
	
	• *delivery*: written information; VEP: face-to-face guided group sessions (max. 16 persons); aerobic exercising without face-to-face instruction; face-to-face individual sessions (coaching)
	• *providers*:
	  ◦ yoga sessions: qualified yoga instructor; workout sessions: certified fitness instructors
	  ◦ coach visits: personal vitality coach (during 4-hour training session, Personal Vitality Coach (PVC) protocol and accompanying materials, such as coaching registration forms, explained to coaches); at Amsterdam location: PVC visits provided by 3 coaches (2 human-movement scientists, 1 health scientist); at Leiden location: PVC visits provided by 3 physical therapists; all coaches with experience of sport exercise training
	• *duration of treatment period and timing*: 6 months in total (2 weekly guided 45-minute sessions (yoga, workout), 1 weekly session exercising, 3 x 30-minute coach visits at start of intervention and followed by 2 consecutive visits 4 – 6 weeks and 10 – 12 weeks after first visit)
	• *description*:
	  ◦ written information: information about a healthy lifestyle in general (i.e. diet, physical activity, and relaxation)
	  ◦ VEP: 1) WEEKLY GUIDED YOGA GROUP SESSIONS: aimed at relaxation exercises; based on Hatha yoga (i.e. asana, pranayama, and relaxation exercises); included exercises consisting of a) relaxation and preparation postures for the hips, shoulders, neck, feet, and hands while focusing on breathing, b) series of standing postures, forward bending postures and twists, and light back-bending postures, and c) total relaxation (i.e. the “Savasana Corpse” pose) and meditation
	  ◦ 2) WEEKLY GUIDED AEROBIC WORKOUT GROUP SESSIONS: aimed at improving aerobic fitness and increasing muscle strength; consisted of a warm-up followed by aerobic exercises, resistance train-

Strijk 2011 *(Continued)*

ing, and cooling down; intensity of workout had to be 65% – 90% of the age-predicted maximum heart rate; resistance training was progressive in nature and provided stimulus to all major muscle groups; at the guided group sessions of the VEP: FREE PROVISION OF FRUIT
    - 3) older workers asked to perform vigorous physical activity without face-to-face instruction (e.g. fitness, spinning, distance running) for ≥ 45 minutes once a week
    - 4) COACH VISITS:
        - aimed at changing workers' lifestyle behaviour by goal setting, feedback, and problem-solving strategies; visits aimed to change workers' lifestyle behaviour in both the short term (i.e. 6 months), by attending the guided group sessions of the VEP and performing weekly unsupervised vigorous physical activities, as well as after 12 months (i.e. sustainability of the newly-adopted healthy lifestyle in the long term)
        - during coach visits, 5 items are discussed: a) goal setting (i.e. losing weight; increasing aerobic fitness) and explanation of the goals of the VEP (a yoga session once a week; a workout session once a week; and aerobic exercise without direct face-to-face instruction once a week), b) getting confidence in achieving formulated goals, c) giving feedback on formulated goals, d) discussing barriers to formulated goals, e) problem-solving
        - FIRST VISIT: goal-setting and confidence in achieving formulated goals are discussed
        - SECOND THIRD VISIT: same items are discussed, namely feedback on formulated goals, discussing barriers for formulated goals, and problem-solving; at all visits, workers receive advice on suitable vigorous physical activities they could perform on a regular basis
- *compliance*: started allocated intervention: personal vitality coach: 329 of 367; workout: 234 of 367; Yoga: 259 of 367; mean attendance at intervention: personal vitality coach: 2.7 (range = 1 - 3); yoga workout: 10.4 sessions per 24 weeks 11.1 sessions per 24 weeks; attendance rates (yoga: 51.7%, workout: 44.8%) lower than expected; compliance categories defined: workers in IG who did not follow a guided session (yoga n = 47; workout n = 62); low compliance: ≤ mean number of sessions (yoga n = 95; workout n = 89); high compliance: > mean number of sessions (yoga n = 108; workout n = 99)
- *integrity of delivery*:
    - DOSE DELIVERED: in total 72.3% of planned yoga sessions (Amsterdam: 89.3%; Leiden: 58.3%), and 96.3% of all planned workout sessions were provided (Amsterdam: 95.1%; Leiden: 97.4%); For PVC visits, both locations managed to provide all (100.0%) PVC visits
    - FIDELITY: intervention protocol for the time schedules of the yoga and workout group sessions was partly followed by the providers
        - Amsterdam: both the yoga and workout sessions were provided on all working days
        - Leiden: yoga sessions provided on 2 working days, workout sessions were provided on 4 working days
        - average size of provided yoga group sessions was 4.8 workers (range = 1 - 19). Except for 1 yoga session, in which 19 workers participated, all other sessions were provided in groups of a maximum of 16 workers. Mean number of workers per guided workout session was 3.9 (range = 1 - 15)
        - no substantial differences between the 2 locations in the group sizes of the guided yoga; PVC visits: the mean number of items discussed was 4.3 ± 1.2; sig. significant (P = 0.001) more items discussed at location Amsterdam (4.6 ± 1.0) compared to Leiden (3.7 ± 1.3); first 2 items (goal-setting and obtaining confidence in achieving formulated goals) were discussed in 88.8% of all first PVC visits, with no sig. differences between locations; third item, feedback on formulated goals, discussed in 78.2% of all cases (sig. higher (P = 0.011) in Amsterdam compared to Leiden (91.2% versus 79.2%); fourth and fifth items, discussing barriers for formulated goals and problem-solving, were discussed in 64.0% and 65.1% of all cases, respectively (sig. higher at Amsterdam location: Amsterdam: 91.2% for both items, Leiden: 35.0%: P < 0.001 and 41.0%: P < 0.001)
- *economic information*: free fruit provided at the guided group sessions of the VEP
- *theoretical basis*:
    - yoga sessions: based on Hatha yoga (i.e. asana, pranayama, and relaxation exercises)
    - personal coach visits: based on psychological behaviour-changing theories, such as goal-setting, feedback, and problem-solving strategies

Control: active control (written information) (n = 363)

- *delivery*: written information
- *description*: written information: see IG; information about a healthy lifestyle in general (i.e. diet, physical activity, and relaxation)

Strijk 2011 *(Continued)*

- *compliance*: All 363 allocated participants received control
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis:* not specified

Outcomes

Outcomes collected and reported:

Primary outcome

- (general) vitality - RAND-36 vitality scale
- work-related vitality - vitality scale of UWES

Secondary outcome

- work engagement - UWES
- productivity - single item from WHO Health Productivity Questionnaire
- sick leave - single item from Productivity and Disease Questionnaire

Other outcome

- physical activity, sports activities (min/week) - Short QUestionnaire to ASses Health-enhancing physical activity (SQUASH)
- vigorous physical activity - SQUASH
- moderate-vigorous physical activity - SQUASH
- vigorous physical activity - accelerometer (only in subsample)
- moderate-vigorous physical activity - accelerometer (only in subsample)
- aerobic capacity - VO2max during UKK (UKK institute) 2km walk test (only in subsample)
- weekly fruit intake - Short Fruit and Vegetable Questionnaire
- mental health - RAND-36 mental health scale
- need for recovery from work - Dutch Questionnaire on the Experience and Evaluation of Work

Time points measured: 1) pre-intervention; 2) post-intervention (after 6-month intervention/6 months after baseline); 3) 6-month follow-up (6 months post-intervention/12 months after baseline) (only for outcomes reported in Strijk 2013 (second reference to Strijk 2011): general and work-related vitality, work engagement, productivity, sick leave)

Adverse events: participants reported no adverse events of intervention

Notes

Contact with authors: We contacted the authors for the number of participants lost to follow-up at 12 months in both groups (due to different numbers in the flow chart) (Van der Beek 2018 [pers comm]).

Study start/end date: April 2009 to October 2010 at 2 locations

Funding source: Vital@Work study financially supported by the 'Foundation Institute GAK'

Declaration of interest: no competing interests to declare

Ethical approval needed/obtained for study: approved by the Medical Ethics Committee of the VU University Center Amsterdam (VUmc) and of the Leiden University Medical Center (LUMC)

Comments by authors: registered at the Dutch Trial Register under trial registration number: NTR1240 (http://www.trialregister.nl/trialreg/ admin/rctview.asp?TC=1240)

Miscellaneous outcomes by the review authors: not relevant

Correspondence: Jorien E. Strijk (je.strijk@vumc.nl); corresponding author: Prof. Allard J van der Beek; Department of Public and Occupational Health, EMGO+ Institute for Health and Care Research, VU University Medical Center; Body@Work, Research Center Physical Activity, Work and Health, TNO-VUmc, Van der Boechorststraat 7, 1081 BT Amsterdam, The Netherlands; a.vanderbeek@vumc.nl

Strijk 2011 *(Continued)*

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "The workers who consented to participate were, after baseline measurements, individually randomized to the intervention or control group using Random Allocation Software (version 1.0, May 2004, Isfahan University of Medical Sciences, Iran)." Quote: "...baseline characteristics of the study population are presented with no significant differences between the groups in any of these variables." Judgement comment: The investigators describe a random component in the sequence-generation process (randomisation software) and there is verified baseline comparability between groups for sociodemographic characteristics; baseline comparability for outcome variables are unclear
Allocation concealment (selection bias)	Low risk	Quote: see study protocol: "Randomisation will be executed, after completing baseline measurements, by an **independent researcher** (i.e. research assistant) using Random Allocation Software (...)" Judgement comment: participants and investigators enrolling participants could probably not foresee assignment (random-sequence generation by independent researcher after baseline assessments, i.e. after participant enrolment was completed)
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Quote: "Blinding of participants or intervention providers was impossible." Quote: "The research assistant notified each worker to which group he or she had been allocated" Judgement comment: no blinding of participants and personnel (face-to-face intervention), but the review authors judge that the outcome is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "Blinding of participants or intervention providers was impossible." Quote: "The research assistant notified each worker to which group he or she had been allocated" Judgement comment: no blinding of participants and personnel (face-to-face intervention), and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Quote: "The research assistant notified each worker to which group he or she had been allocated and did not reveal the group allocation to the investigator responsible for data analyses." Judgement comment: insufficient information about blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Quote: "The research assistant notified each worker to which group he or she had been allocated and did not reveal the group allocation to the investigator responsible for data analyses." Judgement comment: insufficient information about blinding of outcome assessment (blinding of data analysis but unclear who distributed the questionnaires to the participants); however, due to performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)

Strijk 2011 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "As presented in the study flow diagram (figure 1), a total of 730 workers completed the baseline questionnaire and were randomized to the intervention (N=367) or control group (N=363)." Quote: "In total, 500 workers completed the questionnaire 12 months after baseline and were, therefore, used for complete cases analyses. In addition, sensitivity analyses with imputed data among the total study population (N=730) were performed." Quote: "All analyses were performed according to the intention-to-treat principle. As possible effects of missing participants should be considered, it is recommended to perform both complete cases and sensitivity analyses with imputed data (41). For the sensitivity analyses, all missing data on the outcome measure were imputed using multiple imputations (MI) based on multivariate imputation by chained equations (42, 43). The MI procedure was performed in PASW (version 18.0, SPSS Inc, Chicago, IL, USA), in which 40 different data sets were generated." Quote: "Effects were analysed according to the intention-to-treat principle with complete cases (n=575) and imputed data (n=730) using linear regression analyses." Judgement comment: reasons for missing data likely to be related to true outcome with imbalance in missing data between groups (Lost to follow-up 6 months: IG: 74, CG: 81, compare unknown reasons: IG: 35, CG: 58, compare no interest/motivation: IG: 6, CG: 4; 12 months: IG: 117, CG: 113, compare unknown reasons: IG: 46, CG: 62, compare no interest/motivation: IG: 11, CG: 6); complete-case analysis with complete cases (Strijk 2013: 500 workers who completed questionnaire at baseline and at 12 months; Strijk 2012: 575 workers who completed questionnaire at baseline and at 6 months) and multiple imputation for intent-to-treat analysis (physical activity using accelerometers and VO2max in subsample)
Selective reporting (reporting bias)	High risk	Judgement comment: trial registration (NTR1240) and study protocol (Strijk 2009) available; not all of the prespecified outcomes have been reported; not all reported outcomes were prespecified; PRE-SPECIFIED (in trial registration and study protocol): Primary: Vitality and lifestyle behaviour (Physical activity, dietary behaviour, alcohol consumption, smoking habits); Secondary: work engagement and productivity, general health status (also RAND-36), quality of life, sick leave and cost effectiveness; in addition in study protocol: BMI, waist circumference combined with 2-km UKK walking test; REPORTED: Primary: vitality (UWES), vitality (RAND-36); Secondary: work engagement, productivity, sick leave; reported, but not specified if primary or secondary outcome: physical activity (SQUASH, accelerometers), aerobic fitness (2-km UKK walking test for VO2max), dietary behaviour (fruit intake), mental health, need for recovery from work

Tierney 1997

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** power not specified but, according to authors, small sample size to achieve statistical significance

Tierney 1997 *(Continued)*

	Imputation of missing data: not specified
Participants	**Country:** USA **Setting:** suburban community hospital **Age:** see Population description; age not specified **Sample size (randomised):** 62 **Sex:** not specified (unclear if male nurses also included) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** staff nurses employed between 6 months and 2½ years at community hospital **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified

Interventions	**Intervention 1:** hardiness class (n = 21)
	
	• *delivery*: face-to-face; group session; didactics, role play, discussion
	• *providers*: given by the authors with guest lecture by a nurse manager
	• *duration of treatment period and timing*: 1-day 6-hour class
	• *description*
	  ◦ identification of urgent stressors; Introduction of concept of hardiness: commitment, control and challenge
	  ◦ situational reconstruction (assertiveness training, stress inoculation, rational emotive techniques)
	  ◦ relaxation and visual imagery
	  ◦ situation reviews and critiques
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis*: content based on course for nurse managers (Rich unpublished manuscript)
	
	Intervention 2: time management class (n = 19)
	
	• *delivery*: face-to-face; group session
	• *providers*: taught by one of the authors
	• *duration of treatment period and timing*: 1-day 6-hour class
	• *description*:
	  ◦ issues involved in hardiness eliminated from this course
	  ◦ identification of work dilemmas involved in time management; setting priorities
	  ◦ 6 steps for better time management: 1) planning, 2) delegating, 3) avoiding procrastination, 4) dealing with interruptions, 5) working with others, 6) completing paper work
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis*: using principles of Douglass 1983
	
	Control: no intervention (n = 22)

Outcomes	**Outcomes collected and reported:**

Tierney 1997 *(Continued)*

- hardiness - PVS
- hardiness, commitment - PVS
- hardiness, control - PVS
- hardiness, challenge - PVS

Time points measured and reported: 1) pre-intervention; 2) post-intervention; 3) 6-month follow-up (6 months post-intervention)

Adverse events: not specified

Notes	**Contact with authors:** no correspondence required **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by authors:** not specified **Miscellaneous outcomes by the review authors:** time management group is no-attention control but second intervention group (see results: only no-intervention group is indicated as CG) **Correspondence:** Mary Jo Tierney, Nurse Practitioner, San Mateo County, San Mateo, California

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Subjects were assigned randomly to one of three groups." Quote: "To determine whether there was a significant difference among the three groups at baseline, an analysis of variance was performed for the hardiness scores and subscales of all three groups at baseline. Table 1 shows that no significant difference existed among the three groups." Judgement comment: insufficient information about random sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for outcomes of interest on the basis of analysis; baseline comparability for sociodemographic characteristics is unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (e.g. unclear if there were any missing data in the 3 groups and if missing data were imputed)

Tierney 1997 *(Continued)*

Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Varker 2012

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** no imputation of missing data; available-case analysis (only participants who took part in video session and for whom outcomes were obtained)
Participants	**Country:** Australia **Setting:** general community; not specified where training took place **Age:** mean = 28.4 (SD = 10.4, range = 18 - 63) years **Sample size (randomised):** 82 **Sex:** 45 women, 35 men (in analysed sample of 80) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** post-traumatic stress symptoms, depression, anxiety and stress at pre-intervention (not specified) **Population description:** individuals from general population **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** Originally there were 82 participants who attended the first session; however, 2 participants failed to attend the second session (video and post-intervention assessment) and were therefore excluded (group not specified); 1 participant was excluded from DASS-21 analysis (not specified which group); 2 participants excluded from memory analysis (IG = 1, CG = 1) **Reasons for missing data:** not specified (n = 2), exclusion for DASS-21 analysis as outlier (n = 1); exclusions for memory analysis as failed to complete memory components at post-intervention and follow-up (n = 2)

Interventions	**Intervention:** inoculation resilience training (n = not specified)
	
	• *delivery*: face-to-face; setting unclear
	• *providers*: not specified
	• *duration of treatment period and timing*: single 40-minute session
	• *description*:
	  ◦ focused on increasing a sense of controllability, reducing unexpectedness and used serial approximation to desensitise the person to likely stressful events
	  ◦ STAGE 1: initial introduction, STAGE 2: education about physical responses to trauma; STAGE 3: teaches applied tension techniques to aid in stopping fainting or fear of fainting; STAGE 4: teaches thought-stopping techniques for inappropriate thoughts; includes identifying distorted thoughts, challenging them, and replacing them with more adaptive thoughts; STAGE 5: participants are exposed to serial approximation/desensitisation using projected still images of car crashes; STAGE 6:

Varker 2012 *(Continued)*

teaches about the importance of social support; STAGE 7: education about appropriate and inappropriate drug and alcohol use

- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*:
  - based on current research on the nature and aetiology of PTSD Foa 1986), and the treatment of PTSD; combines several aspects of stress inoculation training (Cameron 1982) with serial approximation (Foa 1986) and education

Control: attention control (non-intervention 'pragmatic' training group) (n = not specified)

- *delivery*: face-to-face; setting unclear
- *providers*: not specified
- *duration of treatment period and timing*: single 40-minute session
- *description*:
  - accident management training; practical tips and strategies on what to do if they are involved in or witness a traffic accident
  - Participants are taught about the role of the police when they are called to attend a traffic accident. Duties include securing the scene, checking if medical attention is required, determining what took place, breath testing, issuing a fine where necessary and submitting a report.
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: not specified

Outcomes

Outcomes collected and reported:

- perceived social support - Interpersonal Support Evaluation List-12 **- not reported**
- depression - DASS 21 (only pre-intervention and follow-up)
- anxiety - DASS 21 (only pre-intervention and follow-up)
- stress - DASS 21 (only pre-intervention and follow-up)
- posttraumatic stress symptoms, total - PSS-SR (only at follow-up)
- posttraumatic stress symptoms, intrusions - PSS-SR (only at follow-up)
- posttraumatic stress symptoms, avoidance - PSS-SR (only at follow-up)
- posttraumatic stress symptoms, arousal - PSS-SR (only at follow-up)
- memory of video - questionnaire used in previous study (Devilly 2007) (post-intervention and follow-up)
- video distress - single item (post-intervention and follow-up)

Time points measured: 1) pre-intervention; 2) post-intervention (after training in week 1 and stressor exposure in week 2); 3) 1-month follow-up (1-month post-intervention)

Adverse events: not specified

Notes

Contact with authors: We contacted the authors for the number of participants randomised to each group (before n = 3 exclusions), but they had not responded at the time of writing.

Study start/end date: not specified

Funding source: not specified

Declaration of interest: All authors declare no conflict of interests in the preparation of this report.

Ethical approval needed/obtained for study: not specified

Comments by authors: not specified

Miscellaneous outcomes by the review authors: not relevant

Varker 2012 *(Continued)*

Correspondence: Tracey Varker, Australian Centre for Posttraumatic Mental Health, University of Melbourne, Australia; Corresponding author: Grant J. Devilly, Griffith Health Institute School of Applied Psychology, Griffith University, Mt Gravatt Campus, Messines Ridge Road, Mt Gravatt, Qld 4122, Australia; grant@devilly.org; Tel.: +61 7 37353309; fax: +61 7 37353436

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Eighty individuals (35 male, 45 female) aged between 18 and 63 years (M age = 28.4, SD age = 10.4), were recruited from the general population through advertisements, and were randomly allocated (Devilly, 2007) to one of two conditions: inoculation or control" Quote: "There were no significant differences between the two groups in the distribution of age, gender, previous exposure to similar styles of video, history of trauma, prior consultation for emotional problems, blood phobia, anticipatory anxiety regarding what they were about to be shown, and group allocation sizes. Measures completed at Time 2 following the presentation of the video revealed no significant differences between each of the groups in the extent to which participants physically or mentally distracted themselves while viewing the video, the seriousness with which they rated the accident, nor levels of participant empathy with either the accident victims or the emergency workers. Overall, these results suggest that no significant differences existed within the group compositions (Inoculation vs Pragmatic Training Control) before the experimental phase." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for sociodemographic variables; baseline comparability for outcome variables unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Quote: "All data was collected by pencil-and-paper tests within a booklet that the 'therapist' did not see and, hence, the 'therapist' was blind to responses." Judgement comment: insufficient information about blinding of outcome assessment (therapists were blind to responses but unclear if therapists were also the outcome assessors who distributed the questionnaires); however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Eighty individuals (35 male, 45 female) aged between 18 and 63 years (M age = 28.4, SD age = 10.4), were recruited from the general population through advertisements, and were randomly allocated (Devilly, 2007)" Quote: "Originally there were 82 participants who attended the first session, however 2 participants failed to attend the second session and were, therefore, excluded. As such, the attrition rate was very low at just 2.4%." Quote: "With respect to negative affect, descriptive statistics of the DASS21 showed one case to be an outlier, as indicated by a z score over 3.29 ($p < .001$;

Varker 2012 *(Continued)*

		Tabachnik & Fidell, 2001), therefore this person was dropped from the DASS21 analysis." Quote: "The memory analysis was conducted for 78 participants, as 2 participants failed to complete the memory components of the post-video and follow-up questionnaires (1 control participant and 1 inoculation participant)." Judgement comment: n = 2 excluded (not specified which group and no reasons reported); 1 excluded in DASS-21 analysis (outlier; not specified which group); 2 missings (IG: 1, CG: 1) in memory (failed to complete memory components of assessment); available-case analysis (only participants who took part in video session and for whom outcomes were obtained)
Selective reporting (reporting bias)	High risk	Judgement comment: no study protocol available, but not all of the study's prespecified outcomes have been reported (perceived social support)

Villani 2013

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** power not specified; small sample size **Imputation of missing data:** not applicable since no dropouts or exclusions
Participants	**Country:** Italy **Setting:** oncology hospitals **Age:** mean = 43 (SD = 8.80) years **Sample size (randomised):** 30 **Sex:** 30 women (oncology nurses) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** all participants with cut-off of stress corresponding to higher quartile (Italien normative data) measured by Mesure du Stress Psycholyque (MSP); received from authors (Villani 2018 [pers comm]): state anxiety (STAI): IG = 43.64 (8.03), CG = 44.00 (9.91) **Population description:** female oncology nurses with permanent status employed in 6 oncology hospitals in Milan, Italy **Inclusion criteria:** 1) being a current oncology nurse with a minimum of 5 years of experience in the oncology ward; 2) having a permanent status, to avoid sources of stress related to temporary employment; 3) having a cut-off level of stress corresponding to the higher quartile (Italian normative data), measured using the MSP Questionnaire **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** information received from authors (Villani 2018 [pers comm]): no dropouts or exclusions during the study (only 8 participants excluded before randomisation because they did not meet the inclusion criteria) **Reasons for missing data:** not applicable since no dropouts or exclusions

Villani 2013 *(Continued)*

Interventions	**Intervention:** Mobile Stress Inoculation Training (M-SIT) (n = 15)
	• *delivery*: audio-video clips with narrative via mobile phones and headphones; background music
	• *providers:* not specified (probably self-guided)
	• *duration of treatment period and timing*: 4 weeks; 8 videos (1 vide o per session) twice a week; each session: 15 minutes
	• *description*:
	  ○ first 6 audio-video clips show relaxing virtual environment; last 2 video clips present oncology patients suffering from cancer
	  ○ 8 sessions
	  ■ SESSION 1 - 3: CONCEPTUALISATION PHASE: a) aim: to make nurses aware about their typical stressful reactions during their work; b) multimedia content: narrative voice guided participants in a vernal garden, a lake and a small waterfall exploration
	  ■ SESSIONS 4 - 5: SKILLS ACQUISITION REHEARSAL PHASE: a) aim: to teach coping strategies and relaxation techniques; b) multimedia content: narrative voice guides participants to explore an autumn hill, a mountain and a tree house
	  ■ SESSION 7 - 8: APPLICATION FOLLOW-THROUGH PHASE: a) aim: to assess the ability of participants to use the coping skills acquired during the intervention; b) multimedia content: participants watch 2 video clips presenting oncology patients suffering from cancer, in a hospital ward
	  ○ skills acquisition and rehearsal phase combined with 2 kinds of relaxation techniques: PMR and AT
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis*: created according to the SIT procedure (Meichenbaum 1977); PMR (Jacobson 1938) and AT (Schultz 1977). PMR (Jacobson 1938) aims to decrease the physiological aspects of anxiety by distracting individuals from their awareness of anxious feelings. AT (Schultz 1977) explores the effectiveness of a relaxation training based on the individual's ability to control the body through mind exercises
	
	Control: attention control (n = 15)
	• *delivery*: video clips without any narratives via mobile phones; background music (same as in intervention group)
	• *providers*: not specified (probably self-guided)
	• *duration of treatment period and timing*: 4 weeks; 8 videos (1 video per session) twice a week; each session: 15 minutes
	• *description*: 8 video clips represented natural environments; previously validated as neutral stimuli
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis:* Gross 1995

Outcomes	**Outcomes collected and reported:** • state anxiety - STAI • trait anxiety - STAI • coping skills, active coping - Brief Coping Orientation to Problems Experienced (Brief COPE) • coping skills, denial - Brief COPE **Time points measured and reported:** 1) pre-intervention; 2) end of session 1 (only state anxiety); 3) end of session 2 (only state anxiety); 4) end of session 3 (only state anxiety); 5) end of session 4 (only state anxiety); 6) end of session 5 (only state anxiety); 7) end of session 6 (only state anxiety); 8) post-intervention (after all 8 training sessions) **Adverse events:** not specified

Villani 2013 *(Continued)*

Notes	**Contact with authors:** We contacted the authors for the means and SDs for all outcomes at pre- and post-intervention (after 8 sessions), the number of dropouts and the number of participants analysed in each group (Villani 2018 [pers comm]). **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by authors:** not specified **Miscellaneous outcomes by the review authors:** information on attrition and values on state anxiety received from authors (Villani 2018 [pers comm]) **Correspondence:** Daniela Villani, PhD, Department of Psychology, Catholic University of Sacred Heart, Milan, Italy; daniela.villani@unicatt.it

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Participants were randomly allocated into two groups (15 participants for each condition)." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; no information about comparability of groups at baseline or respective analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	Unclear risk	Judgement comment: self-help intervention via mobile phones; insufficient information about blinding of participants and personnel to permit judgement of 'Low risk' or 'High risk'
Blinding of outcome assessment (detection bias) Subjective outcomes	Unclear risk	Judgement comment: insufficient information about blinding of outcome assessment to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	Judgement comment: information received from authors: no dropout from 30 participants
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified (job content and perceived stress only assessed at pre-intervention and no outcomes)

West 2014

Study characteristics

Methods	**Study design:** RCT

West 2014 *(Continued)*

	Study grouping: parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** Of the 37 participants in each arm of the study, 34 (91.9%) provided survey responses. With this sample size, power was 80% to detect a moderate Cohen f^2 effect size of 0.15; no sample size calculation reported **Imputation of missing data:** no imputation of missing data (information received from authors; West 2017 [pers comm]); per-protocol analysis (with participants who took part in allocated intervention, i.e. without 2 participants in IG who withdrew consent) and available-case analysis (with participants for whom outcomes were obtained)
Participants	**Country:** USA **Setting:** Department of Medicine at the Mayo Clinic Rochester **Age:** see Population description; age not specified **Sample size (randomised):** 74 **Sex:** 25 women, 49 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** IG had slightly higher rates of high emotional exhaustion and overall burnout (MBI); burnout, n (%): full high depersonalisation: IG = 9 (24.3%), CG = 9 (25.7%); full high emotional exhaustion: IG = 17 (45.9%), CG = 12 (34.3%); full overall burnout: IG = 20 (54.1%), CG = 15 (42.9%); depression, n (%): positive depression screen (2-question approach): IG = 11 (29.7%), CG = 11 (31.4%) **Population description:** practising physicians in the Mayo Clinic Department of Medicine **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** 2/37 (5.4%) in IG withdrew consent and therefore could not be analysed; number who did not complete assessments (information received from authors; West 2017 [pers comm]): pre-intervention: n = 7; 3-month follow-up: 5 - 6 for different outcomes; 12-month follow-up: 8) **Reasons for missing data:** not specified

Interventions	**Intervention:** small-group curriculum (n = 37)
	
	• *delivery*: face-to-face, group sessions (4 small groups of 8 - 10 physicians each) with similar composition by sex and specialty
	• *providers*:
	  ◦ practising internal-medicine physicians with specific expertise in communication and teaching courses involving small-group facilitation
	  ◦ training: 4-hour training session specific to the study curriculum before start of the small-group sessions
	  ◦ supervision: 1-hour, bi-weekly facilitator meetings to debrief and prepare for the next session
	• *duration of treatment period and timing*: 19 sessions; 1-hour meetings occurring once every 2 weeks for 9 months
	• *description*:
	  ◦ topics addressed during these sessions organised into modules entitled “self,” “patient,” and “balance” and included meaning in work, personal and professional balance, medical mistakes, community, caring for patients, and other topics relevant to the work experiences of practising physicians
	  ◦ same structure in each session: (1) check-in and welcome, (2) preparing the environment (e.g. journalling and reflective exercise), (3) facilitated group discussion, (4) learned skills and solutions, and (5) checkout and summary

West 2014 *(Continued)*

- MODULE I: self
  - 1. introduction and overview of curriculum, group development
  - 2. physician well-being: a. preventive care: e.g., screening, physicians' physical health practices; b. assessing well-being (mainly mental side): honesty, reflective practice, mindfulness
  - 3. physician distress: a. physical and psychological distress (illness, disability); b. the wounded healer: moral distress, burnout, fear, anger, (other emotions)
  - 4. meaning in work: part Ia. definitions of meaning: group question – why do you work doing what you do?; b. sources of meaning: influence of personal values, identity
  - 5. meaning in work: Part IIa. protecting meaning: meaning through the professional life cycle; b. promoting meaning: approaches may vary over time, need to be flexible
  - 6. personal resources: a. mindfulness/resiliency (internal resources); b. spirituality/religion, community, friendships, activities (links to external resources)
  - 7. thriving: a. definitions: the spectrum of well-being, with distress at 1 end, what is on the other end?; b. what is needed to flourish/thrive?
- MODULE II: patient
  - 8. patient connectedness: a. compassion in the face of personal disengagement; b. deep versus surface acting and empathy
  - 9. barriers to care: part I (patient-based) a. the challenging patient; b. expectations from patients and families
  - 10. barriers to care: part II (provider-based) a. physician assumptions and biases (stereotypes, prejudices); b. insight into personal cognitive patterns and how these may represent barriers to the patient-physician relationship, recognising personal limitations
  - 11. bad news: a. effect of suffering and death on physicians (the grieving healer); b. physician as source of hope
  - 12. medical mistakes and errors: a. experiences of error and reactions from peers/system; b. impact on physicians
  - 13. being present: a. definitions, relevance to practice; b. skills for being present: reflective listening, listening to self and listening to others
- MODULE III: balance
  - 14. personal/professional balance: a. work-home interference; b. balancing external pressures (societal and professional expectations)
  - 15. personal/professional identity: a. professional and personal expectations and self; b. the role of choices (intentional or not)
  - 16. personal/professional relationships: a. relationships beyond work and within work (healthy and unhealthy); b. power differentials as a barrier to healthy relationships
  - 17. gender and generational differences: a. male-female roles at work and home; b. priorities across generations, barriers to communication (e.g., mindfulness and acknowledgment of personal perspectives and biases)
  - 18. resiliency: a. mindfulness/resiliency; b. resiliency skills training
  - 19. closure of curriculum: a. orientation to resources, ongoing relationships; b. closure process (reflections on course)

- *compliance*: 35 participants analysed in the intervention arm attended a mean of 11.7 of 19 facilitated small-group sessions
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*:
  - Building on previous literature, this intervention involved facilitated physician discussion groups organised around a curriculum incorporating elements of mindfulness, reflection, shared experience, and small-group learning intended to promote collegiality and community at work among participants (Epstein 1999; Krasner 2009; McCue 1991; Rabow 2001; Shapiro 2005; Sood 2011; ; Shanafelt 2003; Warnecke 2011).

Control: no intervention; could schedule and use this hour of protected time in any manner they believed was most useful but did not participate in the formal curriculum (n = 37)

Outcomes	**Outcomes collected and reported:**

West 2014 *(Continued)*

- job satisfaction - PJSS
- perceived stress - PSS
- fatigue - single-item linear analog question **- not reported**
- quality of life - single-item linear analog question
- engagement, empowerment and meaning at work - EWS
- overall burnout - MBI
- burnout, emotional exhaustion - MBI
- burnout, depersonalization - MBI
- burnout, low personal accomplishment - MBI **- not reported**
- empathy - Jefferson Scale of Physician Empathy **- not reported**
- mental health physical well-being - Medical Outcomes Study Short-Form Health Survey 8 items **- not reported**
- depression screen - 2-question approach

Outcomes reported:

- job satisfaction - PJSS
- perceived stress - PSS
- engagement, empowerment and meaning at work - EWS
- quality of life - single-item linear analog question
- overall burnout - MBI
- burnout, emotional exhaustion - MBI
- burnout, depersonalization - MBI
- depression screen - 2question approach

Time points measured and reported: 1) pre-intervention; 2) during intervention at 3 months (during 9-month intervention); 3) during intervention at 6 months (during 9-month intervention); 4) post-intervention (at 9 months, i.e. end of 9-month intervention); 5) 3-month follow-up (3 months post-intervention); 6) 12-month follow-up (12 months post-intervention)

Adverse events: not specified

Notes

Contact with authors: We contacted the authors to ask for the means and SDs for the outcomes at all time points and the procedures in dealing with missing data (West 2017 [pers comm]).

Study start/end date: study conducted between September 2010 and June 2012

Funding source: supported by the Mayo Clinic Program on Professionalism and Ethics and the Department of Medicine at Mayo Clinic Rochester; funding source had no role in the design and conduct of the study; collection, management, analysis, or interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication

Declaration of interest: no conflicts of interest reported

Ethical approval needed/obtained for study: approved by the Mayo Clinic IRB

Comments by authors: trial registration: clinicaltrials.gov Identifier: NCT0115997

Miscellaneous outcomes by the review authors: not relevant

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Participants were randomized in a concealed fashion into 2 groups via a computer-generated algorithm. Randomization was stratified by sex and

West 2014 *(Continued)*

		specialty (general internal medicine or other internal medicine specialty) using permuted blocks." Quote: "Baseline characteristics of the 2 trial groups were generally similar, with no statistically significant differences observed, although the intervention arm had slightly higher rates of high emotional exhaustion and overall burnout." Quote: "Because of baseline differences across groups for several variables, all analyses were adjusted for levels of distress at study onset." Judgement comment: The investigators describe a random component in the sequence-generation process (computer-generated algorithm) and there is verified baseline comparability of groups for sociodemographic characteristics and outcomes of interest on the basis of analysis
Allocation concealment (selection bias)	Unclear risk	Quote: "Participants were randomized **in a concealed fashion** into 2 groups via a computer-generated algorithm." Judgement comment: insufficient information to permit judgement of 'Low risk' or 'High risk'; exact method of concealment not specified; unclear if random-sequence generation was concealed from personnel and/or participants
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: Insufficient information about blinding of outcome assessment (online questionnaires); however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Of the 37 participants in each arm of the study, 34 (91.9%) provided survey responses." Quote: "The changes in each well-being metric from study baseline to study end, as well as at 3 and 12 months following the study, were analyzed according to the intent-to-treat principle using generalized estimating equations to account for the repeated-measures design." Judgement comment: reasons for missing data unlikely to be related to true outcome with relative balance in missing data between groups (IG: 2 withdrawals, CG: 0; no reasons reported); no imputation of missing data (information received from authors); per-protocol analysis (with participants who took part in allocated intervention, i.e. without 2 participants in IG who withdrew consent) and available-case analysis (with participants for whom outcomes were obtained)
Selective reporting (reporting bias)	High risk	Judgement comment: trial registration available (clinicaltrials.gov/ct2/show/NCT01159977); several reported outcomes were not prespecified; PRESPECIFIED in trial registration: job satisfaction, burnout; AND: not all of the prespecified outcomes (prespecified in the publication) were reported; PRESPECIFIED in publication: job satisfaction, perceived stress, quality of life, empowerment and engagement at work, burnout, mental and physical well-being, fatigue, empathy; REPORTED: all outcomes except for mental and physical well-being, fatigue and empathy

West 2015

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified in conference abstract **Imputation of missing data:** not specified
Participants	**Country:** USA **Setting:** academic internal medicine physicians; setting where intervention took place not specified **Age:** see Population description; age not specified **Sample size (randomised):** 125 **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** academic internal medicine physicians **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified

Interventions	**Intervention:** COMPASS groups (COlleagues Meeting to Promote And Sustain Satisfaction) (n = 64)
	
	• *delivery*: face-to-face; group sessions; meetings of self-formed groups (6 - 8 physicians)
	• *providers*: self-formed group
	• *duration of treatment period and timing*: 12 bi-weekly 1-hour meetings (6 months in total)
	• *description*:
	  ◦ each session: brief 15-minute group discussion of an assigned topic relevant to the physician experience and drawn from prior physician well-being literature
	  ◦ followed by 45 minutes for shared lunch or other group activity as determined by each group itself
	  ◦ small-group topics included: work-life balance, medical mistakes, meaning in work, and resiliency, among other topics relating to the physician experience
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: USD 20 per session for meal expenses
	• *theoretical basis*: not specified
	
	Control: wait-list control (n = 61)

Outcomes	**Outcomes collected and reported:** • quality of life - Linear analog self-assessment of overall quality of life • burnout - MBI • burnout, emotional exhaustion - MBI • burnout, depersonalization - MBI

West 2015 *(Continued)*

- burnout, personal accomplishment - MBI
- depression - PRIME-MD depression screen
- meaning from work - EWS
- social isolation - Social isolation PROMIS (Patient-Reported Outcomes Measurement Information System) instrument
- job satisfaction - PJSS
- likelihood of leaving in next 2 years - no measure specified

Time points measured and reported: pre-intervention and then quarterly assessments: 1) pre-intervention; 2) during intervention (after 3 months); 3) post-intervention (after 6-month intervention); follow-up assessments not specified; **time points reported:** absolute change in outcomes from baseline to 6 months

Adverse events: not specified in conference abstract

Notes

Contact with authors: We contacted the authors to see if the study was published in the meantime (West 2018 [pers comm]). We also asked for the (unpublished) summary data (West 2019 [pers comm]).

Study start/end date: not specified

Funding source: not specified

Declaration of interest: not specified

Ethical approval needed/obtained for study: not specified

Comments by authors: not specified

Miscellaneous outcomes by the review authors: conference abstract; presented at 38th Annual Meeting of the Society of General Internal Medicine, Toronto, Canada, 2015; information received from authors (West 2019 [pers comm]): paper is currently being written, and has not yet been published; data for overall quality of life and burnout (emotional exhaustion, depersonalisation) sent by the authors (West 2019 [pers comm])

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "We conducted a randomized controlled trial of a 6-month intervention involving 12 biweekly one-hour meetings of self-formed groups of 6–8 academic internal medicine physicians, termed COMPASS Groups (COlleagues Meeting to Promote And Sustain Satisfaction)." Quote: "At baseline, no statistically significant differences were observed between the study groups for any well-being variable." Judgement comment: based on conference abstract, insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability for well-being (i.e. outcome) variables; baseline comparability for sociodemographic characteristics unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: based on conference abstract, insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: based on conference abstract, blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding

West 2015 *(Continued)*

Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: based on conference abstract, insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Judgement comment: information received from authors: reasons for missing data likely to be related to true outcome with imbalance in missing data between groups (IG: 13, CG: 5); available-case analysis
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available; based on conference abstract, all of the study's prespecified outcomes that are of interest in the review have been reported in the prespecified way

Wild 2016

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** UK **Setting:** emergency workers (police, fire and rescue, ambulance, search and rescue); setting not specified **Age:** mean = 41.41 (SD = 9.78) years **Sample size (randomised):** 430 **Sex:** 250 women, 180 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** previous traumas (trauma screener, range = 0 - 21): IG = 4.498 (3.45), CG = 4.76 (3.28); (PTSD) (PCL-5; range = 0 - 84): IG = 8.965 (12.37), CG = 9.42 (13.75); AUDIT; (range = 0 - 40): IG = 5.23 (4.08), CG = 5.19 (4.25); depression (PHQ-9): IG = 3.89 (4.07), CG = 3.83 (3.85) **Population description:** employed or volunteering as front-line or office-based staff in 1 of the following emergency services: police, fire and rescue, ambulance, and search and rescue **Inclusion criteria:** being employed or volunteering as front-line or office-based staff in 1 of the following emergency services: police, fire and rescue, ambulance, and search and rescue **Exclusion criteria:** Participants who scored in the clinical range on measures of PTSD or depression, or those who expressed suicidal ideation, had a one-to-one discussion with the study's psychologist. They were included in the study if they did not evidence risk, their symptoms were not interfering with their daily functioning and they did not wish to access treatment. **Attrition (withdrawals and exclusions):** post-intervention: 82 did not complete post-intervention assessment (IG = 61/317 (19.2%), CG = 21/113 (18.6%)); 3-month follow-up: 48 did not complete follow-up assessment (IG = 35/317 (11%), CG = 13/113 (11.5%)) **Reasons for missing data:** not specified

Wild 2016 *(Continued)*

Interventions	**Intervention:** Mind's resilience intervention (n = 317)
	• *delivery*: face-to-face; group sessions (in total 31 resilience courses provided from May to December 2015; on average 9 participants (range = 4 - 16) per group)
	• *providers*: Local Mind trainers
	• *duration of treatment period and timing*: 6 x 2½-hour sessions
	• *description*:
	  ○ improve participants' well-being by building social capital, encouraging positive activities, and teaching psychological coping skills drawn from CBT and mindfulness
	  ○ well-being (BE ACTIVE: improve well-being through positive activities); psychological coping strategies (TAKE NOTICE: develop evidence-based psychological coping strategies drawn from CBT and mindfulness; KEEP LEARNING: learn psychological coping skills drawn from CBT and mindfulness, try new activities); social capital (GIVE: build social capital through joining social networks to foster a sense of belonging in neighbourhoods and communities, give your time as part of a group; CONNECT: build social networks and social capital, access social support to foster belonging)
	• *compliance*: IG participants completed mean number of 4.67 sessions (SD = 1.43)
	• *integrity of delivery*:
	  ○ random selection of 30 audio-recordings of group sessions from the 31 courses offered from May - December 2015
	  ○ double-rating for inter-rater reliability of 10% of these audio-recordings (r = 0.985) (excellent inter-rater reliability)
	  ○ adherence to protocol ratings out of 100%: range 60 - 100, mean rating of 85.65 (13.07); good adherence of Local Mind trainers for delivering the intervention
	• *economic information*: not specified
	• *theoretical basis*:
	  ○ Mind's model of resilience
	  ○ builds on the 5 ways to well-being, a set of evidence-based public mental health messages, identified by the New Economics Foundation, aimed at improving the mental health and well-being of the whole population: 1. be active, 2. take notice, 3. keep learning, 4. give, 5. connect; teaching psychological coping skills drawn from CBT and mindfulness
	Control: active control: online control intervention (n = 113)
	• *delivery*: online; link for each topic emailed to participants once a week
	• *providers*: topics completed remotely by participants; content developed by Mind
	• *duration of treatment period and timing*: 6 weeks (6 topics)
	• *description*: already available information on mental health developed by Mind and, where possible, tailored for emergency personnel; 6 topics: sleep, stress, depression, anger, mindfulness, and PTSD
	• *compliance*: CG participants completed mean number of 5.21 (1.38) topics; completed sig. more topics than sessions completed by the IG F(1,380) = 10.63, P = 0.001
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis*: not specified

Outcomes	**Outcomes collected and reported:** • resilience - CD-RISC • wellbeing - WEMWS • self-efficacy - SJGSES • ability to problem-solve and achieve goals - unpublished questionnaire • social participation (home) - 13 items • social support - 13 items • social support (home) - 6 of 13 items • social support (work) - 7 of 13 items • confidence in managing mental health and resilience - unpublished questionnaire • attributions of negative events - Attributions Questionnaire

Wild 2016 *(Continued)*

- coping behaviour, self-distraction - Brief COPE
- coping behaviour, active coping - Brief COPE
- coping behaviour, acceptance - Brief COPE
- coping behaviour, denial - Brief COPE
- coping behaviour, substance use - Brief COPE
- coping behaviour, emotional support - Brief COPE
- coping behaviour, behavioural disengagement - Brief COPE
- coping behaviour, self-blame - Brief COPE
- coping behaviour, wishful thinking - Brief COPE
- rumination - RRS
- maladaptive responses to intrusive memories (suppression, rumination, and numbing) - RIQ
- exposure to trauma - trauma screener
- posttraumatic stress symptoms - PCL
- anxiety - GAD-7
- alcohol use - AUDIT
- depression - PHQ-9
- days off work - unpublished questionnaire (only pre-intervention and follow-up)

Time points measured and reported: 1) pre-intervention; 2) post-intervention; 3) 3-month follow-up (3 months post-intervention)

Adverse events: not specified

Notes

Contact with authors: We contacted the authors to ask for the subgroup (summary outcome data) for ambulance personnel and the number of participants analysed, but they had not responded at the time of writing.

Study start/end date: total study duration: May 2015 to March 2016 (see trial registry); March to November 2015: work with Local Minds to invite participants to take part in the study

Funding source: sponsor: University of Oxford (UK), University Offices; funding: Mind, the mental health charity (UK) (see trial registration)

Declaration of interest: not specified

Ethical approval needed/obtained for study: ethical approval by Medical Sciences Division Research Ethics Committee at the University of Oxford

Miscellaneous outcomes by the review authors: trial registration: ISRCTN79407277

Correspondence: Dr Jennifer Wild, Department of Experimental Psychology, University of Oxford, South Parks Road, Oxford, OX1 3UD, United Kingdom; jennifer.wild@psy.ox.ac.uk; Telephone: +44 (0)1865 618 612

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Our evaluation is a randomized controlled trial in which participants (N=430) were randomly allocated in a 3:1 ratio to receive Mind's resilience intervention (N=317) or a control online intervention (N=113)." Quote: "All N=430 participants were randomized in a 3:1 ratio to receive the resilience intervention or the control intervention in four phases across nine sites in England. Random allocation was stratified by site and gender." Quote: "There were no significant differences on any of the demographic (age, previous trauma, number of years of education, service, marital status, gen-

Wild 2016 *(Continued)*

		der, qualifications, ethnicity) and baseline measures between participants receiving the group or online conditions." No obvious differences in outcome variables between resilience and control groups at baseline to suggest unbalanced groups (compare repeated measures ANOVAs with three levels (baseline, post-intervention and follow-up) for resilience, well-being, self-efficacy, ability to problem solve and reach goals, nine coping behaviours in response to stress (e.g. active coping), rumination, maladaptive responses to intrusive memories (e.g. suppression), levels of social participation, feeling supported at home and work, severe stress (PTSD), depression, anxiety, alcohol use, and the number of days off per week. Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; RCT and verified baseline comparability of groups for sociodemographic variables and most outcome measures; baseline comparability in 'confidence in managing mental health' unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment (online questionnaires/secure digital programme); however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Judgement comment: reasons for missing data likely to be related to true outcome with imbalance in missing data (post-intervention IG: 61; CG: 21; 3-month follow-up: IG: 35; CG: 13); fewer participants in IG received the allocated intervention compared to CG (IG: 279/317, 88% vs CG: 105/113, 92.9%); reasons for missing data not provided for each group; unclear how many participants were analysed
Selective reporting (reporting bias)	Low risk	Judgement comment: trial registration available (ISRCTN79407277); all of the study's prespecified (primary and secondary) outcomes that are of interest in the review have been reported in the prespecified way

α: alpha (significance level); ACG: Authentic Connections Group; ACT: Acceptance and Commitment Therapy; AIT: Attention and Interpretation Therapy; AMS: Auxilliary Medical Service; ANCOVA: analysis of covariance; ANOVA: analysis of variance; β: beta (statistical power); AT: autogenic training; AUDIT: Alcohol Use Disorder Identification Scale; BDI: Beck Depression Inventory; BP: blood pressure; BRCS: Brief Resilience Coping Scale; Brief COPE: Coping Orientation to Problems Experience; BSI: Brief Symptom Index; CB: controlled breathing; CBI: Copenhagen Burnout Inventory; CBT: cognitive behavioural therapy; CD: compact disc; CD-RISC: Connor-Davidson Resilience Scale; CERQ: Cognitive Emotional Regulation Questionnaire; CES-D: Centers for Epidemiology Studies - Depression Scale; DVD: digital versatile disc; CG: control group; CMS: Coping Mechanism Scale; COPSOQ: Copenhagen Psychosocial Questionnaire; CP: civilian population; CPQ: Copenhagen Psychosocial Questionnaire; d: delta (Cohen's d, effect size); DASS: Depression Anxiety Stress Scale; DBP: diastolic blood pressure; ED: Emergency Department; EDDS: Eating Disorder Diagnostic Scale; e.g.: for example; EMA: Ecological Momentary Assessment; ERS: Effort-Reward Scale; ERSQ-27: Emotional Regulation Skills Questionnaire; EWS: Empowerment at Work Scale; f or f^2: Cohen's f or f^2 (effect size); FFMQ: Five-facet mindfulness Questionnaire; fMRI: functional Magnetic Resonance Imaging; GAD-7: Generalised Anxiety Disorder, 7-item scale; GHQ: General Hospital Questionnaire; ICC: inter-class correlation coefficient; IES-R: Impact of Event Scale - Revised; ICU: intensive care unit; IG: intervention group; IRB: Institutional Review Board; ISEL: Interpersonal Support Evaluation List; ISI: Insomnia Severity Index; MAAS: Mindful Attention and Awareness Scale; MAACL-R: Multiple Affect Adjective Checklist - Revised; MANOVA: multivariate analysis of variance; MASL: Maslach Burnout Inventory; MBCT: Mindfulness-based Cognitive Therapy; MBI: Maslach Burnout Inventory;

MBI: mindfulness-based intervention; MBI-GS: MBI-General Survey; MBI-HSS: Maslach Burnout Inventory - Human Services Survey; MBRT: Mindfulness-based Resilience Training; MBSR: Mindfulness-based Stress Reduction; MHCP: Mental Health Care Providers; MSICU: Medical-Surgical Intensive Care Unit; n: sample size (e.g. in respective study group); n^2: eta^2 (effect size); NICU: neonatal intensive care unit; NIH-EXAMINER: National Institutes of Health Executive Abilities; NP: nurse practitioner; NSS: Nursing Stress Scale; OLBI: Oldenburg Burnout Inventory; PA: physician assistant; PAA: Personal Assertion Analysis; PANAS: Positive and Negative Affect Schedule; PCL: PTSD Checklist; PCT: Psychosocial Competency Training; PFA: Psychological First Aid; PHQ: Patient Health Questionnaire; PJSS: Physician Job Satisfaction Scale; PMR: progressive muscle relaxation; PQ: Presence Questionnaire; PRIME-MD: Primary Care Evaluation of Mental Disorders; ProQoL: Professional Quality of Life; PSI: Parenting Stress Inventory; PSI: Physical Symtom Inventory; PSQ: Perceived Stress Questionnaire; PSQI: Pittsburgh Sleep Quality Index; PSS: Perceived Stress Scale; PSS-SR: PTSD Symptom Scale - Self-Report; PTSD: Post-traumaticc Stress Disorder; PVS: Personal Views Survey; QRI: Quality Relationship Inventory; RCT: randomised controlled trial; RIQ: Responses to Intrusions Questionnaire; RPMG: Relational Psychotherapy Mothers Group; RRS: Ruminative Response Scale; SAQ: Safety Attitudes Questionnaire; SAS: Smith Anxiety Scale; SBP: systolic blood pressure; SD: standard deviation; SICU: Surgical Intensive Care Unit; SMART: Stress Management and Resilience Training; STAI: State Trait Anxiety Inventory; STSS: Secondary Trauma Stress Scale; SWOP-K9: Self-efficacy Optimism and Pessimism; TAU: treatment as usual; TNICU: Trauma and Neurosurgery Intenisve Care Unit; UWES: Utrecht Work Engagement Scale; VA: Veterans Affairs; VR-SIT: Virtual Reality - Stress Inoculation Training; WEMWS: Warwick-Edinburgh Mental Well-being Scale; WES: Work Engagement Scale; WFCS: Work-Family Conflict Scale; WSBMS: Work Stress and Burnout Management Scale

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Bian 2011	Ineligible population (no healthcare professionals)
Chang 2008	Ineligible intervention (no focus of the intervention on fostering resilience/psychological adaptation despite stress, hardiness or post-traumatic growth; no resilience factors trained)
Dyrbye 2016	Ineligible intervention (no focus of the intervention on fostering resilience/psychological adaptation despite stress, hardiness or post-traumatic growth; no resilience factors trained)
Imamura 2019	Ineligible intervention (no focus of the intervention on fostering resilience/psychological adaptation despite stress, hardiness or post-traumatic growth; no resilience factors trained) based on information received from study authors (Kawakami 2019 [pers comm])
Lahn 2014	Ineligible study design
Maunder 2010	Ineligible study design
NCT02417051	Ineligible population (no healthcare professionals)
NCT03753360	Ineligible intervention (no focus of the intervention on fostering resilience/psychological adaptation despite stress, hardiness or post-traumatic growth; no resilience factors trained)
NCT03914898	Ineligible intervention (no focus of the intervention on fostering resilience/psychological adaptation despite stress, hardiness or post-traumatic growth; no resilience factors trained)
Rowe 1999	Ineligible intervention (no focus of the intervention on fostering resilience/psychological adaptation despite stress, hardiness or post-traumatic growth; no resilience factors trained)
Speckens 2019	Ineligible intervention (no focus of the intervention on fostering resilience/psychological adaptation despite stress, hardiness or post-traumatic growth; no resilience factors trained)
Strauss 2018	Ineligible intervention (no focus of the intervention on fostering resilience/psychological adaptation despite stress, hardiness or post-traumatic growth; no resilience factors trained) based on information received from study authors (Strauss 2019 [pers comm])
Watanabe 2019	Ineligible intervention (no focus of the intervention on fostering resilience/psychological adaptation despite stress, hardiness or post-traumatic growth; no resilience factors trained)

Characteristics of studies awaiting classification *[ordered by study ID]*

Almén 2020

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Aranda Auserón 2018

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** A sample size of 50 participants was estimated, necessary for have a power of 80% to detect as significant differences between the pre- and post-intervention situation of 0.6 SDs in the scores of the scales considered **Imputation of missing data:** no imputation of missing data; per-protocol analysis (i.e. only participants who completed training/attended at least 75% of sessions)
Participants	**Country:** Spain **Setting:** health centre in Pamplona **Age:** mean = 49.9 (SD = 8.2) years (analysed sample) **Sample size (randomised):** 48 **Sex:** 38 women, 7 men (analysed sample) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** no psychiatric illness (see inclusion criteria); burnout in MBI: 1) emotional exhaustion: low (< 19): IG: 9 (41%), CG: 13 (59%); moderate (19 - 26): IG: 3 (14%), CG: 3 (14%); high (> 26): IG: 10 (46%), CG: 6 (27%); 2) depersonalisation: low (< 6): IG: 10 (46%), CG: 11 (50%); moderate (6 - 9): IG: 5 (23%), CG: 5 (23%); high (> 9): IG: 7 (32%), CG: 6 (27%); 3) personal accomplishment: low (> 39): IG: 8 (35%), CG: 9 (41%); moderate (39 - 34): IG: 11 (48%), CG: 10 (45%); high (< 34): IG: 3 (14%), CG: 3 (14%) **Population description:** primary care health professionals **Inclusion criteria:** 1) informed consent; 2) committed to complete pre- and post-tet questionnaires; 3) attend at least 75% of sessions and perform mindfulness and self-compassion practices 45 minutes a day **Exclusion criteria:** 1) having completed programme of mindfulness or self-compassion or both in the previous 6 months; 2) suffer from psychiatric illness that did not advise participating in the study **Attrition (withdrawals and exclusions):** 3 dropouts (IG: 2 (8%), CG: 1 (4%))

Aranda Auserón 2018 *(Continued)*

Reasons for missing data: for 3 dropouts/losses: IG: 2 lost due to not completing the programme; CG: 1 due to attending a mindfulness course during the study

Interventions

Intervention: Mindfulness and Self-Compassion Programme (n = 25)

- *delivery*: face-to-face; group setting; material provided for practice at home (manual of theoretical contents, audios, practice diaries)
- *providers*: taught by Master's level instructor in mindfulness who was trained in MBSR and MSC programmes
- *duration of treatment period and timing*: 8 weekly 2½-hour sessions; daily 45-minute practice
- *description*:
  - course inspired by MBSR programme which incorporates practice for the cultivation of self-compassion of MSC programme by Neff
  - each session deals with specific topic, and mindfulness and self-compassion practices are carried out, including time for dialogue and exchange of experiences between participants
  - presentation day: presentation and course objectives; schedule and structure of face-to-face sessions; completion of questionnaires
  - WEEK 1: full consciousness: a) concepts: mindfulness, full attention vs autopilot, attitudes for practice, presentation of formal and informal mindfulness practices; b) practice during session: raisin exercise, 3-minute practice, body scan; c) daily practice at home during the week: body scan at least 6 days a week
  - WEEK 2: perceptions and reality: a) concepts: how we perceive reality, opening, beginner's mind acceptance, no judgement, metacognition; b) practice during session: introduction to meditation posture, mindfulness in breathing; c) practice at home during the week: body scan at least 6 days a week, mindfulness in breathing for 10 - 15 minutes a day
  - WEEK 3: emotions: a) basic emotions, neurobiology of emotions, emotion regulation, self-compassion: mindfulness, common humanity, self-kindness and opposites; b) practice during session: 'self-compassion pause', practice stretching and exercises with mindfulness; c) practice at home during the week: alternate body scan with yoga exercises and stretching with full awareness, practice 'self-compassion pause' every time a stressful/painful time is experienced during the week (especially at work)
  - WEEK 4: stress reactivity, coping strategies, burnout: a) concepts: stress and stressors, physiological and psychological basis of stress reactivity, automatic reaction vs effective response in stress situations, coping strategies, burnout; b) practice during session: mindful walking compassion hug; c) practice at home during the week: alternate compassionate body scan with yoga and stretching exercises with mindfulness, practise mindfulness in breathing for 10 - 15 minutes a day, meditative walking
  - WEEK 5: relationships, conscious communication, communication styles: a) concepts: stress and interpersonal relationships, conscious communication, communicative styles; b) practice during session: practice of 'empathic listening' in pairs; c) practice at home during the week: mindfulness in whole range of experiences or awareness practice without choice, attending to all mental content (sensations, emotions, thoughts), mindfulness in breathing
  - WEEK 6: meaning in medicine, values: a) concepts: values as guides to direct our vital objectives, discovering our values and strengths; b) practice during session: centring meditation: observe the possible connection of this experience with our own values, practice of your future 1': helps to discover own important values; c) practice at home during the week: formal daily practice of at least 45 minutes duration at the student's choice (choosing each day the most appropriate practice at the time, mood, intention), e.g. single formal body scan practice, attention to breathing, body exercises and stretching with full attention or combination of several of them, either in the same session or in several sessions throughout the day
  - WEEK 7: healthcare professional in face of suffering, time management: a) concepts: primary pain and secondary suffering, pain resistance, radical acceptance, coping against avoidance/denial, difference between empathy and compassion, empathy fatigue vs compassion satisfaction, time management; b) practice during session: practice of "Tonglen" (give and take) to manage the caregiver's fatigue; c) practice at home during the week: perform any of the formal mindfulness and self-compassion practices learned up to now, to student choice and as needed; can be single practice in 1 session or by combining several at different times of the day (45 minutes); participant asked to design a 'Personal Self-Care Plan' thinking about the aspects

Aranda Auserón 2018 *(Continued)*

	of his life that he/she would like to modify to feel better and committed to include in day-to-day meditation techniques and self-compassion exercises learned during the programme ◦ WEEK 8: personal self-care plan, farewell: a) concepts: take care of the caregiver, awareness of own needs, in small groups (2 - 3 people): sharing of 'personal self-care plan', reflection on conditions we need to feel good in our work, factors that influence that well-being, how we can prevent stress, anxiety, hurry, and what measures can we take for our self-care; b) questionnaires and course evaluation; c) final meditation: circle of compassion: meditation of loving kindness (metta meditation) addressed to a loved one, to ourselves, to a neutral being, to a conflicting one and finally to all living beings • *compliance*: participants had to attend at least 75% of the sessions; 2 lost in IG due to not completing the programme • *integrity of delivery*: not specified • *economic information*: training offered free (outside of working hours • *theoretical basis*: mindfulness-based; based on MBSR and MSC **Control:** unspecified control group (n = 23) • *delivery*: not specified • *providers*: not specified • *duration of treatment period and timing*: not specified • *description*: not specified • *compliance*: not specified • *integrity of delivery*: not specified • *economic information*: not specified • *theoretical basis*: not specified
Outcomes	**Outcomes collected and reported:** • mindfulness - FFMQ • perceived stress - PSQ • self-compassion, self-kindness - SCS • self-compassion, common humanity - SCS • self-compassion, mindfulness - SCS • burnout, emotional exhaustion - MBI • burnout, depersonalization - MBI • burnout, personal accomplishment - MBI **Time points measured and reported:** 1) pre-intervention; 2) post-intervention **Adverse events:** not specified
Notes	**Contact with authors:** We contacted authors for the potential focus of the intervention on fostering resilience, but received no response **Study start/end date**: not specified; course held during February - March 2016 **Funding source:** partially funded by the Department of Health of the Government of Navarra, when obtaining the first prize in the II Research Ideas Competition Health in Primary Care **Declaration of interest:** The authors declare that there is no conflict of interest. **Ethical approval needed/obtained for study:** approved by the Ethics Committee of Clinical Research of Navarra **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** focus of intervention on resilience unclear (resilience only mentioned once in report)

Aranda Auserón 2018 *(Continued)*

Correspondence: Gloria Aranda Auserón, Subdirección de Farmacia, Servicio Navarro de Salud-Osasunbidea, Pamplona, Spain; garandaa@navarra.es

Chesak 2019a

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Dyrbye 2019

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Grabbe 2020

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Heath 2020

Methods	
Participants	

Heath 2020 *(Continued)*

Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Kim 2018a

Methods	**Study design:** RCT including head-to-head comparison **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** With a predicted effect size of Cohen d = 0.4, an α level of.05, a desired power of 0.95, and a correlation of 0.5 among repeated measures, the estimated total sample size using G-Power was 69 (23 participants per condition); considering a dropout rate of 20%, we aimed to recruit 87 participants **Imputation of missing data:** no imputation of missing data; per-protocol analysis (i.e. only participants who completed the study)
Participants	**Country:** Korea **Setting:** training setting not exactly specified; employees and see method of recruitment, but training setting unclear **Age:** mean = 40.29 (SD = 10.82) years **Sample size (randomised):** 81 **Sex:** 67 women, 5 men (in analysed sample) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** Mini-International Neuropsychiatric Interview during screening process to detect psychiatric disorders **Population description:** employees **Inclusion criteria:** 1) age between 19 and 65 years; 2) a score of ≥ 14 on the PSS at baseline; 3) possession of an Android smartphone; 4) currently employed full-time **Exclusion criteria:** 1) age < 19 or > 65 years; 2) cognitive disorders, such as intellectual disability or dementia; 3) neurological disorders, including epilepsy, stroke, or others; 4) history of schizophrenia or bipolar I disorder; 5) current report of suicidal ideation; and 6) nonpharmacological treatment or counselling within the past 6 months **Attrition (withdrawals and exclusions):** AFTER RANDOMISATION (before treatment initiation): IG1: 4 dropouts; IG2: 1 dropout; DURING TREATMENT: IG1: 3 dropouts; CG: 1 dropout **Reasons for missing data:** AFTER RANDOMISATION; for 4 dropouts in IG1: trouble installing the app on their smartphone (n = 3); refused participation due to difficulty in scheduling appointments (n = 1); IG2: needed psychiatric treatment due to aggravation of psychiatric symptoms (n = 1); DURING TREATMENT: for 3 dropouts in IG1: personal schedules (n = 2), complained of unstable Wi-Fi connection (n = 1); CG: dropout due to personal matters, but refused to give a detailed explanation (n = 1)
Interventions	**Intervention 1:** educational material from self-care condition (CG) + mobile videoconference-based intervention on stress reduction and resilience enhancement (n = 25)

Kim 2018a *(Continued)*

- *delivery*: mobile videoconference-based: “Hello Mindcare” Android app; individual setting (1:1 therapy)
- *providers*: 1 of 3 psychologists with Master's degree in education (1:1 therapy)
- *duration of treatment period and timing*: 4 weekly 50-minute sessions
- *description*:
  - protocol adapted from SMART-3RP --> modified into 4-week programme
  - SMART-3RP = 8-week, 1½-hour session programme developed by the Benson-Henry Institute for Mind Body Medicine at Massachusetts General Hospital
  - goals of the programme include: 1) eliciting a relaxation response through meditation; 2) reducing overall stress reactivity; 3) increasing connectedness to oneself and others
- *compliance*: n = 18 completed all 4 sessions of intervention; dropout rate after treatment engagement 14% (3/21)
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: adapted from SMART-3RP, based on principles of CBT and positive psychology in conjunction with methods that elicit a relaxation response

Intervention 2: educational material from self-care condition (CG) + in-person condition on stress reduction and resilience enhancement (n = 28)

- *delivery*: face-to-face (in-person); individual setting (1:1 therapy)
- *providers*: 1 of 3 psychologists with Master's degree in education (1:1 therapy)
- *duration of treatment period and timing*: 4 weekly 50-minute sessions
- *description*:
  - protocol adapted from SMART-3RP
  - SMART-3RP = 8-week, 1½-hour session programme developed by the Benson-Henry Institute for Mind Body Medicine at Massachusetts General Hospital
  - goals of the programme include: 1) eliciting a relaxation response through meditation; 2) reducing overall stress reactivity; 3) increasing connectedness to oneself and others
- *compliance*: n = 27 completed all 4 sessions of intervention; dropout rate after treatment engagement 0%
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: adapted from SMART-3RP, based on principles of cognitive behavioral therapy and positive psychology in conjunction with methods that elicit a relaxation response

Control: active control (self-care condition) (n = 28)

- *delivery*: educational material
- *providers*: self-guided
- *duration of treatment period and timing*: participants instructed to read 1 chapter each week for 4 weeks
- *description*: educational material on methods to self-regulate stress
- *compliance*: n = 27 completed all 4 sessions of intervention; dropout rate after treatment engagement 3% (1/27)
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis:* not specified

Outcomes

Outcomes collected and reported:

- perceived stress - Korean version of PSS-10
- resilience - BRS
- emotional labor - Korean Emotional Labor Scale
- occupational/job stress - Korean Occupational Stress Scale-Short Form
- insomnia - Athens Insomnia Scale

Kim 2018a *(Continued)*

	• therapeutic alliance - 4 questions (only IGs) **Time points measured and reported:** 1) pre-intervention; 2) post-intervention; 3) 1-month follow-up (1 month post-intervention) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted authors to get the information about the potential inclusion of healthcare professionals, but received no response to 2 inquiries. **Study start/end date**: recruitment between August 2017 and November 2017 **Funding source:** supported from a fund by the Ministry of Trade, Industry and Energy of South Korea (No. 10069105 to J-HK) **Declaration of interest:** none declared **Ethical approval needed/obtained for study:** approved by the IRB of Seoul National University Bundang Hospital **Comments by study authors:** trial registration NCT03256682 **Miscellaneous outcomes by the review authors:** head-to-head comparison between mobile videoconference condition and in-person condition, self-care condition as control group (i.e. hypothesis that mobile videoconference intervention for stress reduction and resilience enhancement is superior to self-care); unclear if study also included healthcare professionals **Correspondence:** Jeong-Hyun Kim, Hanyang University Medical Center, Seoul, Republic Of Korea; ten.liamnah@3lairter

Mainwaring 2018

Methods	**Study design:** not specified in abstract; full text could not be retrieved or obtained from the study authors **Study grouping:** not specified **Unit of allocation/randomisation:** not specified **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** USA **Setting:** medium-size anaesthesia department (serving one of the busiest surgical and obstetric facilities on the east coast) **Age:** not specified **Sample size (randomised):** not specified **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** anaesthesia professionals working in a medium-size anaesthesia department **Included criteria:** not specified **Excluded criteria:** not specified

Mainwaring 2018 *(Continued)*

	Attrition (withdrawals and exclusions): not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** mindfulness-based resilience training (n not specified) • *delivery*: not specified • *providers*: not specified • *duration of treatment period and timing*: not specified • *description*: mindful communication training; gratitude and mindfulness practice • *compliance*: not specified • *integrity of delivery*: unclear, not specified • *economic information*: not specified • *theoretical basis*: mindfulness-based intervention **Control:** potential control group not specified in abstract (n not specified)
Outcomes	**Outcomes collected and reported:** based on publication abstract 1) mindfulness; 2) resilience; 3) positive outlook and attitude (no statistical data reported) **Time points measured and reported:** 1) pre-intervention; 2) post-intervention; overall changes between pre- and post-intervention reported **Adverse events:** not specified in abstract
Notes	**Contact with authors:** We contacted authors twice to ask for the corresponding full text, but did not receive a response **Study start/end date**: not specified **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not specified **Miscellaneous outcomes by the review authors:** study procedures (e.g. design) could not be determined based on abstract **Correspondence:** Prof. Jacqueline Mainwaring, Thomas Jefferson University; jacqueline.mainwaring@jefferson.edu

Moffatt-Bruce 2019

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

NCT03613441

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified in trial registration **Imputation of missing data:** not specified
Participants	**Country:** USA **Setting:** paediatric residency training at University of California Los Angeles's Mattel Children's Hospital **Age:** not specified **Sample size (randomised):** 82 (actual enrolment) **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** residents in paediatrics training **Inclusion criteria:** 1) age: 18 years and older years; 2) paediatric resident at the University of California Los Angeles's Mattel Children's Hospital; 3) medicine/paediatric resident at University of California Los Angeles's Mattel Children's Hospital **Exclusion criteria:** none **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** Mindful Awareness Practices (MAPs) (n not specified) • *delivery*: face-to-face (in person) and online; combined setting (group-based and self-study) • *providers*: live sessions administered by trained mindfulness educator at the University of California, Los Angeles (UCLA), Westwood, Olive View Medical Center and Cedars-Sinai Medical Center campuses • *duration of treatment period and timing*: 6 weekly 2-hour sessions: 1 x 45-minute live session and 5 web-based self-study sessions • *description*: group-based course in mindfulness meditation • *compliance*: not specified • *integrity of delivery*: not specified • *economic information*: not specified • *theoretical basis*: mindfulness-based **Control:** wait-list control (n not specified; opportunity to receive intervention after study completion)
Outcomes	**Outcomes collected and reported:** ***Primary outcome*** • perceived stress - PSS-14 ***Secondary outcome***

NCT03613441 *(Continued)*

- burnout symptoms (emotional exhaustion, depersonalisation, personal accomplishment) - Abbreviated MMBI-9
- depression symptoms - BDI
- anxiety - BAI
- loneliness - UCLA Loneliness Scale
- sleep quality - PSQI
- mindfulness - MAAS

Outcomes reported: not specified

Time points measured and reported: 1) pre-intervention; 2) post-intervention; time points reported not specified

Adverse events: not specified

Notes

Contact with authors: We contacted the authors for the status of the trial (Irwin 2019 [pers comm]) and also whether the trial/intervention focused on resilience. The authors replied about the trial status, but gave no clear response concerning the potential study focus on resilience

Study start/end date: June 2017 to April 2018 (actual study completion date)

Funding source: University of California, Los Angeles

Declaration of interest: not specified

Ethical approval needed/obtained for study: not specified

Comments by authors: not specified

Miscellaneous outcomes by the review authors: recruitment status: completed, unpublished trial; resilience only mentioned once in trial registration; focus on this construct is unclear

Correspondence: Michael Irwin, MD (study director), University of California, Los Angeles, USA; michaelirwin1@mac.com

NCT03781336

Methods

Study design: RCT

Study grouping: parallel group

Unit of randomisation: individuals

Power (power sample size calculation, level of power achieved): not specified in trial registration

Imputation of missing data: not specified

Participants

Country: USA

Setting: National Institutes of Health (NIH) Clinical Center

Age: not specified

Sample size (randomised): 82 (actual enrolment)

Sex: not specified

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified

NCT03781336 *(Continued)*

	Population description: NIH employees, contractors, or trainees **Inclusion criteria:** 1) age: 18 years and older; 2) any NIH employee, contractor, or trainee willing and able to participate in a 5-week mindfulness-based self-care course during the work day; 3) English speaking **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** mindfulness-based self-care (n not specified) • *delivery*: not specified • *providers*: not specified • *duration of treatment period and timing*: 5 weekly 1½-hour sessions • *description*: abridged mindfulness-based programme incorporated into work day • *compliance*: not specified • *integrity of delivery*: not specified • *economic information*: not specified • *theoretical basis*: mindfulness-based **Control:** wait-list control (n not specified; as intervention group offered during work hours, wait-list group best described as TAU)
Outcomes	**Outcomes collected and reported:** ***Primary outcome*** • perceived stress - PSS-10 ***Secondary outcome*** • trait mindfulness - MAAS • state mindfulness - MAAS • positive and negative affect - PANAS • course evaluations • anxiety/stress - VAS • general self-care - Mindful Self Care Scale • burnout - MBI **Outcomes reported:** not specified **Time points measured and reported:** 1) pre-intervention; 2) post-intervention; time points reported not specified **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors for the status of the trial and also whether the trial/intervention focus on resilience, but received no response from the authors **Study start/end date:** October 2017 to June 2018 (actual completion date) **Funding source:** National Institutes of Health Clinical Center **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by authors:** not specified

NCT03781336 *(Continued)*

	Miscellaneous outcomes by the review authors: recruitment status: completed, unpublished trial; resilience only mentioned once in trial registration; focus on this construct is unclear
	Correspondence: Rezvan Ameli, PhD (principal investigator), National Institutes of Health Clinical Center, USA; rezvan.ameli@nih.gov

NCT04368676

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

NCT04372303

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

NCT04373382

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

NCT04384861

Methods	

NCT04384861 *(Continued)*

Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Ouyang 2017

Methods	**Study design:** not specified in abstract (randomisation unclear) **Study grouping:** not specified in abstract **Unit of randomisation:** individuals as unit of assignment; however, randomisation unclear **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** not specified **Setting:** hospital **Age:** not specified in abstract **Sample size (randomised):** 160 **Sex:** 160 women **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** primary nurses **Included criteria:** not specified **Excluded criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention 1:** positive psychology group only receiving positive psychology (n = 40) • *only theoretical basis specified*: positive psychology **Intervention 2:** professional training group receiving professional training (n = 40) **Intervention 3:** joint counselling group with professional training combined with positive psychology counselling (n = 40) • *only theoretical basis specified*: in part positive psychology **Control:** no intervention (without counselling; n = 40)
Outcomes	**Outcomes collected and reported:** based on abstract: 1) well-being (General Well-Being Schedule); 2) resilience; 3) anxiety (Self-Rating Anxiety Scale); 4) nurse satisfaction

Ouyang 2017 *(Continued)*

	Time points measured and reported: based on abstract: 1) post-intervention (after 3 months if intervention); group differences reported **Adverse events:** not specified in abstract
Notes	**Contact with authors:** We were not able to identify contact data to ask for the full text and more information about the study procedures **Study start/end date**: not specified **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not specified **Miscellaneous outcomes by the review authors:** study procedures (e.g. design) could not be determined based on publication abstract; full text not available; no contact data for authors for inquiry identified **Correspondence:** no contact data identified

Rodgers 2018

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Ruehl 2013

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** Sample size was estimated using Cohen 1992 power tables' suggestions for necessary Ns for sufficient power of 0.80. For a medium-to-large effect size with 2 groups, at an α level of $P < 0.05$, accounting for a 15% attrition rate, a minimum of 60 participants per group were initially required for the study. The current study was only able to recruit 29 participants due to extensive difficulty with participant recruitment **Imputation of missing data:** no imputation of missing data; per-protocol and available-case analysis (i.e. only participants who are finally left in the sample; n = 19)
Participants	**Country:** USA **Setting:** psychology office at Rady Children's Hospital San Diego (RCHSD) or participants' home (if face-to-face visits) or mail contact

Ruehl 2013 *(Continued)*

Age: mean = 34.5 (range = 23 - 62) years

Sample size (randomised): 29

Sex: not specified

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: depression (BDI-II): IG: 5.20 (2.74), CG: 5.00 (5.29); burnout (MBI): IG: 62.00 (11.10), CG: 60.44 (6.13); secondary trauma (STSS): IG: 33.10 (5.80), CG: 27.78 (7.93)

Population description: male and female nursing staff from different hospital units

Inclusion criteria: 1) currently employed as nurse in the Haematology/Oncology, PICU or NICU at RCHSD for at least 3 months or employed as Emergency Room or Adult Psychiatric nurse working at the same facility for at least 3 months; 2) nurses required to hold one of the following nursing degrees: LVN (Licensed Vocational Nurses), RN (Registered Nurse), ASN, (Associate's Degree in Nursing), BSN (Bachelor of Science in Nursing), or MSN (Master of Science in Nursing); 3) self-reported perceived stress: reported at least 1 work-related or personal stressor (list of work-related and personal-life stressors); 4) report of a traumatic event or events: report experience of 1+ traumatic events, as measured by Traumatic Life Events Questionnaire; 5) employed at least 30 hours a week; 6) directly involved with patient care; 7) participants currently taking any medications, including psychotropic medications, must be stabilised on medications for at least 1 month prior to starting the study and were requested not to change medication status during the study; had to notify investigator of any medication changes; 8) read and write in English; 9) be able to write for required duration of 20 - 30 minutes, on 3 separate occasions

Exclusion criteria: 1) current medical diagnosis of a major chronic illness (i.e., heart disease, cancer, hypertension, diabetes, HIV, liver/kidney disease); 2) starting new medication, or with medication changes less than 1 month prior to study start dates; 3) individuals with symptoms of psychotic spectrum disorders, bipolar disorder, dissociative disorders, or organic brain damage, as indicated by a recent diagnosis, past/current hospitalisations, active psychosis, or use of antipsychotic medications not eligible; 4) reporting a current or recent suicidal ideation/threat within the past 6 months or suicidal attempt within the past year (were referred to psychiatric care); 5) participants currently in psychotherapy were asked not to change their psychotherapist during study and asked not to make any changes in their psychotherapy during the study

Attrition (withdrawals and exclusions): 9 dropouts (attrition rate of 31%); 1 exclusion from final analysis

Reasons for missing data: DROPOUTS: main reasons for attrition: participants too busy; 3 initially expressed interest in study participation, but did not return preliminary consents/questionnaires; 1 dropped for meeting exclusion medical criteria; 3 dropped prior to writing; 2 did not complete post- and follow-up questionnaires; EXCLUSION: 1 (CG) excluded due to significant outlying variables

Interventions

Intervention: written emotional expression intervention (n = 10 in analysed sample)

- *delivery*: face-to-face writing sessions (meetings with investigator in psychology office at RCHSD or at participant's home) or by mail; all sessions involved talking with participant by telephone for specific instructions on certain session; participants receive booklet for writing sessions (for participants completing study through mail: material is sent in envelopes); individual setting
- *providers*: investigator
- *duration of treatment period and timing*: 3 x 20- to 30-minute journal-writing sessions; each approximately 1 week apart (within range of 4 - 10 days); writing session either completed immediately before/after the participant' work shift or on day off

Ruehl 2013 *(Continued)*

- *description*:
  - prior to writing, participants asked to turn to previous week's behaviour log and are given another behaviour log to complete over next week (not further presented here)
  - participants complete measure of current affective state
  - participants use booklet and receive set of writing instructions that they are asked to read over and complete
  - immediately after 20- to 30-minute writing session, participants again complete PANAS and Subjective Experience Questionnaire
  - participants received contact information from the researcher/investigator and could call if they had any questions during the 3 weeks
  - **participants asked to write about their most stressful or upsetting experience or a chronic stressful situation**
  - participants have choice to write about a traumatic event or chronic stressor that was either personal or work-related
  - DAY 1 INSTRUCTION: e.g. "...write about your most stressful or upsetting experience or a chronic situation that is currently most important to you. You could write about your work stress, a situation in your personal life, something from your past that is still bothering you, or a combination of these."
  - DAY 2 INSTRUCTION: e.g. "...tell a story about the topic that you wrote about on Day 1, emphasizing how you reacted to the situation. You might discuss who you were before the experience, what might have led up to the experience, and/or how the experience came or did not come as an interruption in your life"
  - DAY 3 INSTRUCTION: e.g. "...think about and maybe re-read what you wrote on Day 2. Begin your writing today by re-telling your story, this time incorporating any new insights you may have come to over the writing sessions, including any alternative ways of handling the stressful situation or your reactions to it, knowing what you know now"
  - examples of essay topics found in this group: work stress, trauma (i.e. rape, abuse), death of patients and family members, career development stress, relationship conflict
- *compliance*: n = 4 in IG did not complete study; n = 30 journal completed; no missing journal entries for study completers
- *integrity of delivery*: adherence to writing instructions assessed for all participants by to raters using a 3-point Likert scale; instructions were followed in IG
- *economic information*: reward bucks or USD 5 gift card at study completion
- *theoretical basis*: written emotional expression intervention developed by Pennebaker 1986

Control: attention control (n = 9 in analysed sample)

- *delivery*: face-to-face writing sessions (meetings with investigator in psychology office at RCHSD or at participant's home) or by mail; all sessions involved talking with participant by telephone for specific instructions on certain sessions; participants receive booklet for writing sessions (for participants completing study through mail: material is sent in envelopes); individual setting
- *providers*: investigator
- *duration of treatment period and timing*: 3 x 20- to 30-minute journal-writing sessions; each approximately 1 week apart (within range of 4 - 10 days); writing session either completed immediately before/after the participant' work shift or on day off
- *description*:
  - see 5 first bullet points for IG (identical in CG)
  - **participants asked to write about a series of time management topics**
  - **participants wrote strictly about activities outside of work**
  - DAY 1 INSTRUCTION: "...list your activities outside of work, for the past seven days, and how much time you spent on each of them. Describe your activities in detail without referring to your thoughts or feelings about them"
  - DAY 2 INSTRUCTION: "You will continue to write about time management, but today I want you to focus just on the next seven days."
  - DAY 3 INSTRUCTION: "For the third writing session, you will continue to focus on time management. Today, I would like you to write about your activities outside of work for the next

Ruehl 2013 *(Continued)*

	two weeks examples of essay topics found in this group: mundane daily activities with no emotions" • *compliance*: 1 did not complete study; 27 journals completed; no missing journal entries for study completers • *integrity of delivery*: adherence to writing instructions assessed for all participants by to raters using a 3-point Likert scale; instructions were followed in CG • *economic information*: reward bucks or USD 5 gift card at study completion • *theoretical basis:* writing instructions adapted from Broderick 2004
Outcomes	**Outcomes collected and reported:** • behavioural and illness journal (physician visits, work absenteeism) - Behavioral and Illness Journal • depression - BDI-II • positive affect - POMS – Vigor Subscale • burnout - MBI • fatigue, chronic fatigue - Occupational Fatigue Exhaustion Recovery Scale-Revised (OFER15) • fatigue, acute fatigue - OFER15 • fatigue, intershift recovery - OFER15 • job satisfaction - Job In General • perceived control over stress - Dimensions of Stress–Control • secondary trauma - STSS Post-traumatic growth (PGI) and other variables as exploratory measure; further exploratory measures and moderators assessed (not presented here since no outcomes) **Time points measured and reported:** 1) pre-intervention (1 week prior to first writing session); 2) post-intervention (1 week after last writing session); 3) 6-week follow-up (5 weeks after 1st post-test appointment, since post-test is 1 week after last writing session --> 6 weeks after last writing session); NO OUTCOME MEASURE, but assessed before and after each writing session: PANAS as measure of current affective state (for manipulation check) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted authors for the potential focus of the intervention on fostering post-traumatic growth, but received no response **Study start/end date**: not specified **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** probably approved by IRBs of Alliant International University, and Rady Children's Hospital and Care Center, San Diego **Comments by study authors:** not specified **Miscellaneous outcomes by the review authors:** dissertation; post-traumatic growth assessed as exploratory measure, but unclear if also primary focus of the study on fostering this construct **Correspondence:** no contact data for author Brooke D. Ruehl identified; therefore, contact to Melanie Greenberg, PhD (dissertation chair person); melanie@drmelaniegreenberg.com

Van Berkel 2014

Methods	**Study design:** RCT **Study grouping:** parallel group

Van Berkel 2014 *(Continued)*

	Unit of randomisation: individuals **Power (power sample size calculation, level of power achieved):** The sample size was based on finding an effect on the primary outcome of this study, work engagement, measured using the UWES. An effect of a 10% increase in mean score was expected to be relevant and feasible. With a power of 90% and a 2-sided α of 5%, both groups needed 89 participants. Accounting for a loss to follow-up of 25% over 12 months, each group needed 119 workers at baseline, thus an initial total of 238 participants for the 2 groups **Imputation of missing data:** intention-to-treat analysis (linear mixed effects model; according to authors all 257 participants taken into analyses) and sensitivity analysis (linear regression analyses with complete cases at either time 1 (T1) or time 2 (T2), i.e. only participants with at least 1 follow-up measurement)
Participants	**Country:** The Netherlands **Setting:** intervention held in a room at the worksite (2 Dutch research institutes) **Age:** mean = 45.6 (SD = 9.5) years **Sample size (randomised):** 257 **Sex:** 173 women, 84 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** mental health (mental health scale 36-Item Short Form Survey Instrument, RAND-36): IG: 74.8 (12.9); CG: 73.6 (14.1) (range: 0 - 100) **Population description:** employees from Dutch research institutes **Inclusion criteria:** 1) signed informed consent; 2) not being on sick leave for more than 4 weeks; 3) not being pregnant at the time of recruitment **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** lost to follow-up: post-intervention (T1; at 6 months after baseline): n = 22 (IG: 8, CG: 14); 6-month follow-up (T2; at 12 months after baseline): n = 3 further lost to follow-up in CG **Reasons for missing data:** reasons for losses to follow-up: resignation (n = 6), no time (n = 11), personal reasons (n = 4), dissatisfied with control (n = 3), unknown (n = 1)
Interventions	**Intervention:** active control (weblink to website about health promotion) + Mindful 'Vitality In Practice' intervention (Mindful VIP intervention) (n = 129) • *delivery*: face-to-face group sessions (4 - 17 participants) (in-company mindfulness-related training with homework exercises); CDs with guided meditation exercises and booklet with examples of workplace situations, background and (workplace) exercises for homework training; e-coaching (individual setting) • *providers*: led by 4 certified trainers; trainers are all members of the Society of Mindfulness-Based Trainers in The Netherlands and Flanders (i.e. followed mindfulness trainer education that is recognised by this society) • *duration of treatment period and timing*: 6 months in total: 1) 8 weekly 90-minute sessions of in-company mindfulness-related training (participation during own time of workers, but timetable adapted to working hours as much as possible: before working hours, around lunchtime, after working hours) with homework exercises for approximately 30 minutes a day on 5 days a week; 2) followed by 8 sessions of e–coaching

Van Berkel 2014 *(Continued)*

- *description*:
  - worksite mindfulness-related multicomponent health promotion intervention
  - IN-COMPANY MINDFULNESS-RELATED TRAINING WITH HOMEWORK EXERCISES: 8 weekly sessions
    - WEEK 1: training mindful attention: a) homework formal exercises: body scan; b) informal exercises: walking with mindful attention; eating with mindful attention; stop, sit and do nothing for 1 minute; read the booklet (background information, working situations)
    - WEEK 2: gaining by stopping and exploring boundaries: a) formal exercise: body scan and/or sitting meditation; b) informal exercises: logbook for (small) pleasant happiness; meditation exercise to start working day; meditation exercise to finish working day
    - WEEK 3: switching from doing to being: a) formal exercises: body scan, breathing exercises; b) informal exercises: Logbook for (small) unpleasant happiness; standing meditation in front of the window, eat a raisin/apple…with attention; walk the stairs with attention
    - WEEK 4: vigour and balance: a) formal exercise: office yoga, breathing exercises; b) informal exercises: walking with mindful attention; meditation exercise to finish the working day; yoga balance exercise; meditation (breathing exercise) with moments of inspiration or vigour
    - WEEK 5: inspiration for working and living: a) formal exercises: sitting meditation, breathing exercise (each stressful or joyous moment); b) informal exercises: value orientation exercise, guided meditation exercise "the tree" (values)
    - WEEK 6: maintaining your centre in interpersonal relationships: a) formal exercises: sitting meditation or body scan at choice; room for breathing exercise, and notice your needs (each stressful or joyous moment); b) informal exercises: set your mobile phone alarm daily on a random moment and stop for 1 minute to notice how you are doing; compliment a colleague, notice what happens, internally and externally; train a different sense each day (hearing, seeing etc.)
    - WEEK 7: handling habits: a) formal exercises: walking meditation; b) informal exercises: write your personal energy plan; mindful grocery shopping (using senses); 'awareness of intake' exercise (information, light, computer, phone, food, drinks)
    - WEEK 8: caring for yourself: a) formal exercises: free choice of previous exercises; b) informal exercises: Personal Energy Plan (PEP)
  - HOMEWORK EXERCISES: formal ('body scan'", sitting meditation) and informal exercises (small exercises, such as breathing exercises when starting up the computer, grocery shopping mindfully); materials for this training: 2 CDs with guided meditation exercises and booklet with examples of workplace situations, background and (workplace) exercises
  - COGNITIVE EXERCISES in the training: hypothesised to have an effect on work engagement; adjusted to mindfulness context, such as logbook for pleasant happenings
  - E-COACHING:
    - adapted to mindfulness context as much as possible
    - key elements: kindness and awareness; during penultimate session, participants are asked to write a PEP, setting goals for themselves, answering the central question: ''What do I need to do, to feel well at work?'' (p. 2), using the techniques and exercises from the training (e.g. 'to sit and meditate five times a week', or 'to concentrate on my breath before speaking up in a meeting')
    - had to e-mail the PEP to the trainer before the last session (marked the start of the coaching by e-mail); 8 x e-coaching sessions consisting of positive feedback (kindness) and answers to questions
    - provision of free fruit and vegetables during 6 months
    - lunch walking routes and buddy-system offered as supportive tools; participants asked to form pairs to discuss homework exercises and keep in contact between sessions
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: workers participated in their own time (not during paid working hours)
- *theoretical basis*:
  - mindfulness-related training
  - effect of mindfulness-related intervention on work engagement expected, because it was hypothesised in the literature that increasing mindfulness would be effective cognitive activity to increase work engagement; working mechanism for increasing work engagement is that by

Van Berkel 2014 *(Continued)*

becoming aware of thoughts, emotions and bodily sensations, and accepting them in a non-judging way, personal resources can be built; personal resources are positive self-evaluations that are linked to resiliency and refer to individuals' sense of their ability to cope with their environment successful; examples of personal resources for work engagement are organisational-based self-esteem, self-efficacy, and optimism

Control: active control (n = 128)

- *delivery*: e-mail with link to internet web page (individual setting)
- *providers*: self-guided
- *duration of treatment period and timing*: not specified
- *description:*
  - web page contained information about what the organisations offered their employees as health promotion (e.g. contact information of the occupational physician and psychologist, an overview of available training and education (mindfulness-related training was NOT provided), and information about the in-company fitness facilities)
  - information already available for all employees but all information about health- and vitality-related offer of the organisations was sorted together on 1 page
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: workers participated in their own time (not during paid working hours)
- *theoretical basis*: not specified

Outcomes

Outcomes collected and reported:

- work engagement - UWES **- reported**
- general mental health - mental health scale RAND-36 **- reported**
- need for recovery - need for recovery scale from Dutch version of Questionnaire on the Experience and Evaluation of Work **- reported**
- mindfulness - MAAS **- reported**
- (vigorous) physical activity - Short Questionnaire to Assess Health Enhancing Physical Activity
- (vigorous) physical activity - accelerometers in subgroup
- fruit and vegetable intake - Short Fruit and Vegetable Questionnaire
- sedentary behaviour - questionnaire based on instrument used in previous study
- perceived behavioural control (self-efficacy, controllability) - 7-point Likert scale

Time points measured and reported: 1) pre-intervention; 2) post-intervention (after 6-month intervention; 6 months after baseline); 3) 6-month follow-up (6 months post-intervention/12 months after baseline)

Adverse events: not specified

Notes

Contact with authors: We contacted authors for the potential inclusion of healthcare professionals and the respective subgroup data (if included), but had received no response at the time of writing the review

Study start/end date: recruitment between April 2010 to November 2010; follow-up assessment between October 2010 to November 2011

Funding source: part of a research intervention, ''Vitality In Practice'', which is financed by Fonds Nuts Ohra (Nuts Ohra Foundation)

Declaration of interest: no competing interests

Ethical approval needed/obtained for study: approved by the Medical Ethics Committee of the Vrije Universiteit (VU) University Medical Center

Comments by study authors: Netherlands Trial Register NTR2199; study protocol available in Supplement (Van Berkel 2011)

Van Berkel 2014 *(Continued)*

	Miscellaneous outcomes by the review authors: unclear whether healthcare professionals were also included in this study; 2 reports of the same study, 1 of them focuses on lifestyle behaviours
	Correspondence: Jantien van Berkel; Corresponding author: Cécile R. L. Boot, Department of Public and Occupational Health - Institute for Health and Care Research, VU University Medical Center and Body@Work, Research Center on Physical Activity, Work and Health (TNO-VU) University Medical Center, Amsterdam, the Netherlands; crl.boot@vumc.nl

Yeo 2019

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

α: alpha (significance level); BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; BRS: Brief Resilience Scale; CBT: cognitive behavioural therapy; CD: compact disc; CG: control group; d: delta (Cohen's d, effect size); e.g.: for example; FFMQ: Five-Facet Mindfulness Questionnaire; IG: intervention group; IRB: Institutional Review Board; n: sample size (e.g. in respective study group); MAAS: Mindful Attention and Awareness Scale; MAPs: mindful awareness practices; MBI: Maslach Burnout Inventory; MBSR: Mindfulness-based Stress Reduction; MSC: Mindful Self-Compassion; NICU: Neonatal Intensive Care Unit; OFER15: Occupational Fatigue Exhaustion Recovery Scale; PANAS: Positive and Negative Affect Schedule; PGI: Post-traumatic Growth Inventory; PICU: Paediatric Intensive Care Unit; POMS: Profile of Moods States; PSS: Perceived Stress Scale; PSQ: Perceived Stress Questionnaire; PSQI: Pittsburgh Sleep Quality Index; RAND-36: Short Form Health Survey; RCT: randomised controlled trial; SCS: Self-Compassion Scale; SD: standard deviation; SMART-3RP: Stress Management and Resilience Training - Relaxation Response Resilience Program; STSS: Secondary Trauma Stress Scale; TAU: treatment as usual; UWES: Utrecht Work Engagement Scale; VAS: Visual Analogue Scale

Characteristics of ongoing studies *[ordered by study ID]*

ACTRN12617000290392

Study name	**Public title:** Doctors working well: a study evaluating an online stress management program for doctors **Scientific title:** A randomised controlled trial of an online intervention on resiliency, occupational stress, and burnout among junior medical doctors
Methods	**Study design:** 2-arm RCT **Study grouping:** parallel assignment **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** Australia **Setting:** online, self-guided intervention **Age:** see inclusion criteria; age not specified

ACTRN12617000290392 *(Continued)*

Sample size (randomised): 60 (targeted)

Sex: not specified

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified

Population description: registered junior medical doctors

Inclusion criteria: 1) registered junior medical doctors (in this study, defined as being an intern, junior house, or senior house doctor); 2) practising in the West Moreton Hospital and Health Service district (Queensland, Australia); 3) aged 18 years or older

Exclusion criteria: 1) aged younger than 18 years; 2) not a medical doctor; 3) practising outside the West Moreton Hospital and Health Service area

Attrition (withdrawals and exclusions): not specified

Reasons for missing data: not specified

Interventions

Intervention: Doctors Working Well (n not specified)

- *delivery*: online programme/online modules; individual setting; each module including mixture of didactic and interactive learning activities (e.g. readings, quizzes, videos, personal reflections)
- *providers*:
  - self-guided
  - automated email reminders (see compliance)
  - programme developed by clinical psychologist with 6 years treatment experience, with input received from 2 other research team members (both psychologists)
- *duration of treatment period and timing:* 6 x 30- to 45-minute modules over 6 weeks (i.e. participants have access to 1 module a week)
- *description*:
  - modules focus on stress management techniques, emotion monitoring and regulation techniques, and self-care
  - designed to target occupational stress and burnout
  - at start of each module, participants are asked small number of questions relating to their mood and engagement with skills learnt in previous module
- *compliance:*
  - intervention adherence not assessed as programme content is delivered consistently across participants, due to electronic intervention format
  - participant adherence to the intervention will be assessed through examination of number of log-ins, time spent using programme, modules completed, and activities completed within each module
  - automated email upon completion of each module to increase participant adherence, commending effort and completion; automated reminder email also if module has not been completed within 2 days of becoming available on weekly cycle
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: not specified

Control: active control (n not specified)

- 1 hour a week of protected individual study time over 6-week study period; access to online programme after 3-month follow-up

Outcomes

Outcomes collected and reported:

- stress - stress subscale of DASS-21
- burnout - CBI
- depression - depression subscale of DASS-21

ACTRN12617000290392 *(Continued)*

	• anxiety - anxiety subscale of DASS-21 • resilience - BRS • affect - PANAS • psychological distress - Kessler-10 scale • mindfulness - Cognitive and Affective Mindfulness Scale-Revised • self-care - Mindful Self-Care Scale • stigma - Stigma of Occupational Stress Scale for Doctors • satisfaction with programme - Client Satisfaction Questionnaire **Outcomes reported** not specified **Time points measured and reported:** 1) pre-intervention; 2) post-intervention; 3) 3-month follow-up (exception: satisfaction with programme only at post-intervention);**time points reported not specified** **Adverse events:** not specified
Starting date	**Study start/end date:** March 2017 (date of first enrolment) to July 2018 (anticipated date of last data collection); not yet recruiting according to trial registration
Contact information	**Principal investigator:** Dr Bonnie Clough (according to trial registration); new contact since Dr Clough changed position: Dr Michael Ireland **Address:** School of Psychology and Counselling; University of Southern Queensland, Springfield Campus; 37 Sinnathamby Boulevard, Springfield Central, Queensland, 4300 Country Australia **Email:** Michael.Ireland@usq.edu.au **Telephone:** not specified
Notes	**Contact with authors:** We contacted the authors for the trial status. According to the authors, the trial is still ongoing and there are no results yet (Ireland 2019 [pers comm]) **Funding source:** University of Southern Queensland; West Moreton Hospital and Health Service **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** approved by West Moreton Hospital and Health Service Human Research Ethics Committee (HREC/16/QWMS/519) and University of Southern Queensland Human Research Ethics Committee (H17REA025) **Comments by study authors:** not specified **Miscellaneous outcomes by the review authors:** trial registration number: ACTRN12617000290392 (assigned 24 February 2017)

JPRN UMIN000031435

Study name	**Public title:** Mindfulness for health professionals building resilience and compassion (MHALO program) - randomised control trial **Scientific title:** Mindfulness for health professionals building resilience and compassion (MHALO program) - randomised control trial
Methods	**Study design:** 2-arm RCT **Study grouping:** parallel assignment **Unit of randomisation:** individuals

JPRN UMIN000031435 *(Continued)*

Power (power sample size calculation, level of power achieved): not specified

Imputation of missing data: not specified

Participants	**Country:** Japan **Setting:** medical professionals; training setting not specified **Age:** see inclusion criteria; age not specified **Sample size (randomised):** 70 (targeted) **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** medical professionals in the field of oncology or palliative care or both **Inclusion criteria:** 1) age 20 years to 65 years (men and women); 2) medical professionals who work in the field of oncology and/or palliative care; 3) those who will be able to participate/commit in the whole programme; 4) those who feels psychological distress or difficulty; 5) no history of psychiatric illness (including with more than 2 years of remission); 6) submission of written informed consent **Exclusion criteria:** 1) who are unable to be followed up for 3 months; 2) past experience of formal mindfulness-based intervention; 3) serious physical illness; 4) judged by the research team as ineligible **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** Mindfulness for health professionals building resilience and compassion (MHALO program) (n not specified) • *delivery*: not specified • *provider*: not specified • *duration of treatment period and timing: 2*-day workshop and 2 half-day follow-up sessions after 4 and 8 weeks • *description*: not specified • *compliance:* not specified • *integrity of delivery*: not specified • *economic information*: not specified • *theoretical basis*: mindfulness-based programme **Control:** no intervention (n not specified)
Outcomes	**Outcomes collected and reported:** • perceived stress - PSS • burnout - MBI • mindfulness - FFMQ • resilience - CD-RISC • self-compassion - Self-Compassion Scale • life satisfaction - SWLS • mood - POMS • interoceptive awareness - Multidimensional Assessment of Interoceptive Awareness • health performance - HPQ **Outcomes reported:** not specified

JPRN UMIN000031435 *(Continued)*

	Time points measured and reported: not specified **Adverse events:** not specified
Starting date	**Study start/end date:** February 2018 (23 February 2018 date of first enrolment); end date not specified; recruiting according to trial registration
Contact information	**Principal investigator:** Daisuke Fujisawa **Address:** Department of Neuropsychiatry, School of Medicine, Keio University, 35 Shinano-machi, Shinjuku, Tokyo **Email:** dai_fujisawa@yhoo.co.jp **Telephone:** 03-3353-1211
Notes	**Contact with authors:** We contacted the authors for the trial status. According to the authors, the MHALO programme is currently in the final observation period and results will be published in several months (Fujisawa [pers comm]). **Funding source:** Keio University **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not specified **Miscellaneous outcomes by the review authors:** trial registration number: JPRN-UMIN000031435 (assigned 23 February 2018)

NCT03518359

Study name	**Public title:** Enhanced Stress Resilience Training for Residents (ESRT-R) **Scientific title:** Enhanced resilience training to improve mental health, stress and performance in resident physicians
Methods	**Study design:** 2-arm RCT **Study grouping:** parallel assignment **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** USA **Setting:** Emergency Medicine, Internal Medicine, Paediatrics, Family Practice, Obstetrics and Gynaecology (OBGYN) and Surgery Departments of University of California San Francisco **Age:** see inclusion criteria; age not specified **Sample size (randomised):** 45 (actual enrolment) **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified, but participants with lifetime history of organic mental illness excluded

NCT03518359 *(Continued)*

Population description: resident physicians/medical interns

Inclusion criteria: 1) any consented medical intern from Emergency Medicine, Internal Medicine, Paediatrics, Family Practice, OBGYN and Surgery Departments in-coming to University of California San Francisco in the study year; 2) aged 18 - 64 years

Exclusion criteria: 1) current personal mindfulness practice, once a week or more frequent; 2) use of medications with Central Nervous System effects; 3) lifetime history of an organic mental illness; 4) acute or chronic immune or inflammatory disorders; 5) pregnancy

Attrition (withdrawals and exclusions): not specified

Reasons for missing data: not specified

Interventions

Intervention: Enhanced Stress Resilience Training (ESRT) (n not specified)

- *delivery*: face-to-face, CDs and videos; group sessions
- *providers*: not specified
- *duration of treatment period and timing:* 6 weekly 90-minute classes (weekly teaching sessions on workday morning protected time; guided meditation CDs, videos of movement-based practice) + single 2- to 4-hour retreat + 20 minutes daily homework)
- *description*:
  - mental training for residents
  - CLASSES: focus on developing mindfulness skills (i.e. sustained attention, open monitoring, emotional regulation, meta-cognition) in the context of skills and concepts for managing stress, particularly in practising medicine
  - DAILY HOMEWORK: mindfulness exercises following guided meditation CDs or videos of movement-based practice (practice reported periodically by text)
  - RETREAT: 3-hour outdoor retreat at week 6
  - central exercises of ESRT: body scan, sitting meditation, chi gong, yoga
- *compliance:* not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: modified form of MBSR

Control: active control (n not specified)

- *delivery*: face-to-face; group sessions
- *providers*: not specified
- *duration of treatment period and timing: 6* weekly 90-minute classes + 20 minutes daily homework
- *description*:
  - externalised attention via “shared reading and listening” model
  - CLASSES: focus on stress management through rest and exercise, with equivalent protected time and small-group bonding but without the use of contemplative practices
  - Topics include: history of surgery, patient perspective, the physician personality, technical mastery, fallibility and limits, balancing compassion and detachment, knowing when not to operate
  - DAILY PRACTICE: participants asked to devote 20 minutes a day to stress management through rest and exercise (reported daily by text)
- *compliance:* not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: “shared reading and listening” model, stress management

Outcomes

Outcomes collected and reported:

- executive function - National Institutes of Health Executive Abilities, Measures and Instruments for Neurobehavioral Evaluation and Research (NIH EXAMINER) battery

NCT03518359 *(Continued)*

- psychological well-being - Mental Health Continuum
- perceived stress - PSS
- burnout - 2-item MBI
- anxiety - Spielberger's STAI
- depression and suicidal ideation - PHQ
- mindfulness - CAMS-R
- alcohol misuse - Alcohol Use Disorder Identification Scale (Alcohol Consumption Questions)
- functional neuro-anatomic changes - fMRI Blood-oxygen-level-dependent imaging (BOLD) and Diffusion Tensor Imaging (DTI) brain scans
- motor skills - Fundamentals of Laparoscopic Surgery modules
- mind-wandering - Mind-Wandering Questionnaire
- change in emotional regulation: decentring - Experiences Questionnaire
- consultation and relational empathy - Consultation and Relational Empathy Measure
- change in performance: patient experience - Patient Enablement Instrument

Outcomes reported: not specified

Time points measured and reported: 1) pre-intervention; 2) post-intervention (9 - 10 weeks after baseline); 3) 6-month follow-up; **time points reported not specified**

Adverse events: not specified

Starting date	**Study start/end date:** June 2018; estimated primary completion date: June 2021; estimated study completion date: June 2022; active, not recruiting according to trial registration
Contact information	**Principal investigator:** Carter K Lebares, MD; Ekaterina V Guvva, BS **Address:** University of Californisa, San Francisco, California, United States, 94143 **Email:** carter.lebares@ucsf.edu; ekaterina.guvva@ucsf.edu **Telephone:** 415-502-5588
Notes	**Contact with authors:** We contacted the authors for the trial status. According to the authors, the recruitment for study is closed and the results will be published in the next 6 months (Guvva 2019 [pers comm]). **Funding source:** University of California, San Francisco **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not specified **Miscellaneous outcomes by the review authors:** trial registration number: NCT03518359 (assigned 8 May 2018)

NCT03645512

Study name	**Public title:** Resilience intervention for critical care nurses **Scientific title:** A randomised controlled trial of a resilience intervention for critical care nurses
Methods	**Study design:** 2-arm RCT **Study grouping:** parallel assignment

NCT03645512 *(Continued)*

	Unit of randomisation: individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** USA **Setting:** Florida Hospital (adult ICU), PICU, paediatric cardiac congenital intensive care (PCVICU), or Level 3 NICU at the Altamonte, Orlando, or Winter Park campus **Age:** see inclusion criteria; age not specified **Sample size (randomised):** 108 (actual enrolment) **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified, but participants with high score on emotional exhaustion or depersonalisation of MBI excluded **Population description:** critical care nurses **Inclusion criteria:** 1) adult ≥ 18 years old; 2) employed as a critical care nurse at Florida Hospital in an adult ICU, PICU, PCVICU, or Level 3 NICU at the Altamonte, Orlando, or Winter Park campus; 3) able to speak, read, and understand English fluently; 4) able to provide informed consent; 5) meet ≥ 2 stress-experience level parameters on the Stress Mindset Measure - General (SMM-G); 6) meet ≤ 4.3 on the BRS; 7) willing to attend a full-day training programme at Human Performance Institute (HPI) on the designated training date; 8) willing and able to comply with all study procedures and requirements for the duration of the study **Exclusion criteria:** 1) meet < 2 stress-experience level parameters on the SMM-G; 2) meet > 4.3 on the BRS; 3) receive a high score of ≥ 27 on the Emotional Exhaustion domain and/or a high score of ≥ 13 on the Depersonalisation domain of the MMBI-HSS) for Medical Personnel (MP) **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** Corporate Athlete® Resilience (CAR) Training Program (n not specified) • *delivery*: not specified • *providers*: not specified • *duration of treatment period and timing:* 1-day training programme • *description:* developed by the HPI, which uses a holistic approach that focuses on moving between stress and strategic recovery to help build resilience and enable higher performance • *compliance:* not specified • *integrity of delivery*: not specified • *economic information*: not specified • *theoretical basis*: holistic approach **Control:** wait-list control (n not specified; 3-month waiting period)
Outcomes	**Outcomes collected and reported:** • stress - SMM-G • perceived stress - PSS • resilience - BRS • burnout - MBI-HSS for MP • perception of personal well-being and satisfaction - Public Health Surveillance - Wellbeing Scale • sleep patterns - RAND Medial Outcomes Study Sleep Scale Survey

NCT03645512 *(Continued)*

	• health ratings and perceived impact of one's health on a variety of daily activities - RAND 36-Item Short Form Health Survey • absenteeism and presenteeism - absenteeism and presenteeism items of World Health Organization's Health and Work Performance Questionnaire • perceived effect of personal health problems on one's ability to work or perform activities - Work Productivity and Activity Impairment Questionnaire • engagement in various activities - EMBQ **Outcomes reported:** not specified **Time points measured and reported:** 1) pre-intervention; 2) 6-month follow-up (change from baseline score at 6-months post CAR training); **time points reported not specified** **Adverse events:** not specified
Starting date	**Study start/end date:** October 2018; estimated study completion date: June 2019; active, not recruiting according to trial registration (i.e. study is ongoing, and participants are receiving an intervention or being examined, but potential participants are not currently being recruited or enrolled; last update posted: March 2019)
Contact information	**Principal investigator:** Amanda T Sawyer, PhD **Address:** Florida Hospital; AdventHealth Research Institute, 301 E Princeton St., Orlando, Florida 32804, USA **Email:** Amanda.Sawyer@adventhealth.com **Telephone:** not specified
Notes	**Contact with authors:** We contacted the authors for the trial status, but received no response **Funding source:** Florida Hospital **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not specified **Miscellaneous outcomes by the review authors:** trial registration number: NCT03645512 (assigned 24 August 2018)

NCT03759795

Study name	**Public title:** Bournemouth University Resilience Training for Surgeons (BURTS) **Scientific title:** Ameliorating the impact of complications and errors on surgeons: Resilience Training for Surgeons For more details, see study protocol: clinicaltrials.gov/ProvidedDocs/95/NCT03759795/Prot_001.pdf
Methods	**Study design:** 2-arm RCT **Study grouping:** parallel assignment **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified; 100 intended to recruit to allow for some attrition and still have approximately 45 participants per condition

NCT03759795 *(Continued)*

	Imputation of missing data: not specified
Participants	**Country:** United Kingdom **Setting:** local hospitals (initially Royal Bournemouth Hospital in Bournemouth, Dorset, and Poole Hospital in Poole, Dorset; later: John Radcliffe Hospital, Oxford, Southampton General Hospital, Southampton, and Portsmouth General Hospital) **Age:** see inclusion criteria; age not specified **Sample size (randomised):** 100 (estimated enrolment) **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** trainee surgeons and consultant surgeons **Inclusion criteria:** 1) trainee surgeons and consultant surgeons; 2) 21 years to 75 years **Exclusion criteria:** none **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified

Interventions	**Intervention:** Acceptance and Commitment Training (ACTr) (n not specified)
	
	• *delivery*: face-to-face; group sessions
	• *providers*: not specified
	• *duration of treatment period and timing:* 3 training sessions over 8 weeks (session 2: 4 weeks after session 1; session 3: 4 weeks after session 2)
	• *description*:
	  ◦ TRAINING SESSION 1:
	  ■ aims: develop a rapport with individuals and create a climate of safety and warmth; describe the basic format, content and aim of the training; instill hope that training has the potential to be unusual, interesting and effective; range of empirically-supported ACT exercises as per Flaxman 2013 such as those outlined below
	  ■ content & intervention: 1. welcome and introduction: mindfulness or values warm-up exercise; 2. overview of the training: presentation of 2 skills organising diagram; 3. introduction to mindfulness: raisin exercise; brief mindfulness of body and breath; 4. introduction to values-based action: values card sort; 5. introduction to values-based action (continued): compass metaphor; 6. presentation of rationale for the programme: 2 sheets of paper technique; 7. discussion of home practice assignments: home practice handouts; environmental reminders: coaching around effective goals-setting – worksheet; 3 valued based actions; 10-minute mindfulness of breath
	  ◦ TRAINING SESSION 2 (4 weeks after session 1):
	  ■ aims: reduce excessive entanglement with unhelpful thought content; undermine experiential avoidance; cultivate acceptance skills; range of empirically-supported ACT exercises as per Flaxman 2013 such as those outlined below
	  ■ content & intervention: 1. opening mindfulness practice and brief review: mindfulness of breath; noticing thoughts and feelings and allowing them to come and go; 2. home practice review: discussion; 3. presentation of training rationale: passengers on the bus metaphor; 4. untangling from thought barriers to valued action: hand in the face metaphor; old film metaphor; self-reflection on unhelpful thought content; thoughts on screen exercise; 2 of 4 options?; 5. Mindfulness of mood/emotion: brief mindfulness of stressful event or thought – locating in the body; physical exercise; 6. defining values and value-based goal- and action-planning: Construction of 4-week values-based goal plan and action plan; 6. discussion of home practice assignments: home practice handout; environmental reminders; public commitment to 1 value-based goal

NCT03759795 *(Continued)*

- TRAINING SESSION 3 (4 weeks after session 2):
  - aims: booster session; further rehearsal of exercises; basic mindfulness training, physical exercise, diffusion, mindfulness of thought, value-based goal- and action-planning; range of empirically-supported ACT exercises as per Flaxman 2013 such as those outlined below
  - content & intervention: 1. welcome back: 2-skills diagram; 2. opening mindfulness practice: mindfulness of body and breath; 3. home practice review: discussion; 4. assessing value consistency: self-reflection on value-consistent and inconsistent actions over past 2 weeks; 5. mindfulness of thought and feeling: thoughts on clouds exercise, contacting the resilient 'observer' perspective; 6. values-based goal- and action-planning: short-term, medium-term and long-term values-based goal-setting exercise; values-based action map; 7. recommendation for continued practice: home practice handout; top tips for building a valued life; 8. final personal reflections on the training: discussion

- *compliance:* not specified
- *integrity of delivery*:
  - training sessions are recorded as a further safeguard and assessment tool
  - The only purpose of recording the sessions is to ensure the ACTr process is being delivered accurately and correctly
  - randomly selected section of sessions will be assessed by an independent ACTr assessor (Dr Bolderston will source the assessor and this will be kept on file) to rate fidelity to the established ACTr protocol
  - If a randomly-selected recording identifies the participant or anyone else, it will NOT be forwarded to the independent assessor, and another recording will be randomly selected.
- *economic information*: not specified
- *theoretical basis*:
  - ACT
  - Flaxman 2013 devised a workplace training programme which formes the basis of this training protocol
  - ACT as a workplace training has been supported by numerous studies including Lappalainen 2007, Finnes 2019. A recent manual (Flaxman 2013) will be used for this study, with a bespoke tailoring to the surgeons' population

Control: wait-list control (n not specified; same ACTr sessions offered once current study has ended)

Outcomes

Outcomes collected and reported:

- resilience - BRS
- general health - GHQ
- vulnerability to burnout - CBI
- depression, anxiety and stress - DASS
- valuing - VLQ
- work-related psychological flexibility - WAAQ
- general psychological inflexibility - AAQ
- self-compassion - SCS
- preparedness for potential future events - Sense of Preparedness Scale

Outcomes reported: not specified

Time points measured and reported: 1) 2 weeks before training session 1; 2) immediately before training session 2; 3) immediately before training session 3; 4) post-intervention (within 2 weeks after completion of training session 3); 5) 3-month follow-up (12 weeks after training session 3); **time points reported not specified**

Adverse events: not specified

Starting date

Study start/end date: December 2018; estimated study completion date: August 2020; recruiting according to trial registration (last update posted: January 2020)

NCT03759795 *(Continued)*

Contact information	**Principal investigator:** Dr Helen Bolderston **Address:** Bournemouth University, Poole House P252, Talbot Campus, Fern Barrow, Poole, BH12 5BB, UK **Email:** hbolderston@bournemouth.ac.uk **Telephone:** not specified
Notes	**Contact with authors:** no contact with authors needed **Funding source:** see study protocol: • funder: Bournemouth University and Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust • sponsor: Bournemouth University **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** ethical approval sought from the university ethics team and the Integrated Research Application System **Comments by study authors:** not specified **Miscellaneous outcomes by the review authors:** trial registration number: NCT03759795 (assigned 30 November 2018)

AAQ: Acceptance and Action Questionnaire; BRS: Brief Resilience Scale; CAMS-R: Cognitive and Affective Mindfulness Scale - Revised; CBI: Copenhagen Burnout Inventory; CD: compact disc; CD-RISC: Connor-Davidson Resilience Scale; CG: control group; DASS: Depression Anxiety Stress Scale; e.g.: for example; EMBQ: Energy Management Behaviors Questionnaire; FFMQ: Five-Facet Mindfulness Questionnaire; GHQ: General Health Questionnaire; HPQ: Health Performance Questionnaire; IG: intervention group; MBI: Maslach Burnout Inventory; MBI-HSS: MBI - Human Services Survey; MBSR: Mindfulness-based Stress Reduction; n: sample size (e.g. in respective study group); NICU: Neonatal Intensive Care Unit; PHQ: Patient Health Questionnaire; PICU: Paediatric Intensive Care Unit; POMS: Profile of Moods States; PSS: Perceived Stress Scale; RCT: randomised controlled trial; SCS: Self-Compassion Scale; SD: standard deviation; Spielberger's STAI: Spielberger's State Trait Anxiety Inventory; SWLS: Satisfaction with Life Scale; VLQ: Value Living Questionnaire; WAAQ: Work-related Acceptance and Action Questionnaire

DATA AND ANALYSES

Comparison 1. Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.1 Resilience: post-intervention	12	690	Std. Mean Difference (IV, Random, 95% CI)	0.45 [0.25, 0.65]
1.2 Resilience: short-term follow-up (≤ 3 months)	11	1325	Std. Mean Difference (IV, Random, 95% CI)	0.42 [0.17, 0.67]
1.3 Resilience: medium-term follow-up (> 3≤ 6 months)	2	684	Std. Mean Difference (IV, Random, 95% CI)	0.35 [-0.41, 1.11]
1.4 Resilience: long-term follow-up (> 6 months)	2	107	Std. Mean Difference (IV, Random, 95% CI)	0.30 [-0.08, 0.68]

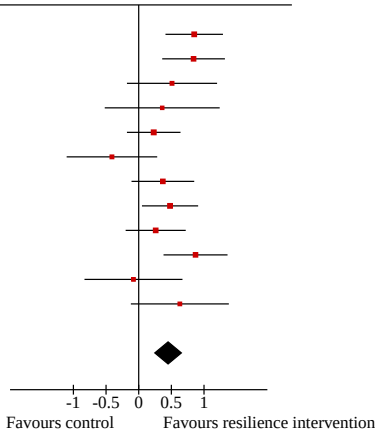
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.5 Anxiety: post-intervention	5	231	Std. Mean Difference (IV, Random, 95% CI)	-0.06 [-0.35, 0.23]
1.6 Anxiety: short-term follow-up (≤ 3 months)	4	133	Std. Mean Difference (IV, Random, 95% CI)	-0.63 [-0.98, -0.27]
1.7 Depression: post-intervention	14	788	Std. Mean Difference (IV, Random, 95% CI)	-0.29 [-0.50, -0.09]
1.8 Depression: short-term follow-up (≤ 3 months)	8	545	Std. Mean Difference (IV, Random, 95% CI)	-0.52 [-0.81, -0.23]
1.9 Depression: medium-term follow-up (> 3 ≤ 6 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.10 Depression: long-term follow-up (> 6 months)	2	87	Std. Mean Difference (IV, Random, 95% CI)	0.09 [-0.33, 0.51]
1.11 Stress or stress perception: post-intervention	17	997	Std. Mean Difference (IV, Random, 95% CI)	-0.61 [-1.07, -0.15]
1.12 Stress or stress perception: short-term follow-up (≤ 3 months)	14	788	Std. Mean Difference (IV, Random, 95% CI)	-0.46 [-0.67, -0.25]
1.13 Stress or stress perception: medium-term follow-up (> 3 ≤ 6 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.14 Stress or stress perception: long-term follow-up (> 6 months)	3	173	Std. Mean Difference (IV, Random, 95% CI)	-0.39 [-0.84, 0.05]
1.15 Well-being or quality of life: post-intervention	13	1494	Std. Mean Difference (IV, Random, 95% CI)	0.14 [-0.01, 0.30]
1.16 Well-being or quality of life: short-term follow-up (≤ 3 months)	12	1413	Std. Mean Difference (IV, Random, 95% CI)	0.07 [-0.04, 0.18]
1.17 Well-being or quality of life: medium-term follow-up (> 3 ≤ 6 months)	3	1414	Std. Mean Difference (IV, Random, 95% CI)	-0.08 [-0.31, 0.16]
1.18 Well-being or quality of life: long-term follow-up (> 6 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.19 Social support: short-term follow-up (≤ 3 months)	2	825	Std. Mean Difference (IV, Random, 95% CI)	-0.07 [-0.22, 0.08]
1.20 Social support: medium-term follow-up (> 3 ≤ 6 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.21 Optimism: post-intervention	3	169	Std. Mean Difference (IV, Random, 95% CI)	0.41 [0.10, 0.72]
1.22 Optimism: short-term follow-up (≤ 3 months)	2	153	Std. Mean Difference (IV, Random, 95% CI)	0.44 [0.12, 0.76]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.23 Self-efficacy: post-intervention	6	461	Std. Mean Difference (IV, Random, 95% CI)	0.43 [0.25, 0.62]
1.24 Self-efficacy: short-term follow-up (≤ 3 months)	7	1258	Std. Mean Difference (IV, Random, 95% CI)	0.32 [0.13, 0.51]
1.25 Self-efficacy: medium-term follow-up (> 3 ≤ 6 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.26 Self-efficacy: long-term follow-up (> 6 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.27 Active coping: post-intervention	3	137	Std. Mean Difference (IV, Random, 95% CI)	0.28 [-0.31, 0.87]
1.28 Active coping: short-term follow-up (≤ 3 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.29 Active coping: medium-term follow-up (> 3 ≤ 6 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.30 Self-esteem: short-term follow-up (≤ 3 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.31 Hardiness: post-intervention	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.32 Hardiness: medium-term follow-up (> 3 ≤ 6 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.33 Positive emotions: post-intervention	2	212	Std. Mean Difference (IV, Random, 95% CI)	0.85 [0.17, 1.53]
1.34 Positive emotions: short-term follow-up (≤ 3 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only

Analysis 1.1. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 1: Resilience: post-intervention

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2019	0	0.2245	44	42	10.7%	0.85 [0.41 , 1.29]
Khoshnazary 2016	0	0.2449	35	38	9.8%	0.84 [0.36 , 1.32]
Klatt 2015	0	0.352	17	17	6.2%	0.51 [-0.18 , 1.20]
Lebares 2018	0	0.449	12	9	4.3%	0.36 [-0.52 , 1.24]
Lin 2019	0	0.2092	44	46	11.5%	0.23 [-0.18 , 0.64]
Loiselle 2018	0	0.3537	15	18	6.1%	-0.41 [-1.10 , 0.28]
Mache 2015a	0	0.2449	35	33	9.8%	0.37 [-0.11 , 0.85]
Mache 2015b	0	0.2194	42	43	10.9%	0.48 [0.05 , 0.91]
Mache 2016	0	0.2347	37	35	10.2%	0.26 [-0.20 , 0.72]
Mache 2017	0	0.25	37	35	9.6%	0.87 [0.38 , 1.36]
Mealer 2014	0	0.3827	13	14	5.5%	-0.08 [-0.83 , 0.67]
Schroeder 2016	0	0.3827	15	14	5.5%	0.63 [-0.12 , 1.38]
Total (95% CI)			**346**	**344**	**100.0%**	**0.45 [0.25 , 0.65]**

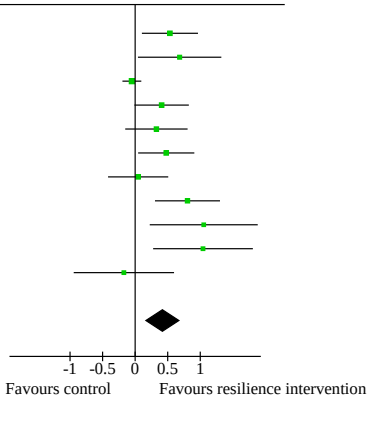
Heterogeneity: Tau² = 0.05; Chi² = 18.49, df = 11 (P = 0.07); I² = 41%
Test for overall effect: Z = 4.33 (P < 0.0001)
Test for subgroup differences: Not applicable



Analysis 1.2. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 2: Resilience: short-term follow-up (≤ 3 months)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2019	3.01	0.5	44	2.71	0.61	42	10.3%	0.53 [0.10 , 0.96]
Chesak 2015	79.74	11.82	19	72.52	8.83	21	7.6%	0.68 [0.04 , 1.32]
Cheung 2014	2.42	0.63	364	2.45	0.56	369	14.1%	-0.05 [-0.20 , 0.09]
Lin 2019	59.7	11.87	44	53.85	16.21	46	10.5%	0.41 [-0.01 , 0.82]
Mache 2015a	61	17.4	35	55.3	17.1	33	9.7%	0.33 [-0.15 , 0.81]
Mache 2015b	61.5	17.9	42	52.9	17.8	43	10.3%	0.48 [0.05 , 0.91]
Mache 2016	57.2	17.2	37	56.4	17.2	35	9.9%	0.05 [-0.42 , 0.51]
Mache 2017	4.1	0.71	33	3.51	0.74	34	9.4%	0.80 [0.30 , 1.30]
Schroeder 2016	24.15	5.47	13	18.28	5.32	13	5.7%	1.05 [0.22 , 1.88]
Sood 2011	79.4	11.3	20	67.2	11.6	12	6.3%	1.04 [0.28 , 1.81]
Sood 2014	73	11.5	13	74.8	8.4	13	6.2%	-0.17 [-0.94 , 0.60]
Total (95% CI)			**664**			**661**	**100.0%**	**0.42 [0.17 , 0.67]**

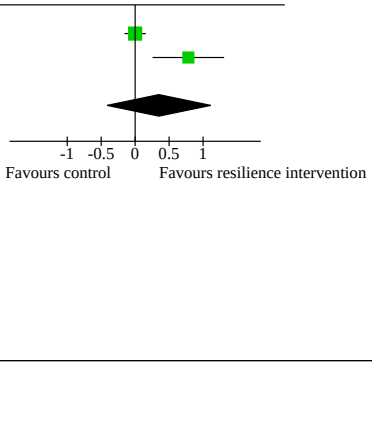
Heterogeneity: Tau² = 0.11; Chi² = 34.27, df = 10 (P = 0.0002); I² = 71%
Test for overall effect: Z = 3.24 (P = 0.001)
Test for subgroup differences: Not applicable



Analysis 1.3. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 3: Resilience: medium-term follow-up (> 3≤ 6 months)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Cheung 2014	2.49	0.62	319	2.49	0.58	305	55.4%	0.00 [-0.16 , 0.16]
Mache 2017	4.08	0.79	31	3.49	0.69	29	44.6%	0.78 [0.26 , 1.31]
Total (95% CI)			**350**			**334**	**100.0%**	**0.35 [-0.41 , 1.11]**

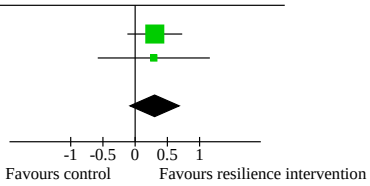
Heterogeneity: Tau² = 0.27; Chi² = 7.80, df = 1 (P = 0.005); I² = 87%
Test for overall effect: Z = 0.90 (P = 0.37)
Test for subgroup differences: Not applicable



Analysis 1.4. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 4: Resilience: long-term follow-up (> 6 months)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2019	2.94	0.58	44	2.76	0.59	42	80.7%	0.30 [-0.12 , 0.73]
Lebares 2018	32.75	5.59	12	31.33	3.12	9	19.3%	0.29 [-0.58 , 1.16]
Total (95% CI)			**56**			**51**	**100.0%**	**0.30 [-0.08 , 0.68]**

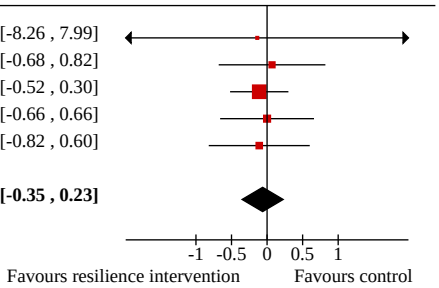
Heterogeneity: Tau² = 0.00; Chi² = 0.00, df = 1 (P = 0.97); I² = 0%
Test for overall effect: Z = 1.55 (P = 0.12)
Test for subgroup differences: Not applicable



Analysis 1.5. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 5: Anxiety: post-intervention

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Calder Calisi 2017	0	4.146	24	22	0.1%	-0.14 [-8.26 , 7.99]
Mealer 2014	0	0.3827	13	14	14.8%	0.07 [-0.68 , 0.82]
Medisauskaite 2019	0	0.2092	39	52	49.5%	-0.11 [-0.52 , 0.30]
Mistretta 2018	0	0.3367	22	15	19.1%	0.00 [-0.66 , 0.66]
Villani 2013	0	0.3623	15	15	16.5%	-0.11 [-0.82 , 0.60]
Total (95% CI)			**113**	**118**	**100.0%**	**-0.06 [-0.35 , 0.23]**

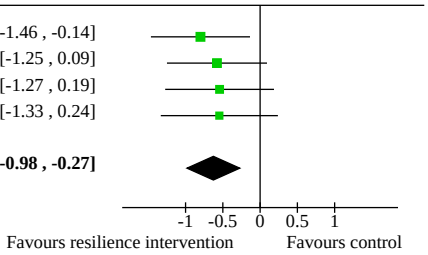
Heterogeneity: Tau² = 0.00; Chi² = 0.22, df = 4 (P = 0.99); I² = 0%
Test for overall effect: Z = 0.42 (P = 0.67)
Test for subgroup differences: Not applicable



Analysis 1.6. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 6: Anxiety: short-term follow-up (≤ 3 months)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Chesak 2015	2.22	2.67	18	5.1	4.14	20	28.4%	-0.80 [-1.46 , -0.14]
Mistretta 2018	2.18	1.76	22	3.67	3.35	15	27.8%	-0.58 [-1.25 , 0.09]
Sood 2011	43.4	14.1	20	53.4	23.1	12	23.5%	-0.54 [-1.27 , 0.19]
Sood 2014	45.5	11.2	13	53.3	16	13	20.3%	-0.55 [-1.33 , 0.24]
Total (95% CI)			**73**			**60**	**100.0%**	**-0.63 [-0.98 , -0.27]**

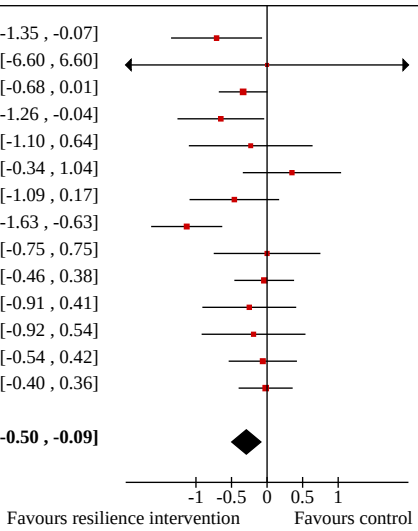
Heterogeneity: Tau² = 0.00; Chi² = 0.37, df = 3 (P = 0.95); I² = 0%
Test for overall effect: Z = 3.47 (P = 0.0005)
Test for subgroup differences: Not applicable



Analysis 1.7. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 7: Depression: post-intervention

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Alexander 2015	0	0.3265	20	20	6.6%	-0.71 [-1.35 , -0.07]
Calder Calisi 2017	0	3.366	24	22	0.1%	0.00 [-6.60 , 6.60]
Cieslak 2016	0	0.1745	72	62	12.3%	-0.34 [-0.68 , 0.01]
Ireland 2017	0	0.3112	23	21	7.0%	-0.65 [-1.26 , -0.04]
Lebares 2018	0	0.4439	12	9	4.3%	-0.23 [-1.10 , 0.64]
Loiselle 2018	0	0.3526	15	18	6.0%	0.35 [-0.34 , 1.04]
Luthar 2017	0	0.3214	21	19	6.7%	-0.46 [-1.09 , 0.17]
Mache 2017	0	0.2551	37	35	8.8%	-1.13 [-1.63 , -0.63]
Mealer 2014	0	0.3827	13	14	5.3%	0.00 [-0.75 , 0.75]
Medisauskaite 2019	0	0.2143	39	52	10.4%	-0.04 [-0.46 , 0.38]
Mistretta 2018	0	0.3367	22	15	6.3%	-0.25 [-0.91 , 0.41]
Schroeder 2016	0	0.3725	15	14	5.5%	-0.19 [-0.92 , 0.54]
West 2014	0	0.2449	34	33	9.2%	-0.06 [-0.54 , 0.42]
West 2015	0	0.1939	51	56	11.4%	-0.02 [-0.40 , 0.36]
Total (95% CI)			**398**	**390**	**100.0%**	**-0.29 [-0.50 , -0.09]**

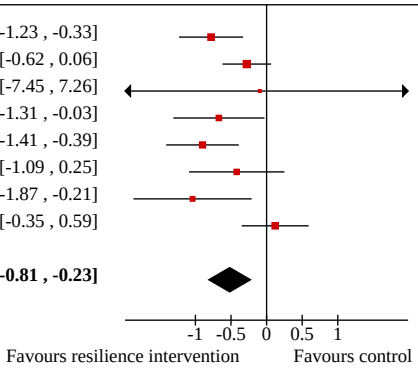
Heterogeneity: Tau² = 0.06; Chi² = 22.34, df = 13 (P = 0.05); I² = 42%
Test for overall effect: Z = 2.80 (P = 0.005)
Test for subgroup differences: Not applicable



Analysis 1.8. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 8: Depression: short-term follow-up (≤ 3 months)

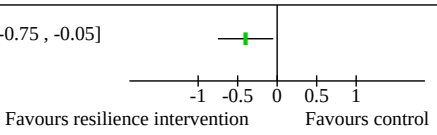
Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Berger 2011	0	0.2296	42	38	16.7%	-0.78 [-1.23 , -0.33]
Cieslak 2016	0	0.1741	72	62	20.1%	-0.28 [-0.62 , 0.06]
Clemow 2018	0	3.755	46	46	0.2%	-0.10 [-7.45 , 7.26]
Luthar 2017	0	0.3265	21	19	11.9%	-0.67 [-1.31 , -0.03]
Mache 2017	0	0.2602	33	34	15.0%	-0.90 [-1.41 , -0.39]
Mistretta 2018	0	0.3418	22	15	11.3%	-0.42 [-1.09 , 0.25]
Schroeder 2016	0	0.4235	13	13	8.6%	-1.04 [-1.87 , -0.21]
West 2014	0	0.2398	34	35	16.2%	0.12 [-0.35 , 0.59]
Total (95% CI)			**283**	**262**	**100.0%**	**-0.52 [-0.81 , -0.23]**

Heterogeneity: Tau² = 0.08; Chi² = 14.05, df = 7 (P = 0.05); I² = 50%
Test for overall effect: Z = 3.48 (P = 0.0005)
Test for subgroup differences: Not applicable



Analysis 1.9. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 9: Depression: medium-term follow-up (> 3 ≤ 6 months)

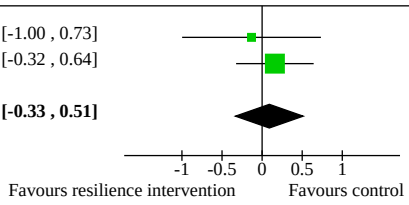
Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Mache 2017	3.75	0.67	31	4.15	0.71	29	-0.40 [-0.75 , -0.05]



Analysis 1.10. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 10: Depression: long-term follow-up (> 6 months)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Lebares 2018	2.25	2.34	12	2.56	2.13	9	23.8%	-0.13 [-1.00 , 0.73]
West 2014	21.03	11.44	34	19.09	12.63	32	76.2%	0.16 [-0.32 , 0.64]
Total (95% CI)			**46**			**41**	**100.0%**	**0.09 [-0.33 , 0.51]**

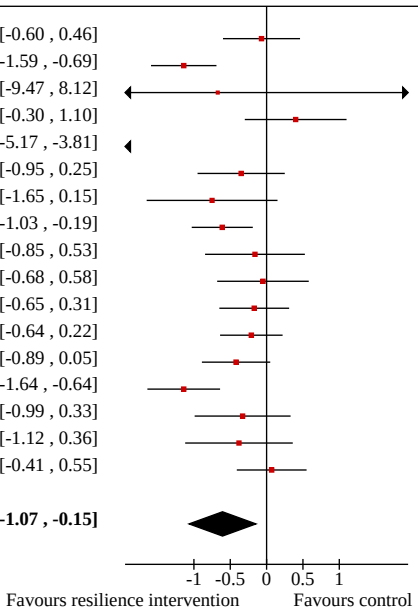
Heterogeneity: Tau² = 0.00; Chi² = 0.33, df = 1 (P = 0.56); I² = 0%
Test for overall effect: Z = 0.42 (P = 0.68)
Test for subgroup differences: Not applicable



Analysis 1.11. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 11: Stress or stress perception: post-intervention

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	0	0.2704	26	28	6.4%	-0.07 [-0.60 , 0.46]
Bernburg 2019	0	0.2296	44	42	6.5%	-1.14 [-1.59 , -0.69]
Calder Calisi 2017	0	4.487	24	22	0.3%	-0.67 [-9.47 , 8.12]
Duchemin 2015	0	0.3571	16	16	6.0%	0.40 [-0.30 , 1.10]
Fei 2019	0	0.3469	61	61	6.0%	-4.49 [-5.17 , -3.81]
Ireland 2017	0	0.3061	23	21	6.2%	-0.35 [-0.95 , 0.25]
Lebares 2018	0	0.4592	12	9	5.5%	-0.75 [-1.65 , 0.15]
Lin 2019	0	0.2143	44	46	6.6%	-0.61 [-1.03 , -0.19]
Loiselle 2018	0	0.3502	15	18	6.0%	-0.16 [-0.85 , 0.53]
Luthar 2017	0	0.3214	21	18	6.2%	-0.05 [-0.68 , 0.58]
Mache 2015a	0	0.2449	35	33	6.5%	-0.17 [-0.65 , 0.31]
Mache 2015b	0	0.2194	42	43	6.6%	-0.21 [-0.64 , 0.22]
Mache 2016	0	0.2398	37	35	6.5%	-0.42 [-0.89 , 0.05]
Mache 2017	0	0.2551	37	35	6.4%	-1.14 [-1.64 , -0.64]
Mistretta 2018	0	0.3367	22	15	6.1%	-0.33 [-0.99 , 0.33]
Schroeder 2016	0	0.3776	15	14	5.9%	-0.38 [-1.12 , 0.36]
West 2014	0	0.2449	34	33	6.5%	0.07 [-0.41 , 0.55]
Total (95% CI)			**508**	**489**	**100.0%**	**-0.61 [-1.07 , -0.15]**

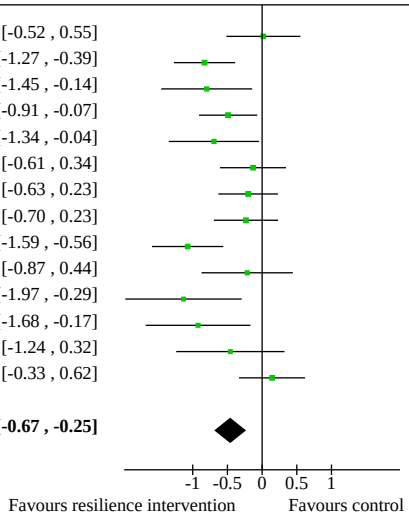
Heterogeneity: Tau² = 0.79; Chi² = 167.66, df = 16 (P < 0.00001); I² = 90%
Test for overall effect: Z = 2.59 (P = 0.010)
Test for subgroup differences: Not applicable



Analysis 1.12. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 12: Stress or stress perception: short-term follow-up (≤ 3 months)

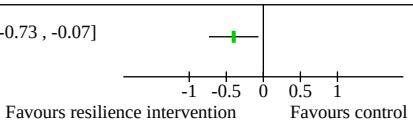
Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	3.15	0.58	26	3.14	0.51	28	7.5%	0.02 [-0.52 , 0.55]
Bernburg 2019	2.9	0.59	44	3.39	0.58	42	8.8%	-0.83 [-1.27 , -0.39]
Chesak 2015	20.11	6.79	19	25.5	6.44	20	6.1%	-0.80 [-1.45 , -0.14]
Lin 2019	36.68	6.79	44	39.67	5.24	46	9.1%	-0.49 [-0.91 , -0.07]
Luthar 2017	61.1	16.9	21	75.44	23.56	18	6.1%	-0.69 [-1.34 , -0.04]
Mache 2015a	54	19.1	35	56.5	18.57	33	8.3%	-0.13 [-0.61 , 0.34]
Mache 2015b	52.3	20.4	42	56.4	20.1	42	9.0%	-0.20 [-0.63 , 0.23]
Mache 2016	55.2	18.3	37	59.4	17.3	35	8.5%	-0.23 [-0.70 , 0.23]
Mache 2017	2.59	0.72	33	3.35	0.68	34	7.8%	-1.07 [-1.59 , -0.56]
Mistretta 2018	5.82	3.95	22	6.6	2.85	15	6.0%	-0.21 [-0.87 , 0.44]
Schroeder 2016	13.23	5.19	13	20.21	6.65	13	4.4%	-1.13 [-1.97 , -0.29]
Sood 2011	22.8	5.5	20	28.3	6.3	12	5.1%	-0.92 [-1.68 , -0.17]
Sood 2014	19.6	5.6	13	22.2	5.4	13	4.9%	-0.46 [-1.24 , 0.32]
West 2014	14.8	7.28	33	13.8	6.54	35	8.3%	0.14 [-0.33 , 0.62]
Total (95% CI)			**402**			**386**	**100.0%**	**-0.46 [-0.67 , -0.25]**

Heterogeneity: Tau² = 0.08; Chi² = 27.42, df = 13 (P = 0.01); I² = 53%
Test for overall effect: Z = 4.23 (P < 0.0001)
Test for subgroup differences: Not applicable



Analysis 1.13. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 13: Stress or stress perception: medium-term follow-up (> 3 ≤ 6 months)

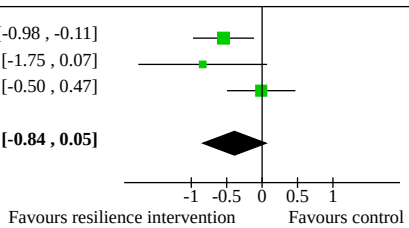
Study or Subgroup	Favours resilience intervention Mean	SD	Total	control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Mache 2017	2.8	0.7	31	3.2	0.62	29	-0.40 [-0.73 , -0.07]



Analysis 1.14. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 14: Stress or stress perception: long-term follow-up (> 6 months)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2019	3.05	0.51	44	3.32	0.47	42	43.0%	-0.55 [-0.98 , -0.11]
Lebares 2018	11.17	3.69	12	14.56	4.13	9	18.0%	-0.84 [-1.75 , 0.07]
West 2014	15.4	7.87	34	15.5	7.41	32	39.0%	-0.01 [-0.50 , 0.47]
Total (95% CI)			**90**			**83**	**100.0%**	**-0.39 [-0.84 , 0.05]**

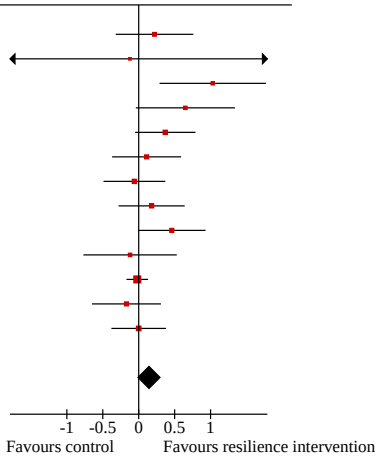
Heterogeneity: Tau² = 0.07; Chi² = 3.76, df = 2 (P = 0.15); I² = 47%
Test for overall effect: Z = 1.72 (P = 0.09)
Test for subgroup differences: Not applicable



Analysis 1.15. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 15: Well-being or quality of life: post-intervention

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	0	0.2755	26	28	6.3%	0.22 [-0.32 , 0.76]
Calder Calisi 2017	0	4.088	24	22	0.0%	-0.12 [-8.13 , 7.89]
Duchemin 2015	0	0.3776	16	16	3.7%	1.03 [0.29 , 1.77]
Klatt 2015	0	0.352	17	17	4.2%	0.65 [-0.04 , 1.34]
Lin 2019	0	0.2143	44	46	9.1%	0.37 [-0.05 , 0.79]
Mache 2015a	0	0.2449	35	33	7.5%	0.11 [-0.37 , 0.59]
Mache 2015b	0	0.2194	42	43	8.8%	-0.06 [-0.49 , 0.37]
Mache 2016	0	0.2347	37	35	8.0%	0.18 [-0.28 , 0.64]
Mache 2017	0	0.2398	37	35	7.7%	0.46 [-0.01 , 0.93]
Mistretta 2018	0	0.3316	22	15	4.6%	-0.12 [-0.77 , 0.53]
Strijk 2011	0	0.0765	367	363	22.3%	-0.02 [-0.17 , 0.13]
West 2014	0	0.2449	34	33	7.5%	-0.17 [-0.65 , 0.31]
West 2015	0	0.1939	51	56	10.3%	0.00 [-0.38 , 0.38]
Total (95% CI)			**752**	**742**	**100.0%**	**0.14 [-0.01 , 0.30]**

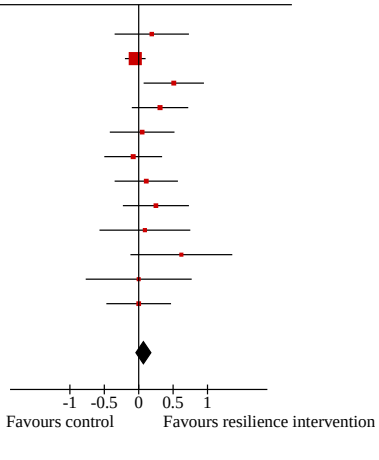
Heterogeneity: Tau² = 0.02; Chi² = 17.44, df = 12 (P = 0.13); I² = 31%
Test for overall effect: Z = 1.83 (P = 0.07)
Test for subgroup differences: Not applicable



Analysis 1.16. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 16: Well-being or quality of life: short-term follow-up (≤ 3 months)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	0	0.2755	26	28	4.0%	0.19 [-0.35 , 0.73]
Cheung 2014	0	0.0765	364	369	48.2%	-0.05 [-0.20 , 0.10]
Hosseinnejad 2018	0	0.2236	40	40	6.1%	0.51 [0.07 , 0.95]
Lin 2019	0	0.2092	44	46	6.9%	0.31 [-0.10 , 0.72]
Mache 2015a	0	0.2398	35	33	5.3%	0.05 [-0.42 , 0.52]
Mache 2015b	0	0.2143	42	43	6.6%	-0.08 [-0.50 , 0.34]
Mache 2016	0	0.2347	37	35	5.5%	0.11 [-0.35 , 0.57]
Mache 2017	0	0.2449	33	34	5.1%	0.25 [-0.23 , 0.73]
Mistretta 2018	0	0.3367	22	15	2.7%	0.09 [-0.57 , 0.75]
Sood 2011	0	0.3776	20	12	2.2%	0.62 [-0.12 , 1.36]
Sood 2014	0	0.3929	13	13	2.0%	0.00 [-0.77 , 0.77]
West 2014	0	0.2398	34	35	5.3%	0.00 [-0.47 , 0.47]
Total (95% CI)			**710**	**703**	**100.0%**	**0.07 [-0.04 , 0.18]**

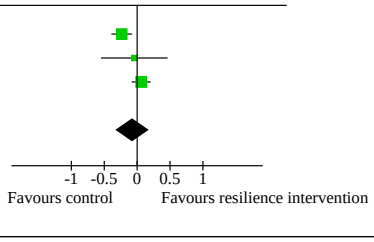
Heterogeneity: Tau² = 0.00; Chi² = 11.13, df = 11 (P = 0.43); I² = 1%
Test for overall effect: Z = 1.23 (P = 0.22)
Test for subgroup differences: Not applicable



Analysis 1.17. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 17: Well-being or quality of life: medium-term follow-up (> 3 ≤ 6 months)

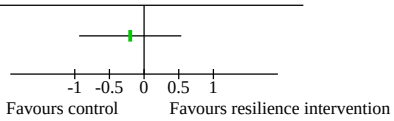
Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Cheung 2014	4.69	1.06	319	4.94	1.07	305	41.7%	-0.23 [-0.39 , -0.08]
Mache 2017	3.02	0.72	31	3.05	0.65	29	15.3%	-0.04 [-0.55 , 0.46]
Strijk 2011	69.2	17.9	367	68.1	17.5	363	42.9%	0.06 [-0.08 , 0.21]
Total (95% CI)			**717**			**697**	**100.0%**	**-0.08 [-0.31 , 0.16]**

Heterogeneity: Tau² = 0.03; Chi² = 7.38, df = 2 (P = 0.02); I² = 73%
Test for overall effect: Z = 0.64 (P = 0.52)
Test for subgroup differences: Not applicable



Analysis 1.18. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 18: Well-being or quality of life: long-term follow-up (> 6 months)

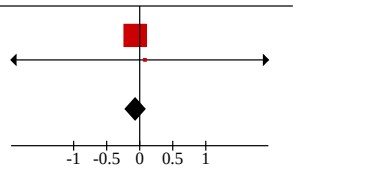
Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Mean Difference IV, Random, 95% CI
West 2014	8.2	1.64	34	8.4	1.41	32	-0.20 [-0.94 , 0.54]



Analysis 1.19. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 19: Social support: short-term follow-up (≤ 3 months)

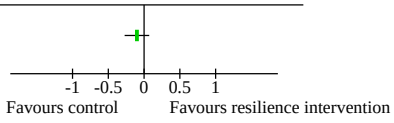
Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Cheung 2014	0	0.0765	364	369	99.9%	-0.07 [-0.22 , 0.08]
Clemow 2018	0	3.246	46	46	0.1%	0.08 [-6.28 , 6.44]
Total (95% CI)			**410**	**415**	**100.0%**	**-0.07 [-0.22 , 0.08]**

Heterogeneity: Tau² = 0.00; Chi² = 0.00, df = 1 (P = 0.96); I² = 0%
Test for overall effect: Z = 0.91 (P = 0.36)
Test for subgroup differences: Not applicable



Analysis 1.20. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 20: Social support: medium-term follow-up (> 3 ≤ 6 months)

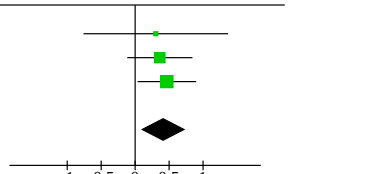
Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Cheung 2014	4.94	1.11	319	5.04	1.08	305	-0.10 [-0.27 , 0.07]



Analysis 1.21. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 21: Optimism: post-intervention

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Gelkopf 2008	4.09	0.83	11	3.83	0.75	5	8.3%	0.30 [-0.76 , 1.37]
Mache 2015a	56.9	18.6	35	50.3	17.2	33	41.0%	0.36 [-0.12 , 0.84]
Mache 2015b	59.2	19.6	42	49.9	19.8	43	50.7%	0.47 [0.04 , 0.90]
Total (95% CI)			**88**			**81**	**100.0%**	**0.41 [0.10 , 0.72]**

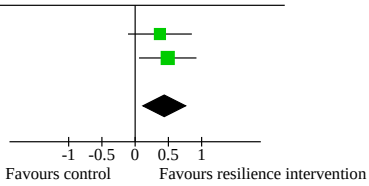
Heterogeneity: Tau² = 0.00; Chi² = 0.14, df = 2 (P = 0.93); I² = 0%
Test for overall effect: Z = 2.63 (P = 0.009)
Test for subgroup differences: Not applicable



Analysis 1.22. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 22: Optimism: short-term follow-up (≤ 3 months)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Mache 2015a	56.6	17.5	35	50	17.5	33	44.7%	0.37 [-0.11 , 0.85]
Mache 2015b	59	18.9	42	49.7	18.7	43	55.3%	0.49 [0.06 , 0.92]
Total (95% CI)			**77**			**76**	**100.0%**	**0.44 [0.12 , 0.76]**

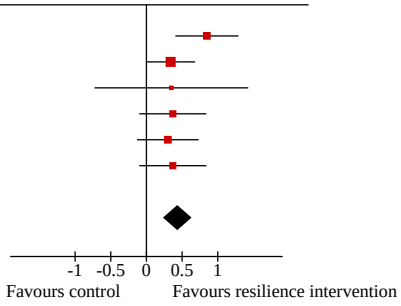
Heterogeneity: Tau² = 0.00; Chi² = 0.13, df = 1 (P = 0.72); I² = 0%
Test for overall effect: Z = 2.67 (P = 0.008)
Test for subgroup differences: Not applicable



Analysis 1.23. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 23: Self-efficacy: post-intervention

Study or Subgroup	SMD	SE	Experimental Total	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2019	0	0.2257	44	42	17.7%	0.85 [0.41 , 1.29]
Cieslak 2016	0	0.1745	72	62	29.5%	0.34 [-0.00 , 0.68]
Gelkopf 2008	0	0.55	11	5	3.0%	0.35 [-0.73 , 1.43]
Mache 2015a	0	0.24	35	33	15.6%	0.37 [-0.10 , 0.84]
Mache 2015b	0	0.22	42	43	18.6%	0.30 [-0.13 , 0.73]
Mache 2016	0	0.24	37	35	15.6%	0.37 [-0.10 , 0.84]
Total (95% CI)			**241**	**220**	**100.0%**	**0.43 [0.25 , 0.62]**

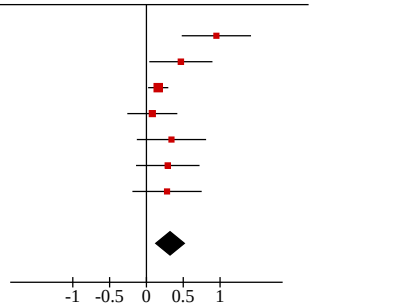
Heterogeneity: Tau² = 0.00; Chi² = 4.19, df = 5 (P = 0.52); I² = 0%
Test for overall effect: Z = 4.55 (P < 0.00001)
Test for subgroup differences: Not applicable



Analysis 1.24. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 24: Self-efficacy: short-term follow-up (≤ 3 months)

Study or Subgroup	SMD	SE	Experimental Total	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Berger 2011	0	0.24	42	38	11.0%	0.95 [0.48 , 1.42]
Bernburg 2019	0	0.2188	44	42	12.3%	0.47 [0.04 , 0.90]
Cheung 2014	0	0.07	364	369	26.7%	0.16 [0.02 , 0.30]
Cieslak 2016	0	0.1733	72	62	15.9%	0.08 [-0.26 , 0.42]
Mache 2015a	0	0.24	35	33	11.0%	0.34 [-0.13 , 0.81]
Mache 2015b	0	0.22	42	43	12.2%	0.29 [-0.14 , 0.72]
Mache 2016	0	0.24	37	35	11.0%	0.28 [-0.19 , 0.75]
Total (95% CI)			**636**	**622**	**100.0%**	**0.32 [0.13 , 0.51]**

Heterogeneity: Tau² = 0.03; Chi² = 12.24, df = 6 (P = 0.06); I² = 51%
Test for overall effect: Z = 3.24 (P = 0.001)
Test for subgroup differences: Not applicable

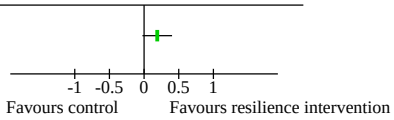


Analysis 1.25. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 25: Self-efficacy: medium-term follow-up (> 3 ≤ 6 months)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Cheung 2014	3.01	0.38	319	2.84	0.45	305	0.17 [0.10 , 0.24]

Analysis 1.26. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 26: Self-efficacy: long-term follow-up (> 6 months)

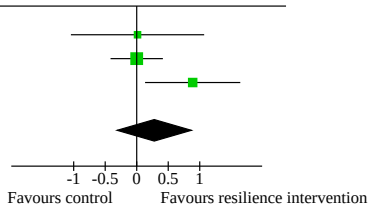
Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Bernburg 2019	2.9	0.5	44	2.71	0.51	42	0.19 [-0.02 , 0.40]



Analysis 1.27. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 27: Active coping: post-intervention

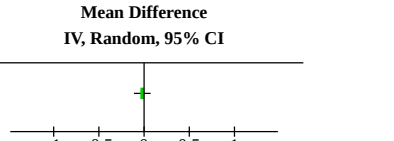
Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Gelkopf 2008	13.64	2.98	11	13.6	2.7	5	20.8%	0.01 [-1.04 , 1.07]
Medisauskaite 2019	2.63	0.78	39	2.63	0.74	52	48.2%	0.00 [-0.42 , 0.42]
Villani 2013	3.37	0.4	15	2.81	0.77	15	31.0%	0.89 [0.13 , 1.64]
Total (95% CI)			**65**			**72**	**100.0%**	**0.28 [-0.31 , 0.87]**

Heterogeneity: Tau² = 0.14; Chi² = 4.19, df = 2 (P = 0.12); I² = 52%
Test for overall effect: Z = 0.93 (P = 0.35)
Test for subgroup differences: Not applicable



Analysis 1.28. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 28: Active coping: short-term follow-up (≤ 3 months)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Cheung 2014	2.51	0.65	364	2.53	0.62	369	-0.02 [-0.11 , 0.07]

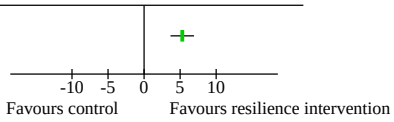


Analysis 1.29. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 29: Active coping: medium-term follow-up (> 3 ≤ 6 months)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Cheung 2014	2.57	0.62	319	2.6	0.57	305	-0.03 [-0.12 , 0.06]

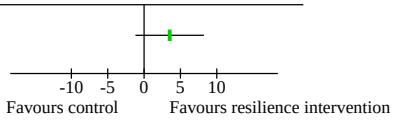
Analysis 1.30. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 30: Self-esteem: short-term follow-up (≤ 3 months)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI
Berger 2011	37.4	3.5	42	32.1	3.9	38	5.30 [3.67 , 6.93]	



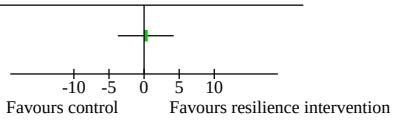
Analysis 1.31. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 31: Hardiness: post-intervention

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI
Tierney 1997	78.16	6.98	21	74.64	8.71	22	3.52 [-1.19 , 8.23]	



Analysis 1.32. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 32: Hardiness: medium-term follow-up (> 3 ≤ 6 months)

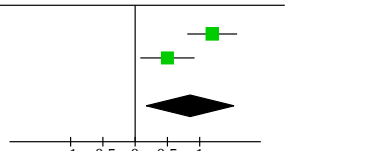
Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI
Tierney 1997	75.73	5.85	21	75.49	7.4	22	0.24 [-3.74 , 4.22]	



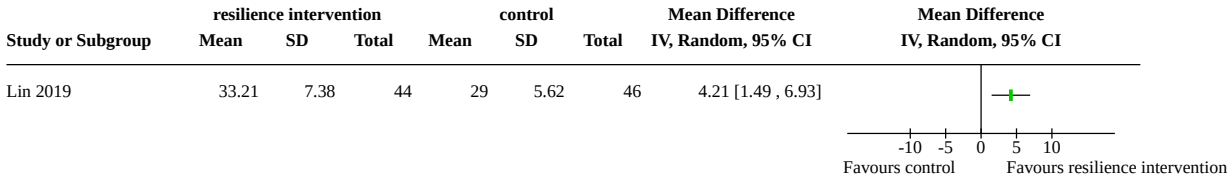
Analysis 1.33. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 33: Positive emotions: post-intervention

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI	Std. Mean Difference IV, Random, 95% CI
Fei 2019	40.28	5.83	61	33.66	5.17	61	50.7%	1.19 [0.81 , 1.58]	
Lin 2019	32.02	6.45	44	29	5.51	46	49.3%	0.50 [0.08 , 0.92]	
Total (95% CI)			**105**			**107**	**100.0%**	**0.85 [0.17 , 1.53]**	

Heterogeneity: Tau² = 0.20; Chi² = 5.68, df = 1 (P = 0.02); I² = 82%
Test for overall effect: Z = 2.46 (P = 0.01)
Test for subgroup differences: Not applicable



Analysis 1.34. Comparison 1: Resilience intervention versus control condition for healthcare professionals: main analyses (primary and secondary outcomes), Outcome 34: Positive emotions: short-term follow-up (≤ 3 months)



Comparison 2. Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.1 Resilience: post-intervention, subgroup analysis: setting	12	690	Std. Mean Difference (IV, Random, 95% CI)	0.45 [0.25, 0.65]
2.1.1 Group setting	9	557	Std. Mean Difference (IV, Random, 95% CI)	0.50 [0.33, 0.67]
2.1.2 Combined setting	3	133	Std. Mean Difference (IV, Random, 95% CI)	0.15 [-0.66, 0.97]
2.2 Resilience: post-intervention, subgroup analysis: delivery format	12	690	Std. Mean Difference (IV, Random, 95% CI)	0.45 [0.25, 0.65]
2.2.1 Face-to-face	9	500	Std. Mean Difference (IV, Random, 95% CI)	0.47 [0.24, 0.71]
2.2.2 Combined delivery	3	190	Std. Mean Difference (IV, Random, 95% CI)	0.37 [-0.13, 0.88]
2.3 Resilience: post-intervention, subgroup analysis: intensity	12	690	Std. Mean Difference (IV, Random, 95% CI)	0.45 [0.25, 0.65]
2.3.1 Moderate intensity	2	67	Std. Mean Difference (IV, Random, 95% CI)	0.05 [-0.85, 0.95]
2.3.2 High intensity	9	550	Std. Mean Difference (IV, Random, 95% CI)	0.47 [0.27, 0.66]
2.3.3 Unclear intensity	1	73	Std. Mean Difference (IV, Random, 95% CI)	0.84 [0.36, 1.32]
2.4 Resilience: post-intervention, subgroup analysis: theoretical foundation	12	690	Std. Mean Difference (IV, Random, 95% CI)	0.45 [0.25, 0.65]
2.4.1 Mindfulness-based	3	83	Std. Mean Difference (IV, Random, 95% CI)	0.17 [-0.48, 0.82]
2.4.2 Combination	8	534	Std. Mean Difference (IV, Random, 95% CI)	0.46 [0.26, 0.67]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.4.3 Unspecific resilience training	1	73	Std. Mean Difference (IV, Random, 95% CI)	0.84 [0.36, 1.32]
2.5 Resilience: post-intervention, subgroup analysis: comparator	12	690	Std. Mean Difference (IV, Random, 95% CI)	0.45 [0.25, 0.65]
2.5.1 Attention control	1	21	Std. Mean Difference (IV, Random, 95% CI)	0.36 [-0.52, 1.24]
2.5.2 Waitlist control	5	272	Std. Mean Difference (IV, Random, 95% CI)	0.38 [-0.03, 0.79]
2.5.3 No intervention control	5	324	Std. Mean Difference (IV, Random, 95% CI)	0.43 [0.17, 0.69]
2.5.4 Unspecified comparator	1	73	Std. Mean Difference (IV, Random, 95% CI)	0.84 [0.36, 1.32]
2.6 Resilience: short-term follow-up (≤ 3 months), subgroup analysis: setting	11	1325	Std. Mean Difference (IV, Random, 95% CI)	0.42 [0.17, 0.67]
2.6.1 Group setting	9	1267	Std. Mean Difference (IV, Random, 95% CI)	0.41 [0.15, 0.68]
2.6.2 Individual setting	1	32	Std. Mean Difference (IV, Random, 95% CI)	1.04 [0.28, 1.81]
2.6.3 Combined setting	1	26	Std. Mean Difference (IV, Random, 95% CI)	-0.17 [-0.94, 0.60]
2.7 Resilience: short-term follow-up (≤ 3 months), subgroup analysis: delivery format	11	1325	Std. Mean Difference (IV, Random, 95% CI)	0.42 [0.17, 0.67]
2.7.1 Face-to-face	8	1169	Std. Mean Difference (IV, Random, 95% CI)	0.45 [0.14, 0.77]
2.7.2 Combined delivery	3	156	Std. Mean Difference (IV, Random, 95% CI)	0.36 [-0.04, 0.76]
2.8 Resilience: short-term follow-up (≤ 3 months), subgroup analysis: intensity	11	1325	Std. Mean Difference (IV, Random, 95% CI)	0.42 [0.17, 0.67]
2.8.1 Low intensity	3	98	Std. Mean Difference (IV, Random, 95% CI)	0.53 [-0.14, 1.20]
2.8.2 Moderate intensity	1	733	Std. Mean Difference (IV, Random, 95% CI)	-0.05 [-0.20, 0.09]
2.8.3 High intensity	7	494	Std. Mean Difference (IV, Random, 95% CI)	0.46 [0.26, 0.66]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.9 Resilience: short-term follow-up (≤ 3 months), subgroup analysis: theoretical foundation	11	1325	Std. Mean Difference (IV, Random, 95% CI)	0.42 [0.17, 0.67]
2.9.1 Mindfulness-based	1	26	Std. Mean Difference (IV, Random, 95% CI)	1.05 [0.22, 1.88]
2.9.2 Attention and interpretation therapy	3	98	Std. Mean Difference (IV, Random, 95% CI)	0.53 [-0.14, 1.20]
2.9.3 Combination	6	468	Std. Mean Difference (IV, Random, 95% CI)	0.43 [0.24, 0.62]
2.9.4 Unspecific resilience training	1	733	Std. Mean Difference (IV, Random, 95% CI)	-0.05 [-0.20, 0.09]
2.10 Resilience: short-term follow-up (≤ 3 months), subgroup analysis: comparator	11	1325	Std. Mean Difference (IV, Random, 95% CI)	0.42 [0.17, 0.67]
2.10.1 Active control	1	40	Std. Mean Difference (IV, Random, 95% CI)	0.68 [0.04, 1.32]
2.10.2 Waitlist control	6	993	Std. Mean Difference (IV, Random, 95% CI)	0.40 [0.01, 0.80]
2.10.3 No intervention control	4	292	Std. Mean Difference (IV, Random, 95% CI)	0.41 [0.11, 0.71]
2.11 Depression: post-intervention, subgroup analysis: setting	14	788	Std. Mean Difference (IV, Random, 95% CI)	-0.29 [-0.50, -0.09]
2.11.1 Group setting	9	457	Std. Mean Difference (IV, Random, 95% CI)	-0.41 [-0.69, -0.13]
2.11.2 Individual setting	1	134	Std. Mean Difference (IV, Random, 95% CI)	-0.34 [-0.68, 0.01]
2.11.3 Combined setting	3	106	Std. Mean Difference (IV, Random, 95% CI)	0.19 [-0.32, 0.69]
2.11.4 Unclear setting	1	91	Std. Mean Difference (IV, Random, 95% CI)	-0.04 [-0.46, 0.38]
2.12 Depression: post-intervention, subgroup analysis: delivery format	14	788	Std. Mean Difference (IV, Random, 95% CI)	-0.29 [-0.50, -0.09]
2.12.1 Face-to-face	10	499	Std. Mean Difference (IV, Random, 95% CI)	-0.35 [-0.65, -0.05]
2.12.2 Combined delivery	3	198	Std. Mean Difference (IV, Random, 95% CI)	-0.27 [-0.55, 0.01]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.12.3 Unclear delivery format	1	91	Std. Mean Difference (IV, Random, 95% CI)	-0.04 [-0.46, 0.38]
2.13 Depression: post-intervention, subgroup analysis: intensity	14	788	Std. Mean Difference (IV, Random, 95% CI)	-0.29 [-0.50, -0.09]
2.13.1 Moderate intensity	6	395	Std. Mean Difference (IV, Random, 95% CI)	-0.23 [-0.47, 0.01]
2.13.2 High intensity	6	262	Std. Mean Difference (IV, Random, 95% CI)	-0.35 [-0.82, 0.11]
2.13.3 Unclear intensity	2	131	Std. Mean Difference (IV, Random, 95% CI)	-0.33 [-0.98, 0.32]
2.14 Depression: post-intervention, subgroup analysis: theoretical foundation	14	788	Std. Mean Difference (IV, Random, 95% CI)	-0.29 [-0.50, -0.09]
2.14.1 Mindfulness-based	3	83	Std. Mean Difference (IV, Random, 95% CI)	0.01 [-0.42, 0.45]
2.14.2 Cognitive behavioural therapy	1	134	Std. Mean Difference (IV, Random, 95% CI)	-0.34 [-0.68, 0.01]
2.14.3 Combination	6	293	Std. Mean Difference (IV, Random, 95% CI)	-0.44 [-0.87, -0.01]
2.14.4 Unspecific resilience training	4	278	Std. Mean Difference (IV, Random, 95% CI)	-0.22 [-0.53, 0.08]
2.15 Depression: post-intervention, subgroup analysis: comparator	14	788	Std. Mean Difference (IV, Random, 95% CI)	-0.29 [-0.50, -0.09]
2.15.1 Attention control	2	155	Std. Mean Difference (IV, Random, 95% CI)	-0.32 [-0.64, -0.00]
2.15.2 Active control	1	44	Std. Mean Difference (IV, Random, 95% CI)	-0.65 [-1.26, -0.04]
2.15.3 Treatment as usual	1	40	Std. Mean Difference (IV, Random, 95% CI)	-0.71 [-1.35, -0.07]
2.15.4 Waitlist control	4	215	Std. Mean Difference (IV, Random, 95% CI)	0.02 [-0.28, 0.32]
2.15.5 No intervention control	6	334	Std. Mean Difference (IV, Random, 95% CI)	-0.33 [-0.71, 0.05]
2.16 Stress or stress perception: post-intervention, subgroup analysis: setting	17	997	Std. Mean Difference (IV, Random, 95% CI)	-0.61 [-1.07, -0.15]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.16.1 Group setting	15	918	Std. Mean Difference (IV, Random, 95% CI)	-0.64 [-1.12, -0.15]
2.16.2 Combined setting	2	79	Std. Mean Difference (IV, Random, 95% CI)	-0.16 [-0.85, 0.52]
2.17 Stress or stress perception: post-intervention, subgroup analysis: delivery format	17	997	Std. Mean Difference (IV, Random, 95% CI)	-0.61 [-1.07, -0.15]
2.17.1 Face-to-face	14	838	Std. Mean Difference (IV, Random, 95% CI)	-0.70 [-1.26, -0.15]
2.17.2 Combined delivery	3	159	Std. Mean Difference (IV, Random, 95% CI)	-0.23 [-0.81, 0.35]
2.18 Stress or stress perception: post-intervention, subgroup analysis: intensity	17	997	Std. Mean Difference (IV, Random, 95% CI)	-0.61 [-1.07, -0.15]
2.18.1 Moderate intensity	6	307	Std. Mean Difference (IV, Random, 95% CI)	-0.83 [-2.24, 0.58]
2.18.2 High intensity	11	690	Std. Mean Difference (IV, Random, 95% CI)	-0.48 [-0.75, -0.20]
2.19 Stress or stress perception: post-intervention, subgroup analysis: theoretical foundation	17	997	Std. Mean Difference (IV, Random, 95% CI)	-0.61 [-1.07, -0.15]
2.19.1 Mindfulness-based	4	115	Std. Mean Difference (IV, Random, 95% CI)	-0.18 [-0.63, 0.28]
2.19.2 Combination	12	843	Std. Mean Difference (IV, Random, 95% CI)	-0.79 [-1.38, -0.20]
2.19.3 Unspecific resilience training	1	39	Std. Mean Difference (IV, Random, 95% CI)	-0.05 [-0.68, 0.58]
2.20 Stress or stress perception: post-intervention, subgroup analysis: comparator	17	997	Std. Mean Difference (IV, Random, 95% CI)	-0.61 [-1.07, -0.15]
2.20.1 Attention control	1	21	Std. Mean Difference (IV, Random, 95% CI)	-0.75 [-1.65, 0.15]
2.20.2 Active control	1	44	Std. Mean Difference (IV, Random, 95% CI)	-0.35 [-0.95, 0.25]
2.20.3 Waitlist control	6	316	Std. Mean Difference (IV, Random, 95% CI)	-0.43 [-0.91, 0.05]
2.20.4 No intervention control	9	616	Std. Mean Difference (IV, Random, 95% CI)	-0.74 [-1.51, 0.02]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.21 Stress or stress perception: short-term follow-up (≤ 3 months), subgroup analysis: setting	14	788	Std. Mean Difference (IV, Random, 95% CI)	-0.46 [-0.67, -0.25]
2.21.1 Group setting	12	730	Std. Mean Difference (IV, Random, 95% CI)	-0.44 [-0.67, -0.20]
2.21.2 Individual setting	1	32	Std. Mean Difference (IV, Random, 95% CI)	-0.92 [-1.68, -0.17]
2.21.3 Combined setting	1	26	Std. Mean Difference (IV, Random, 95% CI)	-0.46 [-1.24, 0.32]
2.22 Stress or stress perception: short-term follow-up (≤ 3 months), subgroup analysis: delivery format	14	788	Std. Mean Difference (IV, Random, 95% CI)	-0.46 [-0.67, -0.25]
2.22.1 Face-to-face	10	596	Std. Mean Difference (IV, Random, 95% CI)	-0.46 [-0.74, -0.18]
2.22.2 Combined delivery	4	192	Std. Mean Difference (IV, Random, 95% CI)	-0.49 [-0.78, -0.20]
2.23 Stress or stress perception: short-term follow-up (≤ 3 months), subgroup analysis: intensity	14	788	Std. Mean Difference (IV, Random, 95% CI)	-0.46 [-0.67, -0.25]
2.23.1 Low intensity	3	97	Std. Mean Difference (IV, Random, 95% CI)	-0.74 [-1.16, -0.32]
2.23.2 Moderate intensity	2	76	Std. Mean Difference (IV, Random, 95% CI)	-0.46 [-0.93, 0.01]
2.23.3 High intensity	9	615	Std. Mean Difference (IV, Random, 95% CI)	-0.40 [-0.68, -0.12]
2.24 Stress or stress perception: short-term follow-up (≤ 3 months), subgroup analysis: theoretical foundation	14	788	Std. Mean Difference (IV, Random, 95% CI)	-0.46 [-0.67, -0.25]
2.24.1 Mindfulness-based	1	26	Std. Mean Difference (IV, Random, 95% CI)	-1.13 [-1.97, -0.29]
2.24.2 Attention and interpretation therapy	3	97	Std. Mean Difference (IV, Random, 95% CI)	-0.74 [-1.16, -0.32]
2.24.3 Combination	9	626	Std. Mean Difference (IV, Random, 95% CI)	-0.34 [-0.60, -0.08]
2.24.4 Unspecific resilience training	1	39	Std. Mean Difference (IV, Random, 95% CI)	-0.69 [-1.34, -0.04]

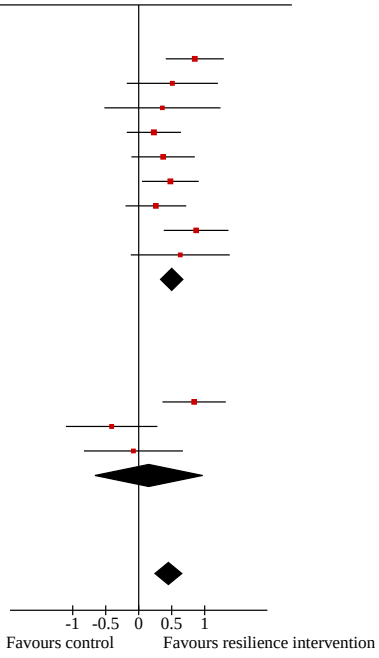
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.25 Stress or stress perception: short-term follow-up (≤ 3 months), subgroup analysis: comparator	14	788	Std. Mean Difference (IV, Random, 95% CI)	-0.46 [-0.67, -0.25]
2.25.1 Active control	1	39	Std. Mean Difference (IV, Random, 95% CI)	-0.80 [-1.45, -0.14]
2.25.2 Waitlist control	5	260	Std. Mean Difference (IV, Random, 95% CI)	-0.71 [-0.96, -0.45]
2.25.3 No intervention control	8	489	Std. Mean Difference (IV, Random, 95% CI)	-0.28 [-0.55, -0.01]
2.26 Well-being or quality of life: post-intervention, subgroup analysis: setting	13	1494	Std. Mean Difference (IV, Random, 95% CI)	0.14 [-0.01, 0.30]
2.26.1 Group setting	11	718	Std. Mean Difference (IV, Random, 95% CI)	0.19 [0.01, 0.37]
2.26.2 Combined setting	2	776	Std. Mean Difference (IV, Random, 95% CI)	-0.02 [-0.17, 0.13]
2.27 Well-being or quality of life: post-intervention, subgroup analysis: delivery format	13	1494	Std. Mean Difference (IV, Random, 95% CI)	0.14 [-0.01, 0.30]
2.27.1 Face-to-face	10	1335	Std. Mean Difference (IV, Random, 95% CI)	0.04 [-0.07, 0.16]
2.27.2 Combined delivery	3	159	Std. Mean Difference (IV, Random, 95% CI)	0.40 [-0.16, 0.95]
2.28 Well-being or quality of life: post-intervention, subgroup analysis: intensity	13	1494	Std. Mean Difference (IV, Random, 95% CI)	0.14 [-0.01, 0.30]
2.28.1 Moderate intensity	4	210	Std. Mean Difference (IV, Random, 95% CI)	0.34 [-0.16, 0.84]
2.28.2 High intensity	9	1284	Std. Mean Difference (IV, Random, 95% CI)	0.06 [-0.06, 0.17]
2.29 Well-being or quality of life: post-intervention, subgroup analysis: theoretical foundation	13	1494	Std. Mean Difference (IV, Random, 95% CI)	0.14 [-0.01, 0.30]
2.29.1 Mindfulness-based	2	66	Std. Mean Difference (IV, Random, 95% CI)	0.83 [0.32, 1.33]
2.29.2 Coaching	1	730	Std. Mean Difference (IV, Random, 95% CI)	-0.02 [-0.17, 0.13]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.29.3 Combination	9	591	Std. Mean Difference (IV, Random, 95% CI)	0.14 [-0.03, 0.31]
2.29.4 Unspecific resilience training	1	107	Std. Mean Difference (IV, Random, 95% CI)	0.00 [-0.38, 0.38]
2.30 Well-being or quality of life: post-intervention, subgroup analysis: comparator	13	1494	Std. Mean Difference (IV, Random, 95% CI)	0.14 [-0.01, 0.30]
2.30.1 Active control	1	730	Std. Mean Difference (IV, Random, 95% CI)	-0.02 [-0.17, 0.13]
2.30.2 Waitlist control	5	309	Std. Mean Difference (IV, Random, 95% CI)	0.41 [0.03, 0.79]
2.30.3 No intervention control	7	455	Std. Mean Difference (IV, Random, 95% CI)	0.10 [-0.09, 0.28]
2.31 Well-being or quality of life: short-term follow-up (≤ 3 months), subgroup analysis: setting	12	1413	Std. Mean Difference (IV, Random, 95% CI)	0.07 [-0.04, 0.18]
2.31.1 Group setting	10	1355	Std. Mean Difference (IV, Random, 95% CI)	0.05 [-0.06, 0.16]
2.31.2 Individual setting	1	32	Std. Mean Difference (IV, Random, 95% CI)	0.62 [-0.12, 1.36]
2.31.3 Combined setting	1	26	Std. Mean Difference (IV, Random, 95% CI)	0.00 [-0.77, 0.77]
2.32 Well-being or quality of life: short-term follow-up (≤ 3 months), subgroup analysis: delivery format	12	1413	Std. Mean Difference (IV, Random, 95% CI)	0.07 [-0.04, 0.18]
2.32.1 Face-to-face	9	1260	Std. Mean Difference (IV, Random, 95% CI)	0.09 [-0.06, 0.23]
2.32.2 Combined delivery	3	153	Std. Mean Difference (IV, Random, 95% CI)	0.21 [-0.11, 0.52]
2.33 Well-being or quality of life: short-term follow-up (≤ 3 months), subgroup analysis: intensity	12	1413	Std. Mean Difference (IV, Random, 95% CI)	0.07 [-0.04, 0.18]
2.33.1 Low intensity	2	58	Std. Mean Difference (IV, Random, 95% CI)	0.32 [-0.29, 0.93]
2.33.2 Moderate intensity	3	850	Std. Mean Difference (IV, Random, 95% CI)	0.15 [-0.23, 0.53]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.33.3 High intensity	7	505	Std. Mean Difference (IV, Random, 95% CI)	0.12 [-0.06, 0.29]
2.34 Well-being or quality of life: short-term follow-up (≤ 3 months), subgroup analysis: theoretical foundation	12	1413	Std. Mean Difference (IV, Random, 95% CI)	0.07 [-0.04, 0.18]
2.34.1 Attention and interpretation therapy	2	58	Std. Mean Difference (IV, Random, 95% CI)	0.32 [-0.29, 0.93]
2.34.2 Combination	8	542	Std. Mean Difference (IV, Random, 95% CI)	0.12 [-0.05, 0.28]
2.34.3 Unspecific resilience training	2	813	Std. Mean Difference (IV, Random, 95% CI)	0.19 [-0.35, 0.73]
2.35 Well-being or quality of life: short-term follow-up (≤ 3 months), subgroup analysis: comparator	12	1413	Std. Mean Difference (IV, Random, 95% CI)	0.07 [-0.04, 0.18]
2.35.1 Waitlist control	4	881	Std. Mean Difference (IV, Random, 95% CI)	0.13 [-0.15, 0.42]
2.35.2 Treatment as usual	1	80	Std. Mean Difference (IV, Random, 95% CI)	0.51 [0.07, 0.95]
2.35.3 No intervention control	7	452	Std. Mean Difference (IV, Random, 95% CI)	0.08 [-0.11, 0.26]

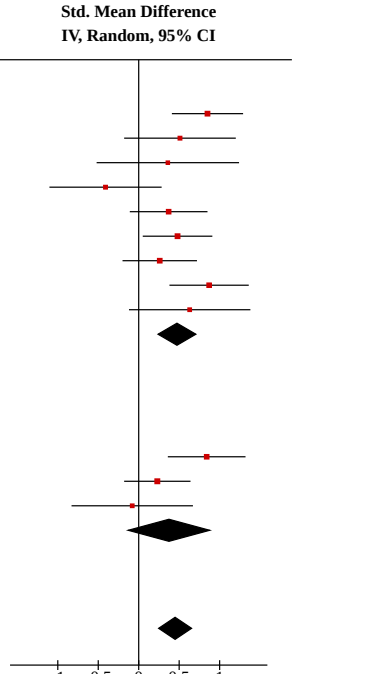
Analysis 2.1. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 1: Resilience: post-intervention, subgroup analysis: setting

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.1.1 Group setting						
Bernburg 2019	0	0.2245	44	42	10.7%	0.85 [0.41 , 1.29]
Klatt 2015	0	0.352	17	17	6.2%	0.51 [-0.18 , 1.20]
Lebares 2018	0	0.449	12	9	4.3%	0.36 [-0.52 , 1.24]
Lin 2019	0	0.2092	44	46	11.5%	0.23 [-0.18 , 0.64]
Mache 2015a	0	0.2449	35	33	9.8%	0.37 [-0.11 , 0.85]
Mache 2015b	0	0.2194	42	43	10.9%	0.48 [0.05 , 0.91]
Mache 2016	0	0.2347	37	35	10.2%	0.26 [-0.20 , 0.72]
Mache 2017	0	0.25	37	35	9.6%	0.87 [0.38 , 1.36]
Schroeder 2016	0	0.3827	15	14	5.5%	0.63 [-0.12 , 1.38]
Subtotal (95% CI)			**283**	**274**	**78.6%**	**0.50 [0.33 , 0.67]**
Heterogeneity: Tau² = 0.00; Chi² = 7.84, df = 8 (P = 0.45); I² = 0%						
Test for overall effect: Z = 5.79 (P < 0.00001)						
2.1.2 Combined setting						
Khoshnazary 2016	0	0.2449	35	38	9.8%	0.84 [0.36 , 1.32]
Loiselle 2018	0	0.3537	15	18	6.1%	-0.41 [-1.10 , 0.28]
Mealer 2014	0	0.3827	13	14	5.5%	-0.08 [-0.83 , 0.67]
Subtotal (95% CI)			**63**	**70**	**21.4%**	**0.15 [-0.66 , 0.97]**
Heterogeneity: Tau² = 0.41; Chi² = 9.86, df = 2 (P = 0.007); I² = 80%						
Test for overall effect: Z = 0.36 (P = 0.72)						
Total (95% CI)			**346**	**344**	**100.0%**	**0.45 [0.25 , 0.65]**
Heterogeneity: Tau² = 0.05; Chi² = 18.49, df = 11 (P = 0.07); I² = 41%						
Test for overall effect: Z = 4.33 (P < 0.0001)						
Test for subgroup differences: Chi² = 0.68, df = 1 (P = 0.41), I² = 0%						

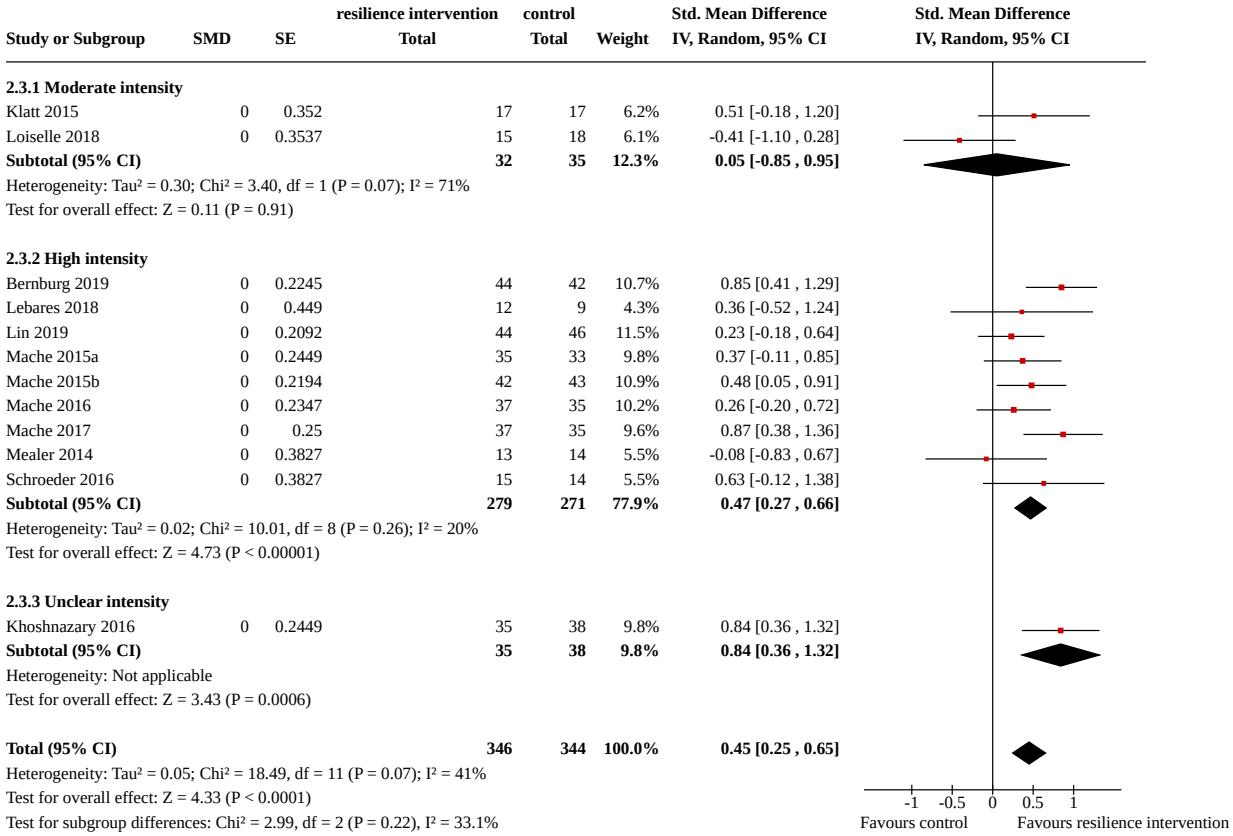


Analysis 2.2. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 2: Resilience: post-intervention, subgroup analysis: delivery format

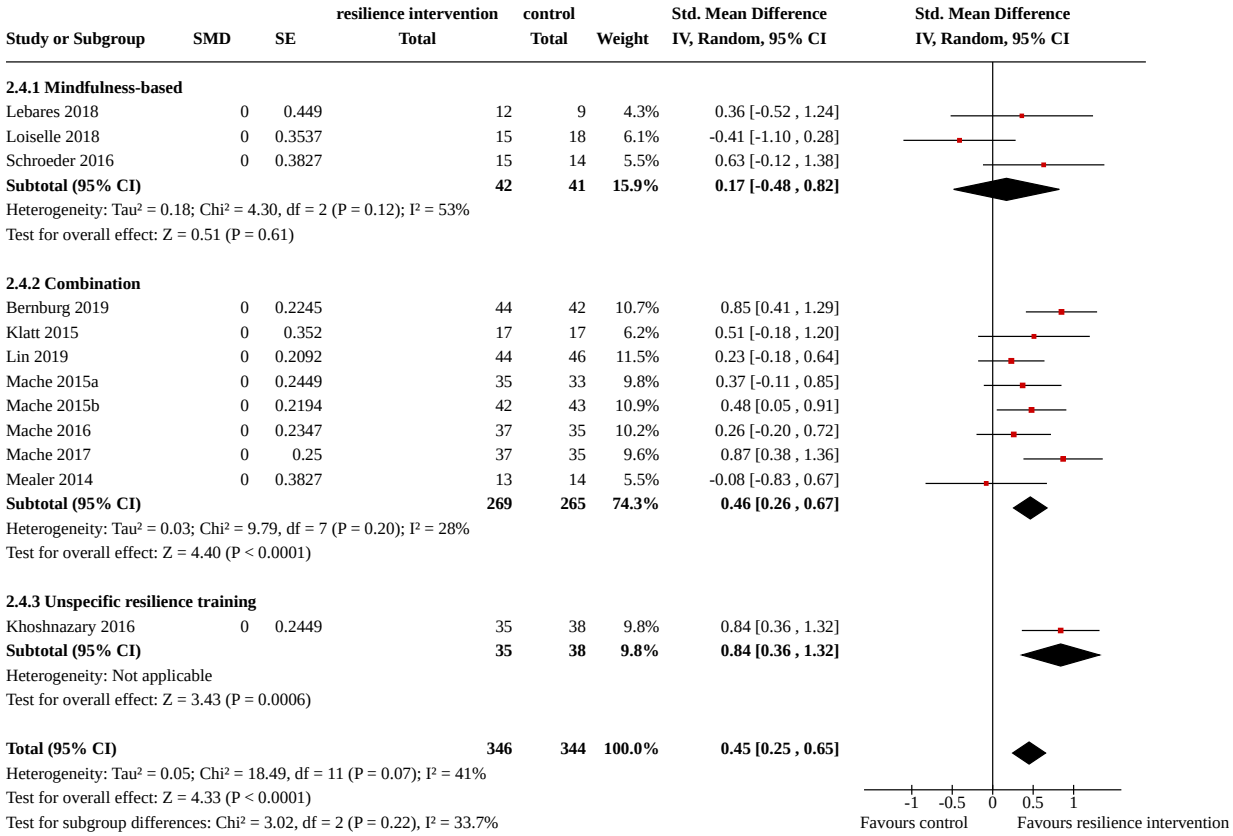
Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.2.1 Face-to-face						
Bernburg 2019	0	0.2245	44	42	10.7%	0.85 [0.41 , 1.29]
Klatt 2015	0	0.352	17	17	6.2%	0.51 [-0.18 , 1.20]
Lebares 2018	0	0.449	12	9	4.3%	0.36 [-0.52 , 1.24]
Loiselle 2018	0	0.3537	15	18	6.1%	-0.41 [-1.10 , 0.28]
Mache 2015a	0	0.2449	35	33	9.8%	0.37 [-0.11 , 0.85]
Mache 2015b	0	0.2194	42	43	10.9%	0.48 [0.05 , 0.91]
Mache 2016	0	0.2347	37	35	10.2%	0.26 [-0.20 , 0.72]
Mache 2017	0	0.25	37	35	9.6%	0.87 [0.38 , 1.36]
Schroeder 2016	0	0.3827	15	14	5.5%	0.63 [-0.12 , 1.38]
Subtotal (95% CI)			**254**	**246**	**73.3%**	**0.47 [0.24 , 0.71]**
Heterogeneity: Tau² = 0.05; Chi² = 12.78, df = 8 (P = 0.12); I² = 37%						
Test for overall effect: Z = 3.97 (P < 0.0001)						
2.2.2 Combined delivery						
Khoshnazary 2016	0	0.2449	35	38	9.8%	0.84 [0.36 , 1.32]
Lin 2019	0	0.2092	44	46	11.5%	0.23 [-0.18 , 0.64]
Mealer 2014	0	0.3827	13	14	5.5%	-0.08 [-0.83 , 0.67]
Subtotal (95% CI)			**92**	**98**	**26.7%**	**0.37 [-0.13 , 0.88]**
Heterogeneity: Tau² = 0.12; Chi² = 5.46, df = 2 (P = 0.07); I² = 63%						
Test for overall effect: Z = 1.46 (P = 0.15)						
Total (95% CI)			**346**	**344**	**100.0%**	**0.45 [0.25 , 0.65]**
Heterogeneity: Tau² = 0.05; Chi² = 18.49, df = 11 (P = 0.07); I² = 41%						
Test for overall effect: Z = 4.33 (P < 0.0001)						
Test for subgroup differences: Chi² = 0.12, df = 1 (P = 0.73), I² = 0%						



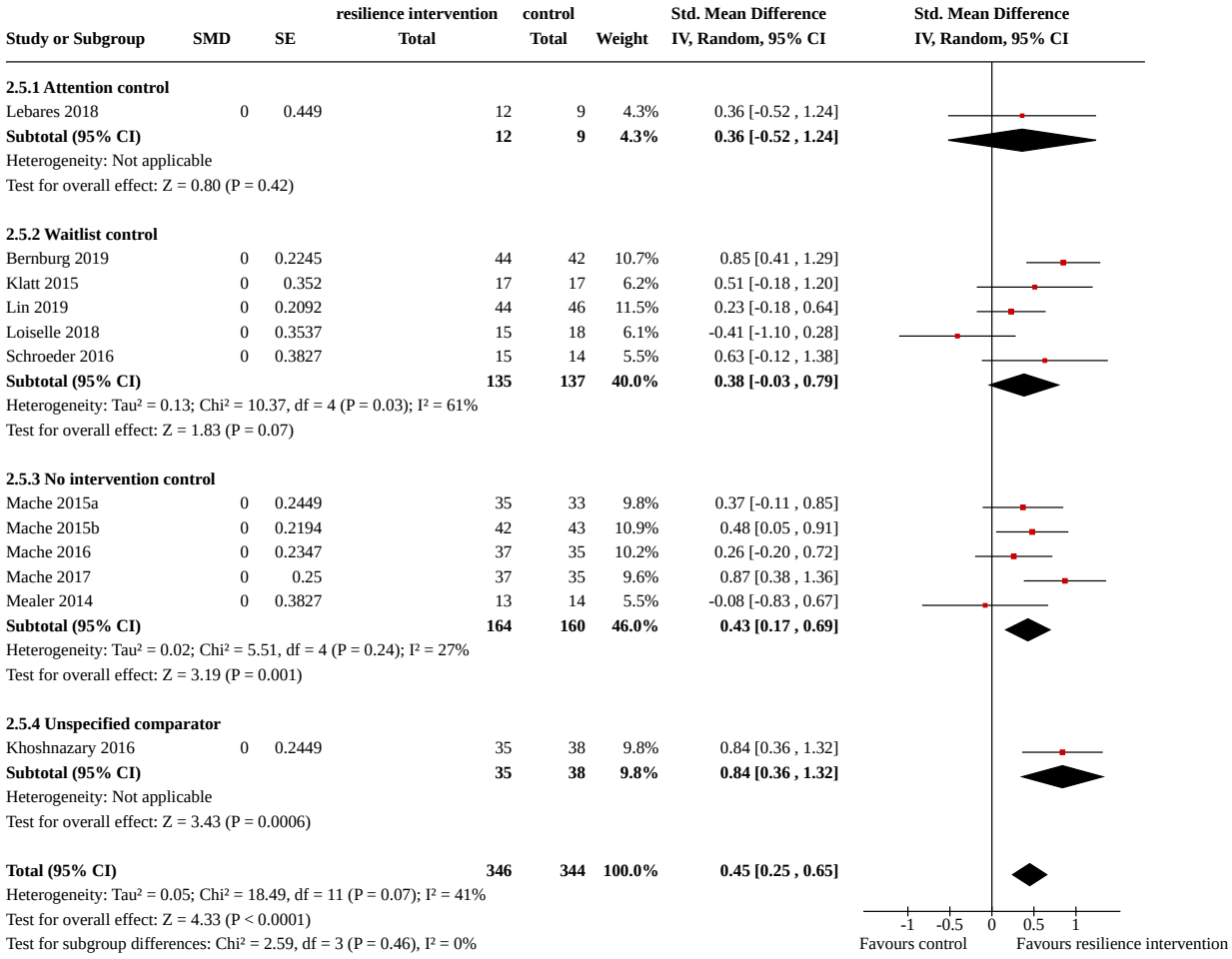
Analysis 2.3. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 3: Resilience: post-intervention, subgroup analysis: intensity



Analysis 2.4. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 4: Resilience: post-intervention, subgroup analysis: theoretical foundation

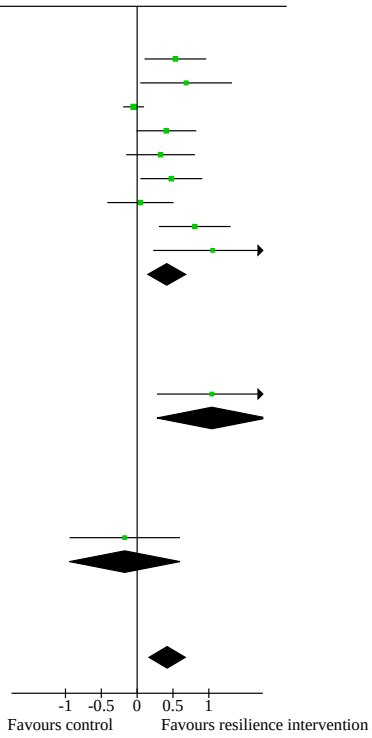


Analysis 2.5. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 5: Resilience: post-intervention, subgroup analysis: comparator



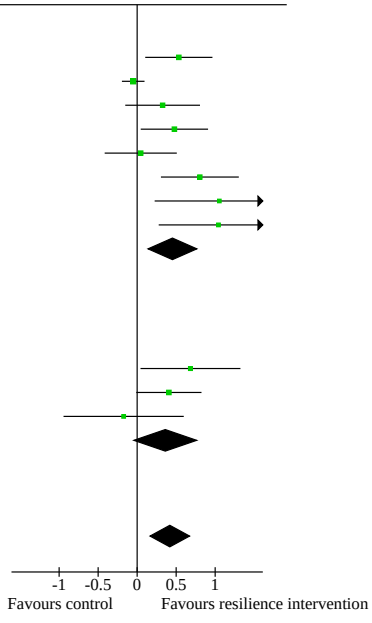
Analysis 2.6. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 6: Resilience: short-term follow-up (≤ 3 months), subgroup analysis: setting

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.6.1 Group setting								
Bernburg 2019	3.01	0.5	44	2.71	0.61	42	10.3%	0.53 [0.10 , 0.96]
Chesak 2015	79.74	11.82	19	72.52	8.83	21	7.6%	0.68 [0.04 , 1.32]
Cheung 2014	2.42	0.63	364	2.45	0.56	369	14.1%	-0.05 [-0.20 , 0.09]
Lin 2019	59.7	11.87	44	53.85	16.21	46	10.5%	0.41 [-0.01 , 0.82]
Mache 2015a	61	17.4	35	55.3	17.1	33	9.7%	0.33 [-0.15 , 0.81]
Mache 2015b	61.5	17.9	42	52.9	17.8	43	10.3%	0.48 [0.05 , 0.91]
Mache 2016	57.2	17.2	37	56.4	17.2	35	9.9%	0.05 [-0.42 , 0.51]
Mache 2017	4.1	0.71	33	3.51	0.74	34	9.4%	0.80 [0.30 , 1.30]
Schroeder 2016	24.15	5.47	13	18.28	5.32	13	5.7%	1.05 [0.22 , 1.88]
Subtotal (95% CI)			**631**			**636**	**87.5%**	**0.41 [0.15 , 0.68]**
Heterogeneity: Tau² = 0.10; Chi² = 28.54, df = 8 (P = 0.0004); I² = 72%								
Test for overall effect: Z = 3.07 (P = 0.002)								
2.6.2 Individual setting								
Sood 2011	79.4	11.3	20	67.2	11.6	12	6.3%	1.04 [0.28 , 1.81]
Subtotal (95% CI)			**20**			**12**	**6.3%**	**1.04 [0.28 , 1.81]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 2.67 (P = 0.008)								
2.6.3 Combined setting								
Sood 2014	73	11.5	13	74.8	8.4	13	6.2%	-0.17 [-0.94 , 0.60]
Subtotal (95% CI)			**13**			**13**	**6.2%**	**-0.17 [-0.94 , 0.60]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 0.44 (P = 0.66)								
Total (95% CI)			**664**			**661**	**100.0%**	**0.42 [0.17 , 0.67]**
Heterogeneity: Tau² = 0.11; Chi² = 34.27, df = 10 (P = 0.0002); I² = 71%								
Test for overall effect: Z = 3.24 (P = 0.001)								
Test for subgroup differences: Chi² = 4.81, df = 2 (P = 0.09), I² = 58.5%								



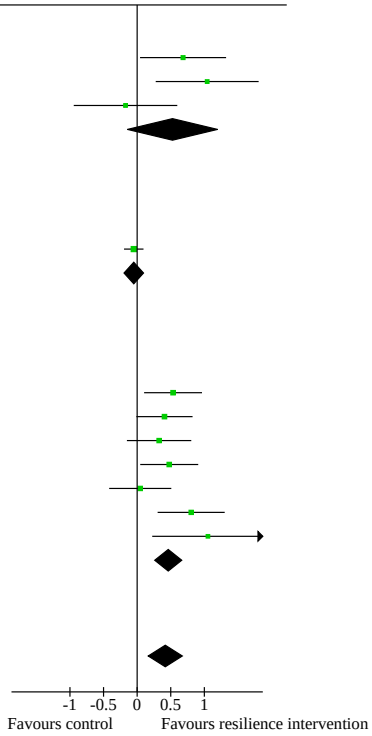
Analysis 2.7. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 7: Resilience: short-term follow-up (≤ 3 months), subgroup analysis: delivery format

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.7.1 Face-to-face								
Bernburg 2019	3.01	0.5	44	2.71	0.61	42	10.3%	0.53 [0.10 , 0.96]
Cheung 2014	2.42	0.63	364	2.45	0.56	369	14.1%	-0.05 [-0.20 , 0.09]
Mache 2015a	61	17.4	35	55.3	17.1	33	9.7%	0.33 [-0.15 , 0.81]
Mache 2015b	61.5	17.9	42	52.9	17.8	43	10.3%	0.48 [0.05 , 0.91]
Mache 2016	57.2	17.2	37	56.4	17.2	35	9.9%	0.05 [-0.42 , 0.51]
Mache 2017	4.1	0.71	33	3.51	0.74	34	9.4%	0.80 [0.30 , 1.30]
Schroeder 2016	24.15	5.47	13	18.28	5.32	13	5.7%	1.05 [0.22 , 1.88]
Sood 2011	79.4	11.3	20	67.2	11.6	12	6.3%	1.04 [0.28 , 1.81]
Subtotal (95% CI)			**588**			**581**	**75.6%**	**0.45 [0.14 , 0.77]**
Heterogeneity: Tau² = 0.14; Chi² = 29.71, df = 7 (P = 0.0001); I² = 76%								
Test for overall effect: Z = 2.84 (P = 0.005)								
2.7.2 Combined delivery								
Chesak 2015	79.74	11.82	19	72.52	8.83	21	7.6%	0.68 [0.04 , 1.32]
Lin 2019	59.7	11.87	44	53.85	16.21	46	10.5%	0.41 [-0.01 , 0.82]
Sood 2014	73	11.5	13	74.8	8.4	13	6.2%	-0.17 [-0.94 , 0.60]
Subtotal (95% CI)			**76**			**80**	**24.4%**	**0.36 [-0.04 , 0.76]**
Heterogeneity: Tau² = 0.04; Chi² = 2.86, df = 2 (P = 0.24); I² = 30%								
Test for overall effect: Z = 1.76 (P = 0.08)								
Total (95% CI)			**664**			**661**	**100.0%**	**0.42 [0.17 , 0.67]**
Heterogeneity: Tau² = 0.11; Chi² = 34.27, df = 10 (P = 0.0002); I² = 71%								
Test for overall effect: Z = 3.24 (P = 0.001)								
Test for subgroup differences: Chi² = 0.12, df = 1 (P = 0.72), I² = 0%								



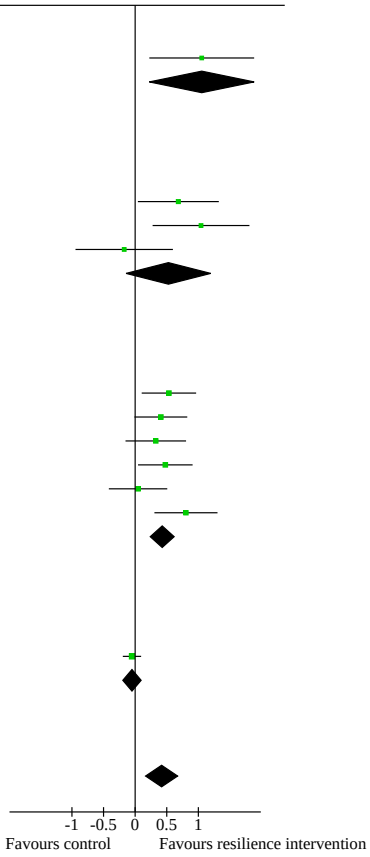
Analysis 2.8. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 8: Resilience: short-term follow-up (≤ 3 months), subgroup analysis: intensity

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.8.1 Low intensity								
Chesak 2015	79.74	11.82	19	72.52	8.83	21	7.6%	0.68 [0.04 , 1.32]
Sood 2011	79.4	11.3	20	67.2	11.6	12	6.3%	1.04 [0.28 , 1.81]
Sood 2014	73	11.5	13	74.8	8.4	13	6.2%	-0.17 [-0.94 , 0.60]
Subtotal (95% CI)			**52**			**46**	**20.1%**	**0.53 [-0.14 , 1.20]**
Heterogeneity: Tau² = 0.21; Chi² = 5.14, df = 2 (P = 0.08); I² = 61%								
Test for overall effect: Z = 1.54 (P = 0.12)								
2.8.2 Moderate intensity								
Cheung 2014	2.42	0.63	364	2.45	0.56	369	14.1%	-0.05 [-0.20 , 0.09]
Subtotal (95% CI)			**364**			**369**	**14.1%**	**-0.05 [-0.20 , 0.09]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 0.68 (P = 0.50)								
2.8.3 High intensity								
Bernburg 2019	3.01	0.5	44	2.71	0.61	42	10.3%	0.53 [0.10 , 0.96]
Lin 2019	59.7	11.87	44	53.85	16.21	46	10.5%	0.41 [-0.01 , 0.82]
Mache 2015a	61	17.4	35	55.3	17.1	33	9.7%	0.33 [-0.15 , 0.81]
Mache 2015b	61.5	17.9	42	52.9	17.8	43	10.3%	0.48 [0.05 , 0.91]
Mache 2016	57.2	17.2	37	56.4	17.2	35	9.9%	0.05 [-0.42 , 0.51]
Mache 2017	4.1	0.71	33	3.51	0.74	34	9.4%	0.80 [0.30 , 1.30]
Schroeder 2016	24.15	5.47	13	18.28	5.32	13	5.7%	1.05 [0.22 , 1.88]
Subtotal (95% CI)			**248**			**246**	**65.8%**	**0.46 [0.26 , 0.66]**
Heterogeneity: Tau² = 0.01; Chi² = 7.35, df = 6 (P = 0.29); I² = 18%								
Test for overall effect: Z = 4.52 (P < 0.00001)								
Total (95% CI)			**664**			**661**	**100.0%**	**0.42 [0.17 , 0.67]**
Heterogeneity: Tau² = 0.11; Chi² = 34.27, df = 10 (P = 0.0002); I² = 71%								
Test for overall effect: Z = 3.24 (P = 0.001)								
Test for subgroup differences: Chi² = 17.84, df = 2 (P = 0.0001), I² = 88.8%								



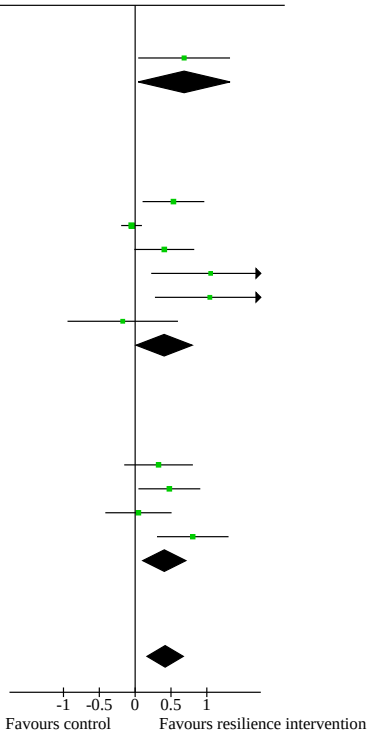
Analysis 2.9. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 9: Resilience: short-term follow-up (≤ 3 months), subgroup analysis: theoretical foundation

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.9.1 Mindfulness-based								
Schroeder 2016	24.15	5.47	13	18.28	5.32	13	5.7%	1.05 [0.22 , 1.88]
Subtotal (95% CI)			**13**			**13**	**5.7%**	**1.05 [0.22 , 1.88]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 2.49 (P = 0.01)								
2.9.2 Attention and interpretation therapy								
Chesak 2015	79.74	11.82	19	72.52	8.83	21	7.6%	0.68 [0.04 , 1.32]
Sood 2011	79.4	11.3	20	67.2	11.6	12	6.3%	1.04 [0.28 , 1.81]
Sood 2014	73	11.5	13	74.8	8.4	13	6.2%	-0.17 [-0.94 , 0.60]
Subtotal (95% CI)			**52**			**46**	**20.1%**	**0.53 [-0.14 , 1.20]**
Heterogeneity: Tau² = 0.21; Chi² = 5.14, df = 2 (P = 0.08); I² = 61%								
Test for overall effect: Z = 1.54 (P = 0.12)								
2.9.3 Combination								
Bernburg 2019	3.01	0.5	44	2.71	0.61	42	10.3%	0.53 [0.10 , 0.96]
Lin 2019	59.7	11.87	44	53.85	16.21	46	10.5%	0.41 [-0.01 , 0.82]
Mache 2015a	61	17.4	35	55.3	17.1	33	9.7%	0.33 [-0.15 , 0.81]
Mache 2015b	61.5	17.9	42	52.9	17.8	43	10.3%	0.48 [0.05 , 0.91]
Mache 2016	57.2	17.2	37	56.4	17.2	35	9.9%	0.05 [-0.42 , 0.51]
Mache 2017	4.1	0.71	33	3.51	0.74	34	9.4%	0.80 [0.30 , 1.30]
Subtotal (95% CI)			**235**			**233**	**60.1%**	**0.43 [0.24 , 0.62]**
Heterogeneity: Tau² = 0.00; Chi² = 5.27, df = 5 (P = 0.38); I² = 5%								
Test for overall effect: Z = 4.44 (P < 0.00001)								
2.9.4 Unspecific resilience training								
Cheung 2014	2.42	0.63	364	2.45	0.56	369	14.1%	-0.05 [-0.20 , 0.09]
Subtotal (95% CI)			**364**			**369**	**14.1%**	**-0.05 [-0.20 , 0.09]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 0.68 (P = 0.50)								
Total (95% CI)			**664**			**661**	**100.0%**	**0.42 [0.17 , 0.67]**
Heterogeneity: Tau² = 0.11; Chi² = 34.27, df = 10 (P = 0.0002); I² = 71%								
Test for overall effect: Z = 3.24 (P = 0.001)								
Test for subgroup differences: Chi² = 21.43, df = 3 (P < 0.0001), I² = 86.0%								



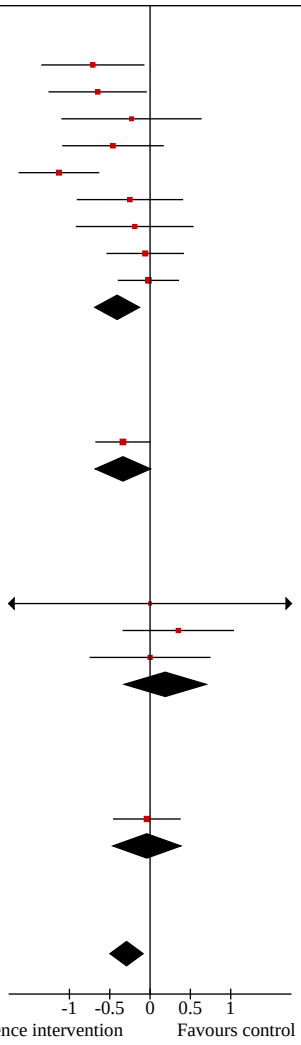
Analysis 2.10. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 10: Resilience: short-term follow-up (≤ 3 months), subgroup analysis: comparator

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.10.1 Active control								
Chesak 2015	79.74	11.82	19	72.52	8.83	21	7.6%	0.68 [0.04 , 1.32]
Subtotal (95% CI)			**19**			**21**	**7.6%**	**0.68 [0.04 , 1.32]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 2.09 (P = 0.04)								
2.10.2 Waitlist control								
Bernburg 2019	3.01	0.5	44	2.71	0.61	42	10.3%	0.53 [0.10 , 0.96]
Cheung 2014	2.42	0.63	364	2.45	0.56	369	14.1%	-0.05 [-0.20 , 0.09]
Lin 2019	59.7	11.87	44	53.85	16.21	46	10.5%	0.41 [-0.01 , 0.82]
Schroeder 2016	24.15	5.47	13	18.28	5.32	13	5.7%	1.05 [0.22 , 1.88]
Sood 2011	79.4	11.3	20	67.2	11.6	12	6.3%	1.04 [0.28 , 1.81]
Sood 2014	73	11.5	13	74.8	8.4	13	6.2%	-0.17 [-0.94 , 0.60]
Subtotal (95% CI)			**498**			**495**	**53.2%**	**0.40 [0.01 , 0.80]**
Heterogeneity: Tau² = 0.16; Chi² = 21.48, df = 5 (P = 0.0007); I² = 77%								
Test for overall effect: Z = 2.03 (P = 0.04)								
2.10.3 No intervention control								
Mache 2015a	61	17.4	35	55.3	17.1	33	9.7%	0.33 [-0.15 , 0.81]
Mache 2015b	61.5	17.9	42	52.9	17.8	43	10.3%	0.48 [0.05 , 0.91]
Mache 2016	57.2	17.2	37	56.4	17.2	35	9.9%	0.05 [-0.42 , 0.51]
Mache 2017	4.1	0.71	33	3.51	0.74	34	9.4%	0.80 [0.30 , 1.30]
Subtotal (95% CI)			**147**			**145**	**39.2%**	**0.41 [0.11 , 0.71]**
Heterogeneity: Tau² = 0.04; Chi² = 4.98, df = 3 (P = 0.17); I² = 40%								
Test for overall effect: Z = 2.65 (P = 0.008)								
Total (95% CI)			**664**			**661**	**100.0%**	**0.42 [0.17 , 0.67]**
Heterogeneity: Tau² = 0.11; Chi² = 34.27, df = 10 (P = 0.0002); I² = 71%								
Test for overall effect: Z = 3.24 (P = 0.001)								
Test for subgroup differences: Chi² = 0.63, df = 2 (P = 0.73), I² = 0%								



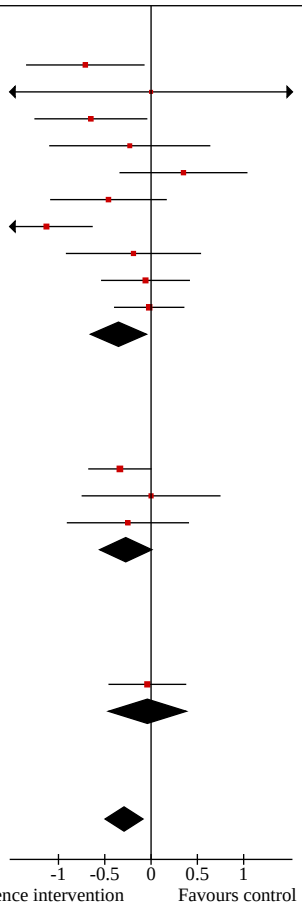
Analysis 2.11. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 11: Depression: post-intervention, subgroup analysis: setting

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.11.1 Group setting						
Alexander 2015	0	0.3265	20	20	6.6%	-0.71 [-1.35 , -0.07]
Ireland 2017	0	0.3112	23	21	7.0%	-0.65 [-1.26 , -0.04]
Lebares 2018	0	0.4439	12	9	4.3%	-0.23 [-1.10 , 0.64]
Luthar 2017	0	0.3214	21	19	6.7%	-0.46 [-1.09 , 0.17]
Mache 2017	0	0.2551	37	35	8.8%	-1.13 [-1.63 , -0.63]
Mistretta 2018	0	0.3367	22	15	6.3%	-0.25 [-0.91 , 0.41]
Schroeder 2016	0	0.3725	15	14	5.5%	-0.19 [-0.92 , 0.54]
West 2014	0	0.2449	34	33	9.2%	-0.06 [-0.54 , 0.42]
West 2015	0	0.1939	51	56	11.4%	-0.02 [-0.40 , 0.36]
Subtotal (95% CI)			**235**	**222**	**65.9%**	**-0.41 [-0.69 , -0.13]**
Heterogeneity: Tau² = 0.09; Chi² = 16.16, df = 8 (P = 0.04); I² = 50%						
Test for overall effect: Z = 2.90 (P = 0.004)						
2.11.2 Individual setting						
Cieslak 2016	0	0.1745	72	62	12.3%	-0.34 [-0.68 , 0.01]
Subtotal (95% CI)			**72**	**62**	**12.3%**	**-0.34 [-0.68 , 0.01]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 1.93 (P = 0.05)						
2.11.3 Combined setting						
Calder Calisi 2017	0	3.366	24	22	0.1%	0.00 [-6.60 , 6.60]
Loiselle 2018	0	0.3526	15	18	6.0%	0.35 [-0.34 , 1.04]
Mealer 2014	0	0.3827	13	14	5.3%	0.00 [-0.75 , 0.75]
Subtotal (95% CI)			**52**	**54**	**11.4%**	**0.19 [-0.32 , 0.69]**
Heterogeneity: Tau² = 0.00; Chi² = 0.46, df = 2 (P = 0.80); I² = 0%						
Test for overall effect: Z = 0.73 (P = 0.47)						
2.11.4 Unclear setting						
Medisauskaite 2019	0	0.2143	39	52	10.4%	-0.04 [-0.46 , 0.38]
Subtotal (95% CI)			**39**	**52**	**10.4%**	**-0.04 [-0.46 , 0.38]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 0.19 (P = 0.85)						
Total (95% CI)			**398**	**390**	**100.0%**	**-0.29 [-0.50 , -0.09]**
Heterogeneity: Tau² = 0.06; Chi² = 22.34, df = 13 (P = 0.05); I² = 42%						
Test for overall effect: Z = 2.80 (P = 0.005)						
Test for subgroup differences: Chi² = 5.34, df = 3 (P = 0.15), I² = 43.9%						

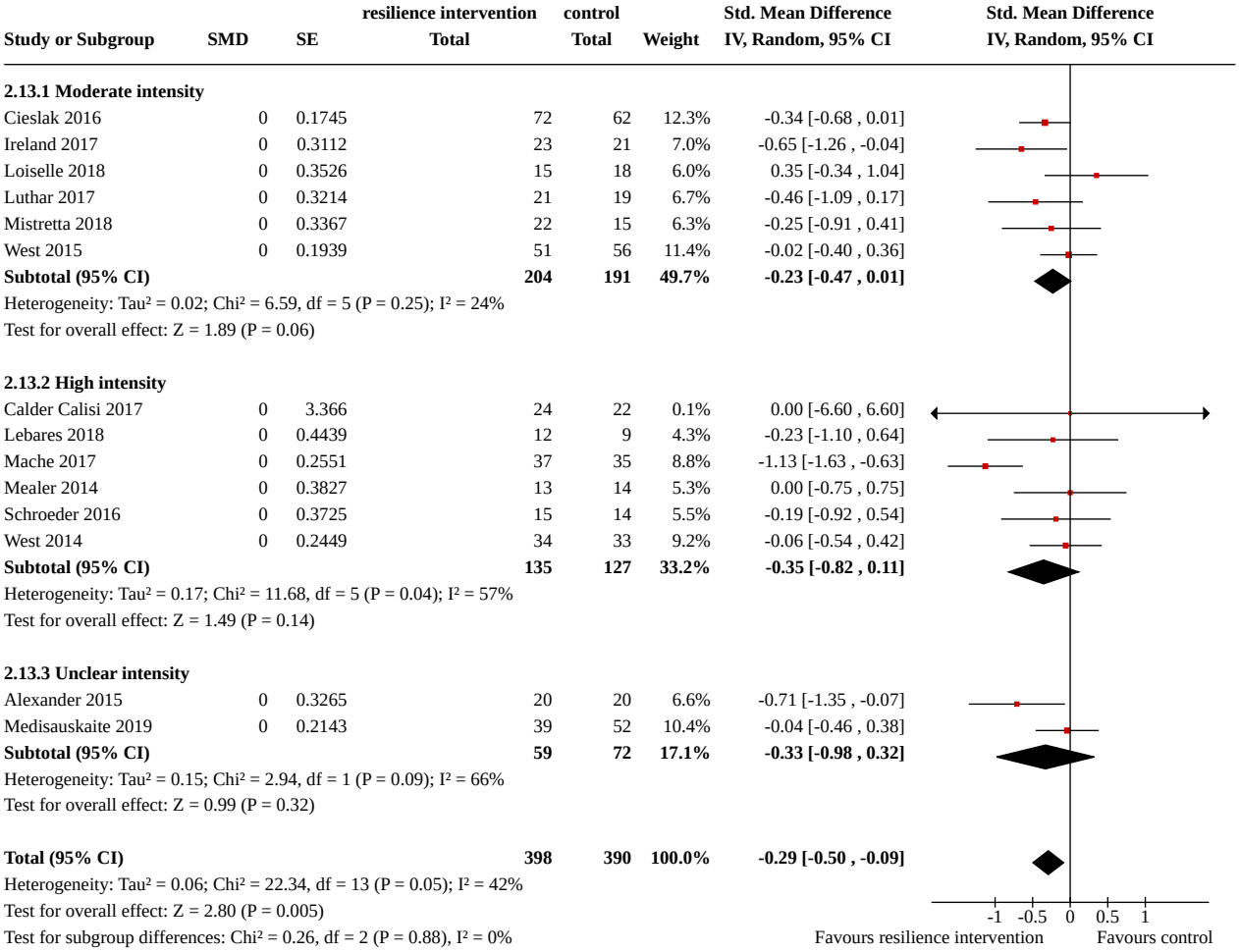


Analysis 2.12. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 12: Depression: post-intervention, subgroup analysis: delivery format

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.12.1 Face-to-face						
Alexander 2015	0	0.3265	20	20	6.6%	-0.71 [-1.35 , -0.07]
Calder Calisi 2017	0	3.366	24	22	0.1%	0.00 [-6.60 , 6.60]
Ireland 2017	0	0.3112	23	21	7.0%	-0.65 [-1.26 , -0.04]
Lebares 2018	0	0.4439	12	9	4.3%	-0.23 [-1.10 , 0.64]
Loiselle 2018	0	0.3526	15	18	6.0%	0.35 [-0.34 , 1.04]
Luthar 2017	0	0.3214	21	19	6.7%	-0.46 [-1.09 , 0.17]
Mache 2017	0	0.2551	37	35	8.8%	-1.13 [-1.63 , -0.63]
Schroeder 2016	0	0.3725	15	14	5.5%	-0.19 [-0.92 , 0.54]
West 2014	0	0.2449	34	33	9.2%	-0.06 [-0.54 , 0.42]
West 2015	0	0.1939	51	56	11.4%	-0.02 [-0.40 , 0.36]
Subtotal (95% CI)			**252**	**247**	**65.6%**	**-0.35 [-0.65 , -0.05]**
Heterogeneity: Tau² = 0.12; Chi² = 20.10, df = 9 (P = 0.02); I² = 55%						
Test for overall effect: Z = 2.29 (P = 0.02)						
2.12.2 Combined delivery						
Cieslak 2016	0	0.1745	72	62	12.3%	-0.34 [-0.68 , 0.01]
Mealer 2014	0	0.3827	13	14	5.3%	0.00 [-0.75 , 0.75]
Mistretta 2018	0	0.3367	22	15	6.3%	-0.25 [-0.91 , 0.41]
Subtotal (95% CI)			**107**	**91**	**23.9%**	**-0.27 [-0.55 , 0.01]**
Heterogeneity: Tau² = 0.00; Chi² = 0.65, df = 2 (P = 0.72); I² = 0%						
Test for overall effect: Z = 1.90 (P = 0.06)						
2.12.3 Unclear delivery format						
Medisauskaite 2019	0	0.2143	39	52	10.4%	-0.04 [-0.46 , 0.38]
Subtotal (95% CI)			**39**	**52**	**10.4%**	**-0.04 [-0.46 , 0.38]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 0.19 (P = 0.85)						
Total (95% CI)			**398**	**390**	**100.0%**	**-0.29 [-0.50 , -0.09]**
Heterogeneity: Tau² = 0.06; Chi² = 22.34, df = 13 (P = 0.05); I² = 42%						
Test for overall effect: Z = 2.80 (P = 0.005)						
Test for subgroup differences: Chi² = 1.42, df = 2 (P = 0.49), I² = 0%						

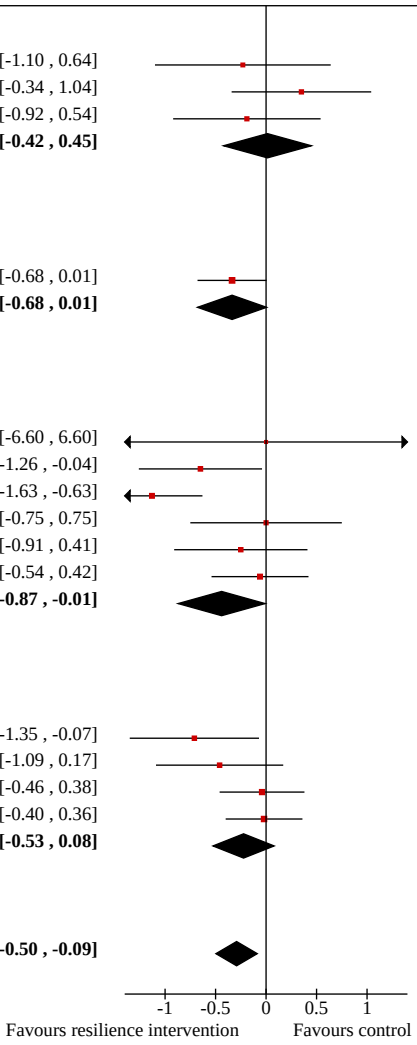


Analysis 2.13. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 13: Depression: post-intervention, subgroup analysis: intensity



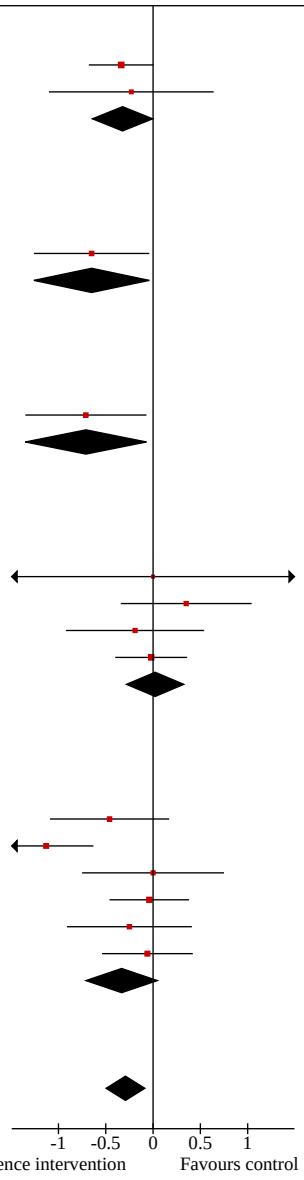
Analysis 2.14. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 14: Depression: post-intervention, subgroup analysis: theoretical foundation

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.14.1 Mindfulness-based						
Lebares 2018	0	0.4439	12	9	4.3%	-0.23 [-1.10 , 0.64]
Loiselle 2018	0	0.3526	15	18	6.0%	0.35 [-0.34 , 1.04]
Schroeder 2016	0	0.3725	15	14	5.5%	-0.19 [-0.92 , 0.54]
Subtotal (95% CI)			**42**	**41**	**15.8%**	**0.01 [-0.42 , 0.45]**
Heterogeneity: Tau² = 0.00; Chi² = 1.51, df = 2 (P = 0.47); I² = 0%						
Test for overall effect: Z = 0.06 (P = 0.95)						
2.14.2 Cognitive behavioural therapy						
Cieslak 2016	0	0.1745	72	62	12.3%	-0.34 [-0.68 , 0.01]
Subtotal (95% CI)			**72**	**62**	**12.3%**	**-0.34 [-0.68 , 0.01]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 1.93 (P = 0.05)						
2.14.3 Combination						
Calder Calisi 2017	0	3.366	24	22	0.1%	0.00 [-6.60 , 6.60]
Ireland 2017	0	0.3112	23	21	7.0%	-0.65 [-1.26 , -0.04]
Mache 2017	0	0.2551	37	35	8.8%	-1.13 [-1.63 , -0.63]
Mealer 2014	0	0.3827	13	14	5.3%	0.00 [-0.75 , 0.75]
Mistretta 2018	0	0.3367	22	15	6.3%	-0.25 [-0.91 , 0.41]
West 2014	0	0.2449	34	33	9.2%	-0.06 [-0.54 , 0.42]
Subtotal (95% CI)			**153**	**140**	**36.8%**	**-0.44 [-0.87 , -0.01]**
Heterogeneity: Tau² = 0.15; Chi² = 11.79, df = 5 (P = 0.04); I² = 58%						
Test for overall effect: Z = 2.00 (P = 0.05)						
2.14.4 Unspecific resilience training						
Alexander 2015	0	0.3265	20	20	6.6%	-0.71 [-1.35 , -0.07]
Luthar 2017	0	0.3214	21	19	6.7%	-0.46 [-1.09 , 0.17]
Medisauskaite 2019	0	0.2143	39	52	10.4%	-0.04 [-0.46 , 0.38]
West 2015	0	0.1939	51	56	11.4%	-0.02 [-0.40 , 0.36]
Subtotal (95% CI)			**131**	**147**	**35.2%**	**-0.22 [-0.53 , 0.08]**
Heterogeneity: Tau² = 0.03; Chi² = 4.50, df = 3 (P = 0.21); I² = 33%						
Test for overall effect: Z = 1.44 (P = 0.15)						
Total (95% CI)			**398**	**390**	**100.0%**	**-0.29 [-0.50 , -0.09]**
Heterogeneity: Tau² = 0.06; Chi² = 22.34, df = 13 (P = 0.05); I² = 42%						
Test for overall effect: Z = 2.80 (P = 0.005)						
Test for subgroup differences: Chi² = 2.44, df = 3 (P = 0.49), I² = 0%						



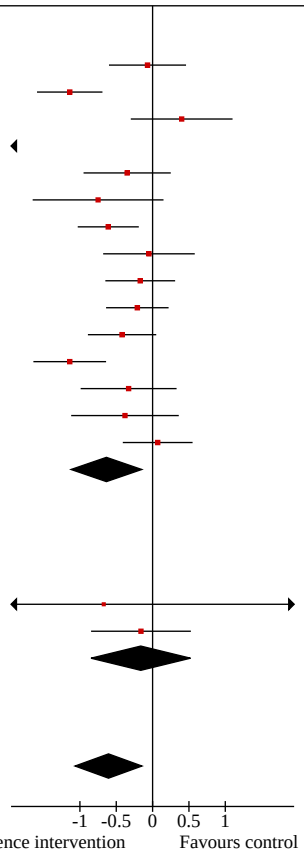
Analysis 2.15. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 15: Depression: post-intervention, subgroup analysis: comparator

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.15.1 Attention control						
Cieslak 2016	0	0.1745	72	62	12.3%	-0.34 [-0.68 , 0.01]
Lebares 2018	0	0.4439	12	9	4.3%	-0.23 [-1.10 , 0.64]
Subtotal (95% CI)			**84**	**71**	**16.5%**	**-0.32 [-0.64 , -0.00]**
Heterogeneity: Tau² = 0.00; Chi² = 0.05, df = 1 (P = 0.82); I² = 0%						
Test for overall effect: Z = 1.99 (P = 0.05)						
2.15.2 Active control						
Ireland 2017	0	0.3112	23	21	7.0%	-0.65 [-1.26 , -0.04]
Subtotal (95% CI)			**23**	**21**	**7.0%**	**-0.65 [-1.26 , -0.04]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 2.09 (P = 0.04)						
2.15.3 Treatment as usual						
Alexander 2015	0	0.3265	20	20	6.6%	-0.71 [-1.35 , -0.07]
Subtotal (95% CI)			**20**	**20**	**6.6%**	**-0.71 [-1.35 , -0.07]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 2.17 (P = 0.03)						
2.15.4 Waitlist control						
Calder Calisi 2017	0	3.366	24	22	0.1%	0.00 [-6.60 , 6.60]
Loiselle 2018	0	0.3526	15	18	6.0%	0.35 [-0.34 , 1.04]
Schroeder 2016	0	0.3725	15	14	5.5%	-0.19 [-0.92 , 0.54]
West 2015	0	0.1939	51	56	11.4%	-0.02 [-0.40 , 0.36]
Subtotal (95% CI)			**105**	**110**	**22.9%**	**0.02 [-0.28 , 0.32]**
Heterogeneity: Tau² = 0.00; Chi² = 1.24, df = 3 (P = 0.74); I² = 0%						
Test for overall effect: Z = 0.14 (P = 0.89)						
2.15.5 No intervention control						
Luthar 2017	0	0.3214	21	19	6.7%	-0.46 [-1.09 , 0.17]
Mache 2017	0	0.2551	37	35	8.8%	-1.13 [-1.63 , -0.63]
Mealer 2014	0	0.3827	13	14	5.3%	0.00 [-0.75 , 0.75]
Medisauskaite 2019	0	0.2143	39	52	10.4%	-0.04 [-0.46 , 0.38]
Mistretta 2018	0	0.3367	22	15	6.3%	-0.25 [-0.91 , 0.41]
West 2014	0	0.2449	34	33	9.2%	-0.06 [-0.54 , 0.42]
Subtotal (95% CI)			**166**	**168**	**46.9%**	**-0.33 [-0.71 , 0.05]**
Heterogeneity: Tau² = 0.14; Chi² = 13.84, df = 5 (P = 0.02); I² = 64%						
Test for overall effect: Z = 1.73 (P = 0.08)						
Total (95% CI)			**398**	**390**	**100.0%**	**-0.29 [-0.50 , -0.09]**
Heterogeneity: Tau² = 0.06; Chi² = 22.34, df = 13 (P = 0.05); I² = 42%						
Test for overall effect: Z = 2.80 (P = 0.005)						
Test for subgroup differences: Chi² = 7.08, df = 4 (P = 0.13), I² = 43.5%						



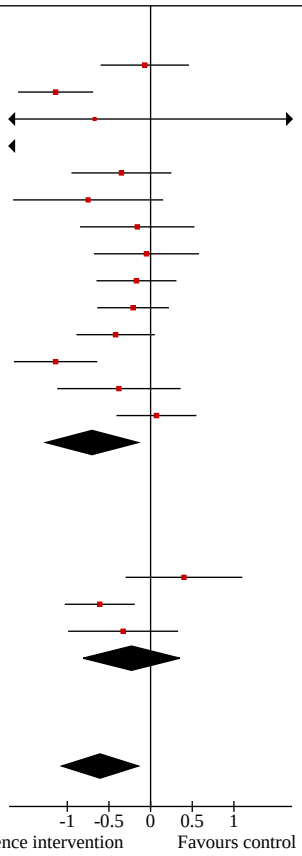
Analysis 2.16. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 16: Stress or stress perception: post-intervention, subgroup analysis: setting

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.16.1 Group setting						
Bernburg 2016	0	0.2704	26	28	6.4%	-0.07 [-0.60 , 0.46]
Bernburg 2019	0	0.2296	44	42	6.5%	-1.14 [-1.59 , -0.69]
Duchemin 2015	0	0.3571	16	16	6.0%	0.40 [-0.30 , 1.10]
Fei 2019	0	0.3469	61	61	6.0%	-4.49 [-5.17 , -3.81]
Ireland 2017	0	0.3061	23	21	6.2%	-0.35 [-0.95 , 0.25]
Lebares 2018	0	0.4592	12	9	5.5%	-0.75 [-1.65 , 0.15]
Lin 2019	0	0.2143	44	46	6.6%	-0.61 [-1.03 , -0.19]
Luthar 2017	0	0.3214	21	18	6.2%	-0.05 [-0.68 , 0.58]
Mache 2015a	0	0.2449	35	33	6.5%	-0.17 [-0.65 , 0.31]
Mache 2015b	0	0.2194	42	43	6.6%	-0.21 [-0.64 , 0.22]
Mache 2016	0	0.2398	37	35	6.5%	-0.42 [-0.89 , 0.05]
Mache 2017	0	0.2551	37	35	6.4%	-1.14 [-1.64 , -0.64]
Mistretta 2018	0	0.3367	22	15	6.1%	-0.33 [-0.99 , 0.33]
Schroeder 2016	0	0.3776	15	14	5.9%	-0.38 [-1.12 , 0.36]
West 2014	0	0.2449	34	33	6.5%	0.07 [-0.41 , 0.55]
Subtotal (95% CI)			**469**	**449**	**93.7%**	**-0.64 [-1.12 , -0.15]**
Heterogeneity: Tau² = 0.83; Chi² = 166.30, df = 14 (P < 0.00001); I² = 92%						
Test for overall effect: Z = 2.56 (P = 0.01)						
2.16.2 Combined setting						
Calder Calisi 2017	0	4.487	24	22	0.3%	-0.67 [-9.47 , 8.12]
Loiselle 2018	0	0.3502	15	18	6.0%	-0.16 [-0.85 , 0.53]
Subtotal (95% CI)			**39**	**40**	**6.3%**	**-0.16 [-0.85 , 0.52]**
Heterogeneity: Tau² = 0.00; Chi² = 0.01, df = 1 (P = 0.91); I² = 0%						
Test for overall effect: Z = 0.47 (P = 0.64)						
Total (95% CI)			**508**	**489**	**100.0%**	**-0.61 [-1.07 , -0.15]**
Heterogeneity: Tau² = 0.79; Chi² = 167.66, df = 16 (P < 0.00001); I² = 90%						
Test for overall effect: Z = 2.59 (P = 0.010)						
Test for subgroup differences: Chi² = 1.22, df = 1 (P = 0.27), I² = 17.8%						



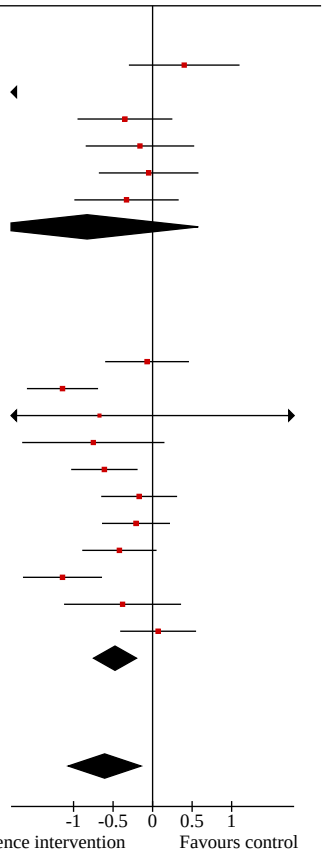
Analysis 2.17. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 17: Stress or stress perception: post-intervention, subgroup analysis: delivery format

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.17.1 Face-to-face						
Bernburg 2016	0	0.2704	26	28	6.4%	-0.07 [-0.60 , 0.46]
Bernburg 2019	0	0.2296	44	42	6.5%	-1.14 [-1.59 , -0.69]
Calder Calisi 2017	0	4.487	24	22	0.3%	-0.67 [-9.47 , 8.12]
Fei 2019	0	0.3469	61	61	6.0%	-4.49 [-5.17 , -3.81]
Ireland 2017	0	0.3061	23	21	6.2%	-0.35 [-0.95 , 0.25]
Lebares 2018	0	0.4592	12	9	5.5%	-0.75 [-1.65 , 0.15]
Loiselle 2018	0	0.3502	15	18	6.0%	-0.16 [-0.85 , 0.53]
Luthar 2017	0	0.3214	21	18	6.2%	-0.05 [-0.68 , 0.58]
Mache 2015a	0	0.2449	35	33	6.5%	-0.17 [-0.65 , 0.31]
Mache 2015b	0	0.2194	42	43	6.6%	-0.21 [-0.64 , 0.22]
Mache 2016	0	0.2398	37	35	6.5%	-0.42 [-0.89 , 0.05]
Mache 2017	0	0.2551	37	35	6.4%	-1.14 [-1.64 , -0.64]
Schroeder 2016	0	0.3776	15	14	5.9%	-0.38 [-1.12 , 0.36]
West 2014	0	0.2449	34	33	6.5%	0.07 [-0.41 , 0.55]
Subtotal (95% CI)			**426**	**412**	**81.4%**	**-0.70 [-1.26 , -0.15]**
Heterogeneity: Tau² = 0.96; Chi² = 159.49, df = 13 (P < 0.00001); I² = 92%						
Test for overall effect: Z = 2.48 (P = 0.01)						
2.17.2 Combined delivery						
Duchemin 2015	0	0.3571	16	16	6.0%	0.40 [-0.30 , 1.10]
Lin 2019	0	0.2143	44	46	6.6%	-0.61 [-1.03 , -0.19]
Mistretta 2018	0	0.3367	22	15	6.1%	-0.33 [-0.99 , 0.33]
Subtotal (95% CI)			**82**	**77**	**18.6%**	**-0.23 [-0.81 , 0.35]**
Heterogeneity: Tau² = 0.17; Chi² = 5.88, df = 2 (P = 0.05); I² = 66%						
Test for overall effect: Z = 0.77 (P = 0.44)						
Total (95% CI)			**508**	**489**	**100.0%**	**-0.61 [-1.07 , -0.15]**
Heterogeneity: Tau² = 0.79; Chi² = 167.66, df = 16 (P < 0.00001); I² = 90%						
Test for overall effect: Z = 2.59 (P = 0.010)						
Test for subgroup differences: Chi² = 1.34, df = 1 (P = 0.25), I² = 25.2%						



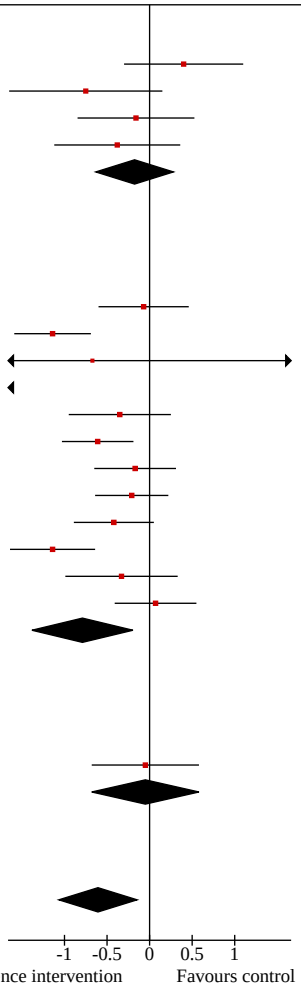
Analysis 2.18. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 18: Stress or stress perception: post-intervention, subgroup analysis: intensity

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.18.1 Moderate intensity						
Duchemin 2015	0	0.3571	16	16	6.0%	0.40 [-0.30 , 1.10]
Fei 2019	0	0.3469	61	61	6.0%	-4.49 [-5.17 , -3.81]
Ireland 2017	0	0.3061	23	21	6.2%	-0.35 [-0.95 , 0.25]
Loiselle 2018	0	0.3502	15	18	6.0%	-0.16 [-0.85 , 0.53]
Luthar 2017	0	0.3214	21	18	6.2%	-0.05 [-0.68 , 0.58]
Mistretta 2018	0	0.3367	22	15	6.1%	-0.33 [-0.99 , 0.33]
Subtotal (95% CI)			**158**	**149**	**36.5%**	**-0.83 [-2.24 , 0.58]**
Heterogeneity: Tau² = 2.98; Chi² = 137.33, df = 5 (P < 0.00001); I² = 96%						
Test for overall effect: Z = 1.16 (P = 0.25)						
2.18.2 High intensity						
Bernburg 2016	0	0.2704	26	28	6.4%	-0.07 [-0.60 , 0.46]
Bernburg 2019	0	0.2296	44	42	6.5%	-1.14 [-1.59 , -0.69]
Calder Calisi 2017	0	4.487	24	22	0.3%	-0.67 [-9.47 , 8.12]
Lebares 2018	0	0.4592	12	9	5.5%	-0.75 [-1.65 , 0.15]
Lin 2019	0	0.2143	44	46	6.6%	-0.61 [-1.03 , -0.19]
Mache 2015a	0	0.2449	35	33	6.5%	-0.17 [-0.65 , 0.31]
Mache 2015b	0	0.2194	42	43	6.6%	-0.21 [-0.64 , 0.22]
Mache 2016	0	0.2398	37	35	6.5%	-0.42 [-0.89 , 0.05]
Mache 2017	0	0.2551	37	35	6.4%	-1.14 [-1.64 , -0.64]
Schroeder 2016	0	0.3776	15	14	5.9%	-0.38 [-1.12 , 0.36]
West 2014	0	0.2449	34	33	6.5%	0.07 [-0.41 , 0.55]
Subtotal (95% CI)			**350**	**340**	**63.5%**	**-0.48 [-0.75 , -0.20]**
Heterogeneity: Tau² = 0.12; Chi² = 26.26, df = 10 (P = 0.003); I² = 62%						
Test for overall effect: Z = 3.43 (P = 0.0006)						
Total (95% CI)			**508**	**489**	**100.0%**	**-0.61 [-1.07 , -0.15]**
Heterogeneity: Tau² = 0.79; Chi² = 167.66, df = 16 (P < 0.00001); I² = 90%						
Test for overall effect: Z = 2.59 (P = 0.010)						
Test for subgroup differences: Chi² = 0.23, df = 1 (P = 0.63), I² = 0%						



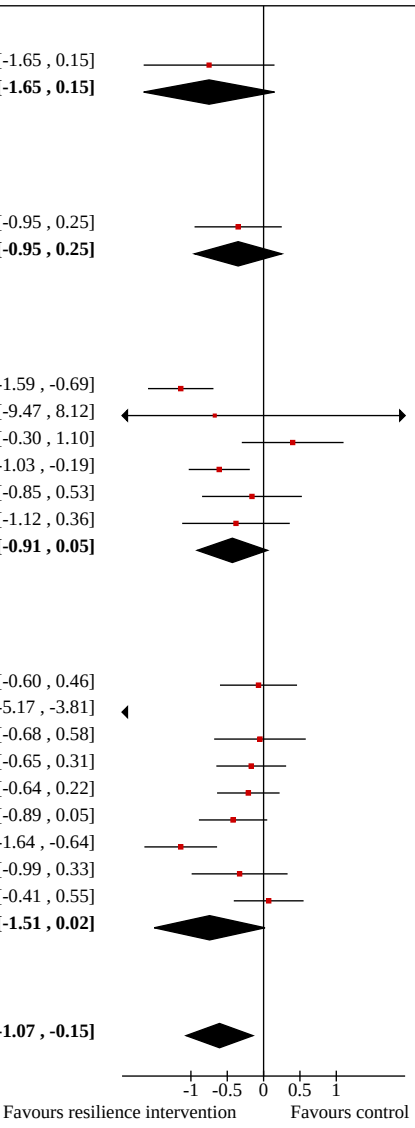
Analysis 2.19. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 19: Stress or stress perception: post-intervention, subgroup analysis: theoretical foundation

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.19.1 Mindfulness-based						
Duchemin 2015	0	0.3571	16	16	6.0%	0.40 [-0.30 , 1.10]
Lebares 2018	0	0.4592	12	9	5.5%	-0.75 [-1.65 , 0.15]
Loiselle 2018	0	0.3502	15	18	6.0%	-0.16 [-0.85 , 0.53]
Schroeder 2016	0	0.3776	15	14	5.9%	-0.38 [-1.12 , 0.36]
Subtotal (95% CI)			**58**	**57**	**23.4%**	**-0.18 [-0.63 , 0.28]**
Heterogeneity: Tau² = 0.07; Chi² = 4.45, df = 3 (P = 0.22); I² = 33%						
Test for overall effect: Z = 0.76 (P = 0.45)						
2.19.2 Combination						
Bernburg 2016	0	0.2704	26	28	6.4%	-0.07 [-0.60 , 0.46]
Bernburg 2019	0	0.2296	44	42	6.5%	-1.14 [-1.59 , -0.69]
Calder Calisi 2017	0	4.487	24	22	0.3%	-0.67 [-9.47 , 8.12]
Fei 2019	0	0.3469	61	61	6.0%	-4.49 [-5.17 , -3.81]
Ireland 2017	0	0.3061	23	21	6.2%	-0.35 [-0.95 , 0.25]
Lin 2019	0	0.2143	44	46	6.6%	-0.61 [-1.03 , -0.19]
Mache 2015a	0	0.2449	35	33	6.5%	-0.17 [-0.65 , 0.31]
Mache 2015b	0	0.2194	42	43	6.6%	-0.21 [-0.64 , 0.22]
Mache 2016	0	0.2398	37	35	6.5%	-0.42 [-0.89 , 0.05]
Mache 2017	0	0.2551	37	35	6.4%	-1.14 [-1.64 , -0.64]
Mistretta 2018	0	0.3367	22	15	6.1%	-0.33 [-0.99 , 0.33]
West 2014	0	0.2449	34	33	6.5%	0.07 [-0.41 , 0.55]
Subtotal (95% CI)			**429**	**414**	**70.5%**	**-0.79 [-1.38 , -0.20]**
Heterogeneity: Tau² = 0.94; Chi² = 154.70, df = 11 (P < 0.00001); I² = 93%						
Test for overall effect: Z = 2.61 (P = 0.009)						
2.19.3 Unspecific resilience training						
Luthar 2017	0	0.3214	21	18	6.2%	-0.05 [-0.68 , 0.58]
Subtotal (95% CI)			**21**	**18**	**6.2%**	**-0.05 [-0.68 , 0.58]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 0.16 (P = 0.88)						
Total (95% CI)			**508**	**489**	**100.0%**	**-0.61 [-1.07 , -0.15]**
Heterogeneity: Tau² = 0.79; Chi² = 167.66, df = 16 (P < 0.00001); I² = 90%						
Test for overall effect: Z = 2.59 (P = 0.010)						
Test for subgroup differences: Chi² = 3.49, df = 2 (P = 0.17), I² = 42.6%						



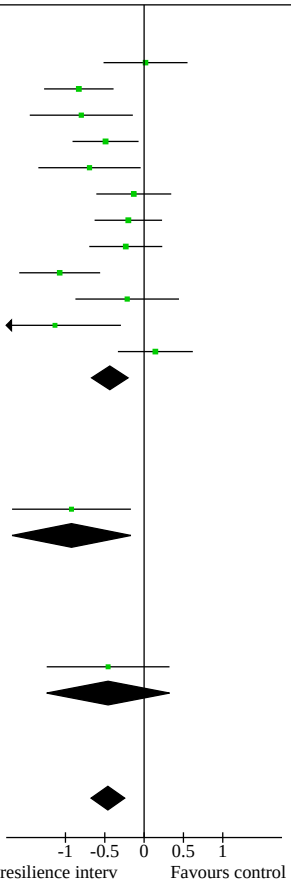
Analysis 2.20. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 20: Stress or stress perception: post-intervention, subgroup analysis: comparator

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.20.1 Attention control						
Lebares 2018	0	0.4592	12	9	5.5%	-0.75 [-1.65 , 0.15]
Subtotal (95% CI)			**12**	**9**	**5.5%**	**-0.75 [-1.65 , 0.15]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 1.63 (P = 0.10)						
2.20.2 Active control						
Ireland 2017	0	0.3061	23	21	6.2%	-0.35 [-0.95 , 0.25]
Subtotal (95% CI)			**23**	**21**	**6.2%**	**-0.35 [-0.95 , 0.25]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 1.14 (P = 0.25)						
2.20.3 Waitlist control						
Bernburg 2019	0	0.2296	44	42	6.5%	-1.14 [-1.59 , -0.69]
Calder Calisi 2017	0	4.487	24	22	0.3%	-0.67 [-9.47 , 8.12]
Duchemin 2015	0	0.3571	16	16	6.0%	0.40 [-0.30 , 1.10]
Lin 2019	0	0.2143	44	46	6.6%	-0.61 [-1.03 , -0.19]
Loiselle 2018	0	0.3502	15	18	6.0%	-0.16 [-0.85 , 0.53]
Schroeder 2016	0	0.3776	15	14	5.9%	-0.38 [-1.12 , 0.36]
Subtotal (95% CI)			**158**	**158**	**31.3%**	**-0.43 [-0.91 , 0.05]**
Heterogeneity: Tau² = 0.21; Chi² = 15.20, df = 5 (P = 0.010); I² = 67%						
Test for overall effect: Z = 1.74 (P = 0.08)						
2.20.4 No intervention control						
Bernburg 2016	0	0.2704	26	28	6.4%	-0.07 [-0.60 , 0.46]
Fei 2019	0	0.3469	61	61	6.0%	-4.49 [-5.17 , -3.81]
Luthar 2017	0	0.3214	21	18	6.2%	-0.05 [-0.68 , 0.58]
Mache 2015a	0	0.2449	35	33	6.5%	-0.17 [-0.65 , 0.31]
Mache 2015b	0	0.2194	42	43	6.6%	-0.21 [-0.64 , 0.22]
Mache 2016	0	0.2398	37	35	6.5%	-0.42 [-0.89 , 0.05]
Mache 2017	0	0.2551	37	35	6.4%	-1.14 [-1.64 , -0.64]
Mistretta 2018	0	0.3367	22	15	6.1%	-0.33 [-0.99 , 0.33]
West 2014	0	0.2449	34	33	6.5%	0.07 [-0.41 , 0.55]
Subtotal (95% CI)			**315**	**301**	**57.0%**	**-0.74 [-1.51 , 0.02]**
Heterogeneity: Tau² = 1.28; Chi² = 151.81, df = 8 (P < 0.00001); I² = 95%						
Test for overall effect: Z = 1.91 (P = 0.06)						
Total (95% CI)			**508**	**489**	**100.0%**	**-0.61 [-1.07 , -0.15]**
Heterogeneity: Tau² = 0.79; Chi² = 167.66, df = 16 (P < 0.00001); I² = 90%						
Test for overall effect: Z = 2.59 (P = 0.010)						
Test for subgroup differences: Chi² = 1.01, df = 3 (P = 0.80), I² = 0%						



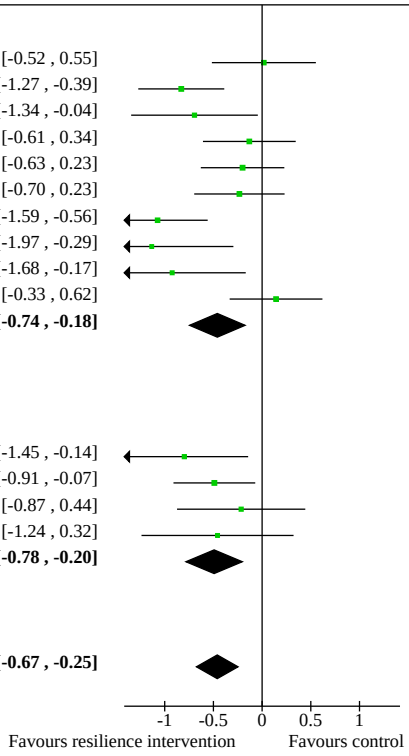
Analysis 2.21. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 21: Stress or stress perception: short-term follow-up (≤ 3 months), subgroup analysis: setting

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.21.1 Group setting								
Bernburg 2016	3.15	0.58	26	3.14	0.51	28	7.5%	0.02 [-0.52 , 0.55]
Bernburg 2019	2.9	0.59	44	3.39	0.58	42	8.8%	-0.83 [-1.27 , -0.39]
Chesak 2015	20.11	6.79	19	25.5	6.44	20	6.1%	-0.80 [-1.45 , -0.14]
Lin 2019	36.68	6.79	44	39.67	5.24	46	9.1%	-0.49 [-0.91 , -0.07]
Luthar 2017	61.1	16.9	21	75.44	23.56	18	6.1%	-0.69 [-1.34 , -0.04]
Mache 2015a	54	19.1	35	56.5	18.57	33	8.3%	-0.13 [-0.61 , 0.34]
Mache 2015b	52.3	20.4	42	56.4	20.1	42	9.0%	-0.20 [-0.63 , 0.23]
Mache 2016	55.2	18.3	37	59.4	17.3	35	8.5%	-0.23 [-0.70 , 0.23]
Mache 2017	2.59	0.72	33	3.35	0.68	34	7.8%	-1.07 [-1.59 , -0.56]
Mistretta 2018	5.82	3.95	22	6.6	2.85	15	6.0%	-0.21 [-0.87 , 0.44]
Schroeder 2016	13.23	5.19	13	20.21	6.65	13	4.4%	-1.13 [-1.97 , -0.29]
West 2014	14.8	7.28	33	13.8	6.54	35	8.3%	0.14 [-0.33 , 0.62]
Subtotal (95% CI)			**369**			**361**	**90.0%**	**-0.44 [-0.67 , -0.20]**
Heterogeneity: Tau² = 0.09; Chi² = 25.73, df = 11 (P = 0.007); I² = 57%								
Test for overall effect: Z = 3.69 (P = 0.0002)								
2.21.2 Individual setting								
Sood 2011	22.8	5.5	20	28.3	6.3	12	5.1%	-0.92 [-1.68 , -0.17]
Subtotal (95% CI)			**20**			**12**	**5.1%**	**-0.92 [-1.68 , -0.17]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 2.40 (P = 0.02)								
2.21.3 Combined setting								
Sood 2014	19.6	5.6	13	22.2	5.4	13	4.9%	-0.46 [-1.24 , 0.32]
Subtotal (95% CI)			**13**			**13**	**4.9%**	**-0.46 [-1.24 , 0.32]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 1.15 (P = 0.25)								
Total (95% CI)			**402**			**386**	**100.0%**	**-0.46 [-0.67 , -0.25]**
Heterogeneity: Tau² = 0.08; Chi² = 27.42, df = 13 (P = 0.01); I² = 53%								
Test for overall effect: Z = 4.23 (P < 0.0001)								
Test for subgroup differences: Chi² = 1.46, df = 2 (P = 0.48), I² = 0%								



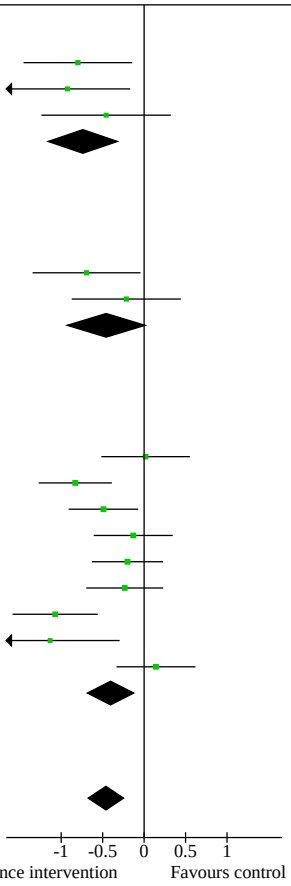
Analysis 2.22. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 22: Stress or stress perception: short-term follow-up (≤ 3 months), subgroup analysis: delivery format

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.22.1 Face-to-face								
Bernburg 2016	3.15	0.58	26	3.14	0.51	28	7.5%	0.02 [-0.52 , 0.55]
Bernburg 2019	2.9	0.59	44	3.39	0.58	42	8.8%	-0.83 [-1.27 , -0.39]
Luthar 2017	61.1	16.9	21	75.44	23.56	18	6.1%	-0.69 [-1.34 , -0.04]
Mache 2015a	54	19.1	35	56.5	18.57	33	8.3%	-0.13 [-0.61 , 0.34]
Mache 2015b	52.3	20.4	42	56.4	20.1	42	9.0%	-0.20 [-0.63 , 0.23]
Mache 2016	55.2	18.3	37	59.4	17.3	35	8.5%	-0.23 [-0.70 , 0.23]
Mache 2017	2.59	0.72	33	3.35	0.68	34	7.8%	-1.07 [-1.59 , -0.56]
Schroeder 2016	13.23	5.19	13	20.21	6.65	13	4.4%	-1.13 [-1.97 , -0.29]
Sood 2011	22.8	5.5	20	28.3	6.3	12	5.1%	-0.92 [-1.68 , -0.17]
West 2014	14.8	7.28	33	13.8	6.54	35	8.3%	0.14 [-0.33 , 0.62]
Subtotal (95% CI)			**304**			**292**	**73.9%**	**-0.46 [-0.74 , -0.18]**
Heterogeneity: Tau² = 0.13; Chi² = 25.67, df = 9 (P = 0.002); I² = 65%								
Test for overall effect: Z = 3.16 (P = 0.002)								
2.22.2 Combined delivery								
Chesak 2015	20.11	6.79	19	25.5	6.44	20	6.1%	-0.80 [-1.45 , -0.14]
Lin 2019	36.68	6.79	44	39.67	5.24	46	9.1%	-0.49 [-0.91 , -0.07]
Mistretta 2018	5.82	3.95	22	6.6	2.85	15	6.0%	-0.21 [-0.87 , 0.44]
Sood 2014	19.6	5.6	13	22.2	5.4	13	4.9%	-0.46 [-1.24 , 0.32]
Subtotal (95% CI)			**98**			**94**	**26.1%**	**-0.49 [-0.78 , -0.20]**
Heterogeneity: Tau² = 0.00; Chi² = 1.53, df = 3 (P = 0.68); I² = 0%								
Test for overall effect: Z = 3.34 (P = 0.0008)								
Total (95% CI)			**402**			**386**	**100.0%**	**-0.46 [-0.67 , -0.25]**
Heterogeneity: Tau² = 0.08; Chi² = 27.42, df = 13 (P = 0.01); I² = 53%								
Test for overall effect: Z = 4.23 (P < 0.0001)								
Test for subgroup differences: Chi² = 0.03, df = 1 (P = 0.87), I² = 0%								



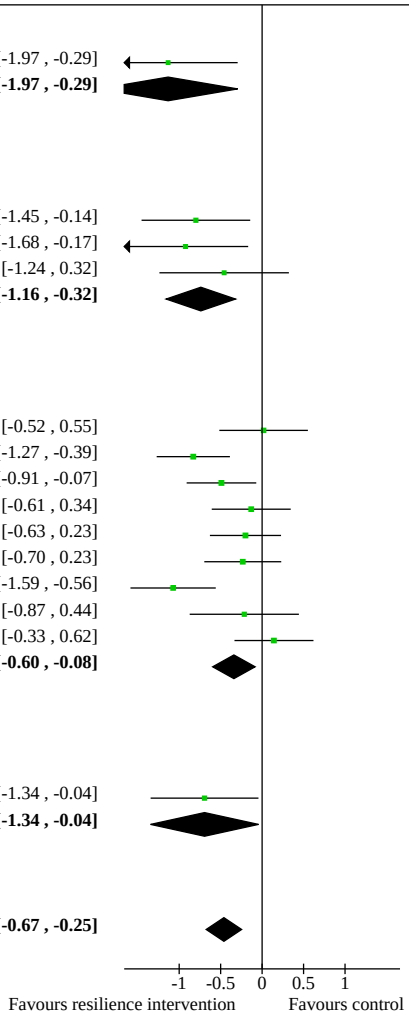
Analysis 2.23. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 23: Stress or stress perception: short-term follow-up (≤ 3 months), subgroup analysis: intensity

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.23.1 Low intensity								
Chesak 2015	20.11	6.79	19	25.5	6.44	20	6.1%	-0.80 [-1.45 , -0.14]
Sood 2011	22.8	5.5	20	28.3	6.3	12	5.1%	-0.92 [-1.68 , -0.17]
Sood 2014	19.6	5.6	13	22.2	5.4	13	4.9%	-0.46 [-1.24 , 0.32]
Subtotal (95% CI)			**52**			**45**	**16.1%**	**-0.74 [-1.16 , -0.32]**
Heterogeneity: Tau² = 0.00; Chi² = 0.76, df = 2 (P = 0.68); I² = 0%								
Test for overall effect: Z = 3.47 (P = 0.0005)								
2.23.2 Moderate intensity								
Luthar 2017	61.1	16.9	21	75.44	23.56	18	6.1%	-0.69 [-1.34 , -0.04]
Mistretta 2018	5.82	3.95	22	6.6	2.85	15	6.0%	-0.21 [-0.87 , 0.44]
Subtotal (95% CI)			**43**			**33**	**12.2%**	**-0.46 [-0.93 , 0.01]**
Heterogeneity: Tau² = 0.00; Chi² = 1.03, df = 1 (P = 0.31); I² = 3%								
Test for overall effect: Z = 1.91 (P = 0.06)								
2.23.3 High intensity								
Bernburg 2016	3.15	0.58	26	3.14	0.51	28	7.5%	0.02 [-0.52 , 0.55]
Bernburg 2019	2.9	0.59	44	3.39	0.58	42	8.8%	-0.83 [-1.27 , -0.39]
Lin 2019	36.68	6.79	44	39.67	5.24	46	9.1%	-0.49 [-0.91 , -0.07]
Mache 2015a	54	19.1	35	56.5	18.57	33	8.3%	-0.13 [-0.61 , 0.34]
Mache 2015b	52.3	20.4	42	56.4	20.1	42	9.0%	-0.20 [-0.63 , 0.23]
Mache 2016	55.2	18.3	37	59.4	17.3	35	8.5%	-0.23 [-0.70 , 0.23]
Mache 2017	2.59	0.72	33	3.35	0.68	34	7.8%	-1.07 [-1.59 , -0.56]
Schroeder 2016	13.23	5.19	13	20.21	6.65	13	4.4%	-1.13 [-1.97 , -0.29]
West 2014	14.8	7.28	33	13.8	6.54	35	8.3%	0.14 [-0.33 , 0.62]
Subtotal (95% CI)			**307**			**308**	**71.8%**	**-0.40 [-0.68 , -0.12]**
Heterogeneity: Tau² = 0.12; Chi² = 23.21, df = 8 (P = 0.003); I² = 66%								
Test for overall effect: Z = 2.84 (P = 0.005)								
Total (95% CI)			**402**			**386**	**100.0%**	**-0.46 [-0.67 , -0.25]**
Heterogeneity: Tau² = 0.08; Chi² = 27.42, df = 13 (P = 0.01); I² = 53%								
Test for overall effect: Z = 4.23 (P < 0.0001)								
Test for subgroup differences: Chi² = 1.74, df = 2 (P = 0.42), I² = 0%								



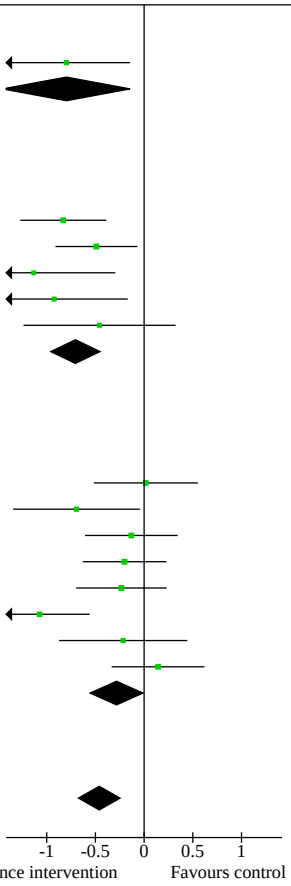
Analysis 2.24. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 24: Stress or stress perception: short-term follow-up (≤ 3 months), subgroup analysis: theoretical foundation

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.24.1 Mindfulness-based								
Schroeder 2016	13.23	5.19	13	20.21	6.65	13	4.4%	-1.13 [-1.97 , -0.29]
Subtotal (95% CI)			**13**			**13**	**4.4%**	**-1.13 [-1.97 , -0.29]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 2.65 (P = 0.008)								
2.24.2 Attention and interpretation therapy								
Chesak 2015	20.11	6.79	19	25.5	6.44	20	6.1%	-0.80 [-1.45 , -0.14]
Sood 2011	22.8	5.5	20	28.3	6.3	12	5.1%	-0.92 [-1.68 , -0.17]
Sood 2014	19.6	5.6	13	22.2	5.4	13	4.9%	-0.46 [-1.24 , 0.32]
Subtotal (95% CI)			**52**			**45**	**16.1%**	**-0.74 [-1.16 , -0.32]**
Heterogeneity: Tau² = 0.00; Chi² = 0.76, df = 2 (P = 0.68); I² = 0%								
Test for overall effect: Z = 3.47 (P = 0.0005)								
2.24.3 Combination								
Bernburg 2016	3.15	0.58	26	3.14	0.51	28	7.5%	0.02 [-0.52 , 0.55]
Bernburg 2019	2.9	0.59	44	3.39	0.58	42	8.8%	-0.83 [-1.27 , -0.39]
Lin 2019	36.68	6.79	44	39.67	5.24	46	9.1%	-0.49 [-0.91 , -0.07]
Mache 2015a	54	19.1	35	56.5	18.57	33	8.3%	-0.13 [-0.61 , 0.34]
Mache 2015b	52.3	20.4	42	56.4	20.1	42	9.0%	-0.20 [-0.63 , 0.23]
Mache 2016	55.2	18.3	37	59.4	17.3	35	8.5%	-0.23 [-0.70 , 0.23]
Mache 2017	2.59	0.72	33	3.35	0.68	34	7.8%	-1.07 [-1.59 , -0.56]
Mistretta 2018	5.82	3.95	22	6.6	2.85	15	6.0%	-0.21 [-0.87 , 0.44]
West 2014	14.8	7.28	33	13.8	6.54	35	8.3%	0.14 [-0.33 , 0.62]
Subtotal (95% CI)			**316**			**310**	**73.4%**	**-0.34 [-0.60 , -0.08]**
Heterogeneity: Tau² = 0.09; Chi² = 20.19, df = 8 (P = 0.010); I² = 60%								
Test for overall effect: Z = 2.61 (P = 0.009)								
2.24.4 Unspecific resilience training								
Luthar 2017	61.1	16.9	21	75.44	23.56	18	6.1%	-0.69 [-1.34 , -0.04]
Subtotal (95% CI)			**21**			**18**	**6.1%**	**-0.69 [-1.34 , -0.04]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 2.09 (P = 0.04)								
Total (95% CI)			**402**			**386**	**100.0%**	**-0.46 [-0.67 , -0.25]**
Heterogeneity: Tau² = 0.08; Chi² = 27.42, df = 13 (P = 0.01); I² = 53%								
Test for overall effect: Z = 4.23 (P < 0.0001)								
Test for subgroup differences: Chi² = 5.28, df = 3 (P = 0.15), I² = 43.2%								



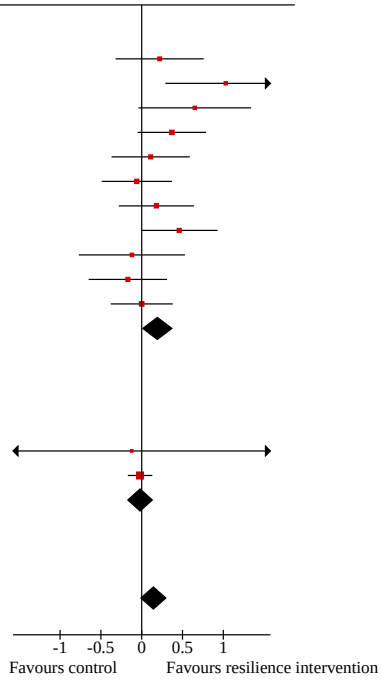
Analysis 2.25. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 25: Stress or stress perception: short-term follow-up (≤ 3 months), subgroup analysis: comparator

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.25.1 Active control								
Chesak 2015	20.11	6.79	19	25.5	6.44	20	6.1%	-0.80 [-1.45 , -0.14]
Subtotal (95% CI)			**19**			**20**	**6.1%**	**-0.80 [-1.45 , -0.14]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 2.39 (P = 0.02)								
2.25.2 Waitlist control								
Bernburg 2019	2.9	0.59	44	3.39	0.58	42	8.8%	-0.83 [-1.27 , -0.39]
Lin 2019	36.68	6.79	44	39.67	5.24	46	9.1%	-0.49 [-0.91 , -0.07]
Schroeder 2016	13.23	5.19	13	20.21	6.65	13	4.4%	-1.13 [-1.97 , -0.29]
Sood 2011	22.8	5.5	20	28.3	6.3	12	5.1%	-0.92 [-1.68 , -0.17]
Sood 2014	19.6	5.6	13	22.2	5.4	13	4.9%	-0.46 [-1.24 , 0.32]
Subtotal (95% CI)			**134**			**126**	**32.4%**	**-0.71 [-0.96 , -0.45]**
Heterogeneity: Tau² = 0.00; Chi² = 3.02, df = 4 (P = 0.55); I² = 0%								
Test for overall effect: Z = 5.47 (P < 0.00001)								
2.25.3 No intervention control								
Bernburg 2016	3.15	0.58	26	3.14	0.51	28	7.5%	0.02 [-0.52 , 0.55]
Luthar 2017	61.1	16.9	21	75.44	23.56	18	6.1%	-0.69 [-1.34 , -0.04]
Mache 2015a	54	19.1	35	56.5	18.57	33	8.3%	-0.13 [-0.61 , 0.34]
Mache 2015b	52.3	20.4	42	56.4	20.1	42	9.0%	-0.20 [-0.63 , 0.23]
Mache 2016	55.2	18.3	37	59.4	17.3	35	8.5%	-0.23 [-0.70 , 0.23]
Mache 2017	2.59	0.72	33	3.35	0.68	34	7.8%	-1.07 [-1.59 , -0.56]
Mistretta 2018	5.82	3.95	22	6.6	2.85	15	6.0%	-0.21 [-0.87 , 0.44]
West 2014	14.8	7.28	33	13.8	6.54	35	8.3%	0.14 [-0.33 , 0.62]
Subtotal (95% CI)			**249**			**240**	**61.5%**	**-0.28 [-0.55 , -0.01]**
Heterogeneity: Tau² = 0.08; Chi² = 15.49, df = 7 (P = 0.03); I² = 55%								
Test for overall effect: Z = 2.05 (P = 0.04)								
Total (95% CI)			**402**			**386**	**100.0%**	**-0.46 [-0.67 , -0.25]**
Heterogeneity: Tau² = 0.08; Chi² = 27.42, df = 13 (P = 0.01); I² = 53%								
Test for overall effect: Z = 4.23 (P < 0.0001)								
Test for subgroup differences: Chi² = 5.68, df = 2 (P = 0.06), I² = 64.8%								



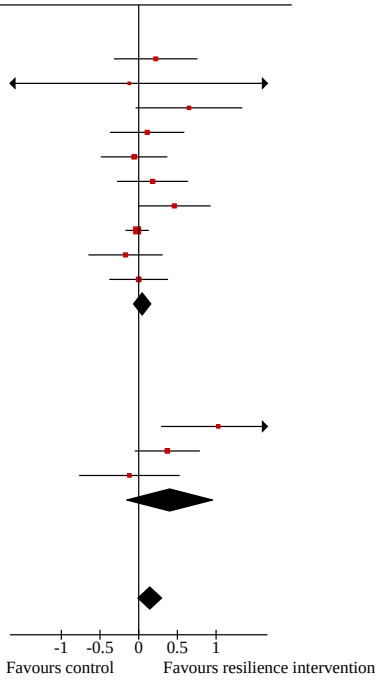
Analysis 2.26. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 26: Well-being or quality of life: post-intervention, subgroup analysis: setting

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.26.1 Group setting						
Bernburg 2016	0	0.2755	26	28	6.3%	0.22 [-0.32 , 0.76]
Duchemin 2015	0	0.3776	16	16	3.7%	1.03 [0.29 , 1.77]
Klatt 2015	0	0.352	17	17	4.2%	0.65 [-0.04 , 1.34]
Lin 2019	0	0.2143	44	46	9.1%	0.37 [-0.05 , 0.79]
Mache 2015a	0	0.2449	35	33	7.5%	0.11 [-0.37 , 0.59]
Mache 2015b	0	0.2194	42	43	8.8%	-0.06 [-0.49 , 0.37]
Mache 2016	0	0.2347	37	35	8.0%	0.18 [-0.28 , 0.64]
Mache 2017	0	0.2398	37	35	7.7%	0.46 [-0.01 , 0.93]
Mistretta 2018	0	0.3316	22	15	4.6%	-0.12 [-0.77 , 0.53]
West 2014	0	0.2449	34	33	7.5%	-0.17 [-0.65 , 0.31]
West 2015	0	0.1939	51	56	10.3%	0.00 [-0.38 , 0.38]
Subtotal (95% CI)			**361**	**357**	**77.7%**	**0.19 [0.01 , 0.37]**
Heterogeneity: Tau² = 0.03; Chi² = 14.02, df = 10 (P = 0.17); I² = 29%						
Test for overall effect: Z = 2.11 (P = 0.04)						
2.26.2 Combined setting						
Calder Calisi 2017	0	4.088	24	22	0.0%	-0.12 [-8.13 , 7.89]
Strijk 2011	0	0.0765	367	363	22.3%	-0.02 [-0.17 , 0.13]
Subtotal (95% CI)			**391**	**385**	**22.3%**	**-0.02 [-0.17 , 0.13]**
Heterogeneity: Tau² = 0.00; Chi² = 0.00, df = 1 (P = 0.98); I² = 0%						
Test for overall effect: Z = 0.26 (P = 0.79)						
Total (95% CI)			**752**	**742**	**100.0%**	**0.14 [-0.01 , 0.30]**
Heterogeneity: Tau² = 0.02; Chi² = 17.44, df = 12 (P = 0.13); I² = 31%						
Test for overall effect: Z = 1.83 (P = 0.07)						
Test for subgroup differences: Chi² = 3.17, df = 1 (P = 0.07), I² = 68.5%						



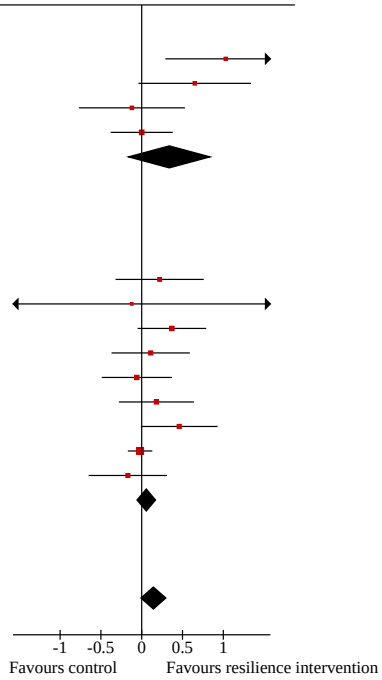
Analysis 2.27. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 27: Well-being or quality of life: post-intervention, subgroup analysis: delivery format

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.27.1 Face-to-face						
Bernburg 2016	0	0.2755	26	28	6.3%	0.22 [-0.32 , 0.76]
Calder Calisi 2017	0	4.088	24	22	0.0%	-0.12 [-8.13 , 7.89]
Klatt 2015	0	0.352	17	17	4.2%	0.65 [-0.04 , 1.34]
Mache 2015a	0	0.2449	35	33	7.5%	0.11 [-0.37 , 0.59]
Mache 2015b	0	0.2194	42	43	8.8%	-0.06 [-0.49 , 0.37]
Mache 2016	0	0.2347	37	35	8.0%	0.18 [-0.28 , 0.64]
Mache 2017	0	0.2398	37	35	7.7%	0.46 [-0.01 , 0.93]
Strijk 2011	0	0.0765	367	363	22.3%	-0.02 [-0.17 , 0.13]
West 2014	0	0.2449	34	33	7.5%	-0.17 [-0.65 , 0.31]
West 2015	0	0.1939	51	56	10.3%	0.00 [-0.38 , 0.38]
Subtotal (95% CI)			**670**	**665**	**82.6%**	**0.04 [-0.07 , 0.16]**
Heterogeneity: Tau² = 0.00; Chi² = 8.53, df = 9 (P = 0.48); I² = 0%						
Test for overall effect: Z = 0.78 (P = 0.43)						
2.27.2 Combined delivery						
Duchemin 2015	0	0.3776	16	16	3.7%	1.03 [0.29 , 1.77]
Lin 2019	0	0.2143	44	46	9.1%	0.37 [-0.05 , 0.79]
Mistretta 2018	0	0.3316	22	15	4.6%	-0.12 [-0.77 , 0.53]
Subtotal (95% CI)			**82**	**77**	**17.4%**	**0.40 [-0.16 , 0.95]**
Heterogeneity: Tau² = 0.15; Chi² = 5.24, df = 2 (P = 0.07); I² = 62%						
Test for overall effect: Z = 1.41 (P = 0.16)						
Total (95% CI)			**752**	**742**	**100.0%**	**0.14 [-0.01 , 0.30]**
Heterogeneity: Tau² = 0.02; Chi² = 17.44, df = 12 (P = 0.13); I² = 31%						
Test for overall effect: Z = 1.83 (P = 0.07)						
Test for subgroup differences: Chi² = 1.51, df = 1 (P = 0.22), I² = 33.9%						



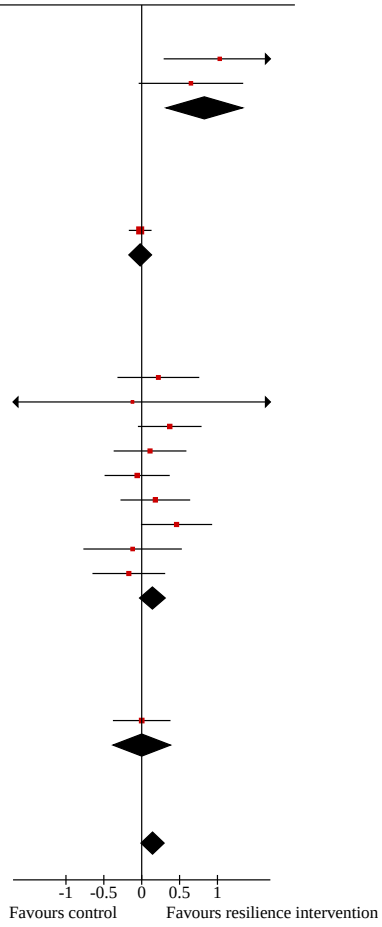
Analysis 2.28. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 28: Well-being or quality of life: post-intervention, subgroup analysis: intensity

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.28.1 Moderate intensity						
Duchemin 2015	0	0.3776	16	16	3.7%	1.03 [0.29 , 1.77]
Klatt 2015	0	0.352	17	17	4.2%	0.65 [-0.04 , 1.34]
Mistretta 2018	0	0.3316	22	15	4.6%	-0.12 [-0.77 , 0.53]
West 2015	0	0.1939	51	56	10.3%	0.00 [-0.38 , 0.38]
Subtotal (95% CI)			**106**	**104**	**22.9%**	**0.34 [-0.16 , 0.84]**
Heterogeneity: Tau² = 0.16; Chi² = 8.43, df = 3 (P = 0.04); I² = 64%						
Test for overall effect: Z = 1.32 (P = 0.19)						
2.28.2 High intensity						
Bernburg 2016	0	0.2755	26	28	6.3%	0.22 [-0.32 , 0.76]
Calder Calisi 2017	0	4.088	24	22	0.0%	-0.12 [-8.13 , 7.89]
Lin 2019	0	0.2143	44	46	9.1%	0.37 [-0.05 , 0.79]
Mache 2015a	0	0.2449	35	33	7.5%	0.11 [-0.37 , 0.59]
Mache 2015b	0	0.2194	42	43	8.8%	-0.06 [-0.49 , 0.37]
Mache 2016	0	0.2347	37	35	8.0%	0.18 [-0.28 , 0.64]
Mache 2017	0	0.2398	37	35	7.7%	0.46 [-0.01 , 0.93]
Strijk 2011	0	0.0765	367	363	22.3%	-0.02 [-0.17 , 0.13]
West 2014	0	0.2449	34	33	7.5%	-0.17 [-0.65 , 0.31]
Subtotal (95% CI)			**646**	**638**	**77.1%**	**0.06 [-0.06 , 0.17]**
Heterogeneity: Tau² = 0.00; Chi² = 7.79, df = 8 (P = 0.45); I² = 0%						
Test for overall effect: Z = 0.96 (P = 0.34)						
Total (95% CI)			**752**	**742**	**100.0%**	**0.14 [-0.01 , 0.30]**
Heterogeneity: Tau² = 0.02; Chi² = 17.44, df = 12 (P = 0.13); I² = 31%						
Test for overall effect: Z = 1.83 (P = 0.07)						
Test for subgroup differences: Chi² = 1.15, df = 1 (P = 0.28), I² = 13.3%						



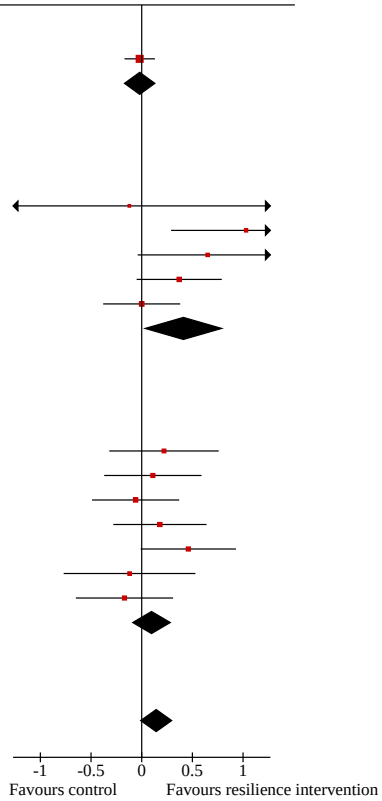
Analysis 2.29. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 29: Well-being or quality of life: post-intervention, subgroup analysis: theoretical foundation

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.29.1 Mindfulness-based						
Duchemin 2015	0	0.3776	16	16	3.7%	1.03 [0.29 , 1.77]
Klatt 2015	0	0.352	17	17	4.2%	0.65 [-0.04 , 1.34]
Subtotal (95% CI)			**33**	**33**	**7.9%**	**0.83 [0.32 , 1.33]**
Heterogeneity: Tau² = 0.00; Chi² = 0.54, df = 1 (P = 0.46); I² = 0%						
Test for overall effect: Z = 3.21 (P = 0.001)						
2.29.2 Coaching						
Strijk 2011	0	0.0765	367	363	22.3%	-0.02 [-0.17 , 0.13]
Subtotal (95% CI)			**367**	**363**	**22.3%**	**-0.02 [-0.17 , 0.13]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 0.26 (P = 0.79)						
2.29.3 Combination						
Bernburg 2016	0	0.2755	26	28	6.3%	0.22 [-0.32 , 0.76]
Calder Calisi 2017	0	4.088	24	22	0.0%	-0.12 [-8.13 , 7.89]
Lin 2019	0	0.2143	44	46	9.1%	0.37 [-0.05 , 0.79]
Mache 2015a	0	0.2449	35	33	7.5%	0.11 [-0.37 , 0.59]
Mache 2015b	0	0.2194	42	43	8.8%	-0.06 [-0.49 , 0.37]
Mache 2016	0	0.2347	37	35	8.0%	0.18 [-0.28 , 0.64]
Mache 2017	0	0.2398	37	35	7.7%	0.46 [-0.01 , 0.93]
Mistretta 2018	0	0.3316	22	15	4.6%	-0.12 [-0.77 , 0.53]
West 2014	0	0.2449	34	33	7.5%	-0.17 [-0.65 , 0.31]
Subtotal (95% CI)			**301**	**290**	**59.4%**	**0.14 [-0.03 , 0.31]**
Heterogeneity: Tau² = 0.00; Chi² = 6.11, df = 8 (P = 0.63); I² = 0%						
Test for overall effect: Z = 1.63 (P = 0.10)						
2.29.4 Unspecific resilience training						
West 2015	0	0.1939	51	56	10.3%	0.00 [-0.38 , 0.38]
Subtotal (95% CI)			**51**	**56**	**10.3%**	**0.00 [-0.38 , 0.38]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 0.00 (P = 1.00)						
Total (95% CI)			**752**	**742**	**100.0%**	**0.14 [-0.01 , 0.30]**
Heterogeneity: Tau² = 0.02; Chi² = 17.44, df = 12 (P = 0.13); I² = 31%						
Test for overall effect: Z = 1.83 (P = 0.07)						
Test for subgroup differences: Chi² = 10.79, df = 3 (P = 0.01), I² = 72.2%						



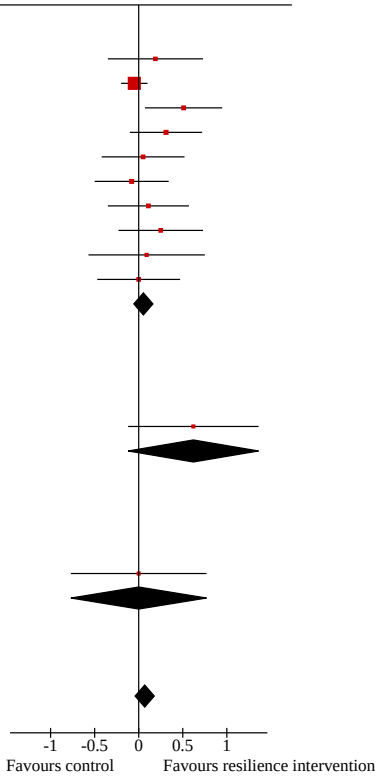
Analysis 2.30. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 30: Well-being or quality of life: post-intervention, subgroup analysis: comparator

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.30.1 Active control						
Strijk 2011	0	0.0765	367	363	22.3%	-0.02 [-0.17 , 0.13]
Subtotal (95% CI)			**367**	**363**	**22.3%**	**-0.02 [-0.17 , 0.13]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 0.26 (P = 0.79)						
2.30.2 Waitlist control						
Calder Calisi 2017	0	4.088	24	22	0.0%	-0.12 [-8.13 , 7.89]
Duchemin 2015	0	0.3776	16	16	3.7%	1.03 [0.29 , 1.77]
Klatt 2015	0	0.352	17	17	4.2%	0.65 [-0.04 , 1.34]
Lin 2019	0	0.2143	44	46	9.1%	0.37 [-0.05 , 0.79]
West 2015	0	0.1939	51	56	10.3%	0.00 [-0.38 , 0.38]
Subtotal (95% CI)			**152**	**157**	**27.3%**	**0.41 [0.03 , 0.79]**
Heterogeneity: Tau² = 0.07; Chi² = 7.20, df = 4 (P = 0.13); I² = 44%						
Test for overall effect: Z = 2.14 (P = 0.03)						
2.30.3 No intervention control						
Bernburg 2016	0	0.2755	26	28	6.3%	0.22 [-0.32 , 0.76]
Mache 2015a	0	0.2449	35	33	7.5%	0.11 [-0.37 , 0.59]
Mache 2015b	0	0.2194	42	43	8.8%	-0.06 [-0.49 , 0.37]
Mache 2016	0	0.2347	37	35	8.0%	0.18 [-0.28 , 0.64]
Mache 2017	0	0.2398	37	35	7.7%	0.46 [-0.01 , 0.93]
Mistretta 2018	0	0.3316	22	15	4.6%	-0.12 [-0.77 , 0.53]
West 2014	0	0.2449	34	33	7.5%	-0.17 [-0.65 , 0.31]
Subtotal (95% CI)			**233**	**222**	**50.4%**	**0.10 [-0.09 , 0.28]**
Heterogeneity: Tau² = 0.00; Chi² = 4.75, df = 6 (P = 0.58); I² = 0%						
Test for overall effect: Z = 1.02 (P = 0.31)						
Total (95% CI)			**752**	**742**	**100.0%**	**0.14 [-0.01 , 0.30]**
Heterogeneity: Tau² = 0.02; Chi² = 17.44, df = 12 (P = 0.13); I² = 31%						
Test for overall effect: Z = 1.83 (P = 0.07)						
Test for subgroup differences: Chi² = 4.58, df = 2 (P = 0.10), I² = 56.3%						



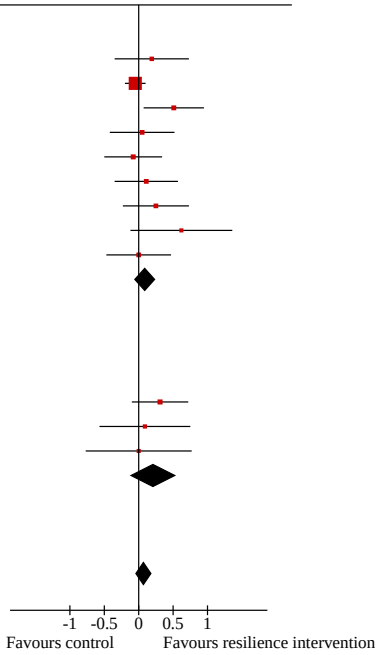
Analysis 2.31. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 31: Well-being or quality of life: short-term follow-up (≤ 3 months), subgroup analysis: setting

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.31.1 Group setting						
Bernburg 2016	0	0.2755	26	28	4.0%	0.19 [-0.35 , 0.73]
Cheung 2014	0	0.0765	364	369	48.2%	-0.05 [-0.20 , 0.10]
Hosseinnejad 2018	0	0.2236	40	40	6.1%	0.51 [0.07 , 0.95]
Lin 2019	0	0.2092	44	46	6.9%	0.31 [-0.10 , 0.72]
Mache 2015a	0	0.2398	35	33	5.3%	0.05 [-0.42 , 0.52]
Mache 2015b	0	0.2143	42	43	6.6%	-0.08 [-0.50 , 0.34]
Mache 2016	0	0.2347	37	35	5.5%	0.11 [-0.35 , 0.57]
Mache 2017	0	0.2449	33	34	5.1%	0.25 [-0.23 , 0.73]
Mistretta 2018	0	0.3367	22	15	2.7%	0.09 [-0.57 , 0.75]
West 2014	0	0.2398	34	35	5.3%	0.00 [-0.47 , 0.47]
Subtotal (95% CI)			**677**	**678**	**95.9%**	**0.05 [-0.06 , 0.16]**
Heterogeneity: Tau² = 0.00; Chi² = 8.90, df = 9 (P = 0.45); I² = 0%						
Test for overall effect: Z = 0.96 (P = 0.34)						
2.31.2 Individual setting						
Sood 2011	0	0.3776	20	12	2.2%	0.62 [-0.12 , 1.36]
Subtotal (95% CI)			**20**	**12**	**2.2%**	**0.62 [-0.12 , 1.36]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 1.64 (P = 0.10)						
2.31.3 Combined setting						
Sood 2014	0	0.3929	13	13	2.0%	0.00 [-0.77 , 0.77]
Subtotal (95% CI)			**13**	**13**	**2.0%**	**0.00 [-0.77 , 0.77]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 0.00 (P = 1.00)						
Total (95% CI)			**710**	**703**	**100.0%**	**0.07 [-0.04 , 0.18]**
Heterogeneity: Tau² = 0.00; Chi² = 11.13, df = 11 (P = 0.43); I² = 1%						
Test for overall effect: Z = 1.23 (P = 0.22)						
Test for subgroup differences: Chi² = 2.23, df = 2 (P = 0.33), I² = 10.5%						



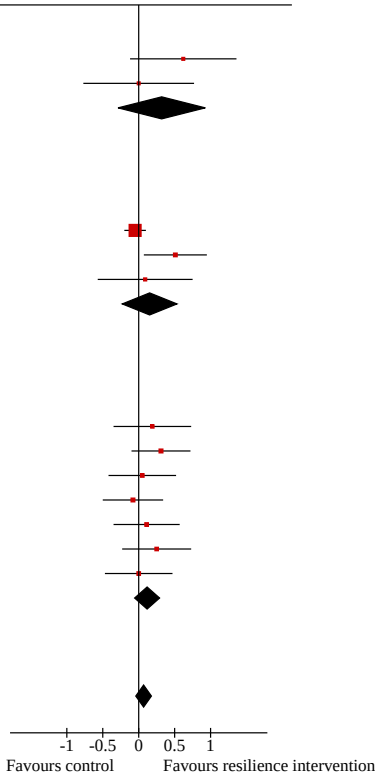
Analysis 2.32. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 32: Well-being or quality of life: short-term follow-up (≤ 3 months), subgroup analysis: delivery format

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.32.1 Face-to-face						
Bernburg 2016	0	0.2755	26	28	4.0%	0.19 [-0.35 , 0.73]
Cheung 2014	0	0.0765	364	369	48.2%	-0.05 [-0.20 , 0.10]
Hosseinnejad 2018	0	0.2236	40	40	6.1%	0.51 [0.07 , 0.95]
Mache 2015a	0	0.2398	35	33	5.3%	0.05 [-0.42 , 0.52]
Mache 2015b	0	0.2143	42	43	6.6%	-0.08 [-0.50 , 0.34]
Mache 2016	0	0.2347	37	35	5.5%	0.11 [-0.35 , 0.57]
Mache 2017	0	0.2449	33	34	5.1%	0.25 [-0.23 , 0.73]
Sood 2011	0	0.3776	20	12	2.2%	0.62 [-0.12 , 1.36]
West 2014	0	0.2398	34	35	5.3%	0.00 [-0.47 , 0.47]
Subtotal (95% CI)			**631**	**629**	**88.4%**	**0.09 [-0.06 , 0.23]**
Heterogeneity: Tau² = 0.01; Chi² = 9.61, df = 8 (P = 0.29); I² = 17%						
Test for overall effect: Z = 1.19 (P = 0.23)						
2.32.2 Combined delivery						
Lin 2019	0	0.2092	44	46	6.9%	0.31 [-0.10 , 0.72]
Mistretta 2018	0	0.3367	22	15	2.7%	0.09 [-0.57 , 0.75]
Sood 2014	0	0.3929	13	13	2.0%	0.00 [-0.77 , 0.77]
Subtotal (95% CI)			**79**	**74**	**11.6%**	**0.21 [-0.11 , 0.52]**
Heterogeneity: Tau² = 0.00; Chi² = 0.64, df = 2 (P = 0.73); I² = 0%						
Test for overall effect: Z = 1.28 (P = 0.20)						
Total (95% CI)			**710**	**703**	**100.0%**	**0.07 [-0.04 , 0.18]**
Heterogeneity: Tau² = 0.00; Chi² = 11.13, df = 11 (P = 0.43); I² = 1%						
Test for overall effect: Z = 1.23 (P = 0.22)						
Test for subgroup differences: Chi² = 0.45, df = 1 (P = 0.50), I² = 0%						



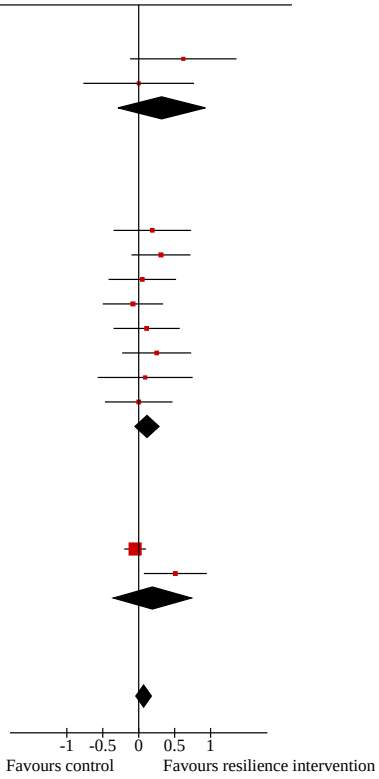
Analysis 2.33. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 33: Well-being or quality of life: short-term follow-up (≤ 3 months), subgroup analysis: intensity

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.33.1 Low intensity						
Sood 2011	0	0.3776	20	12	2.2%	0.62 [-0.12 , 1.36]
Sood 2014	0	0.3929	13	13	2.0%	0.00 [-0.77 , 0.77]
Subtotal (95% CI)			**33**	**25**	**4.1%**	**0.32 [-0.29 , 0.93]**
Heterogeneity: Tau² = 0.04; Chi² = 1.29, df = 1 (P = 0.26); I² = 23%						
Test for overall effect: Z = 1.03 (P = 0.30)						
2.33.2 Moderate intensity						
Cheung 2014	0	0.0765	364	369	48.2%	-0.05 [-0.20 , 0.10]
Hosseinnejad 2018	0	0.2236	40	40	6.1%	0.51 [0.07 , 0.95]
Mistretta 2018	0	0.3367	22	15	2.7%	0.09 [-0.57 , 0.75]
Subtotal (95% CI)			**426**	**424**	**57.0%**	**0.15 [-0.23 , 0.53]**
Heterogeneity: Tau² = 0.07; Chi² = 5.67, df = 2 (P = 0.06); I² = 65%						
Test for overall effect: Z = 0.78 (P = 0.43)						
2.33.3 High intensity						
Bernburg 2016	0	0.2755	26	28	4.0%	0.19 [-0.35 , 0.73]
Lin 2019	0	0.2092	44	46	6.9%	0.31 [-0.10 , 0.72]
Mache 2015a	0	0.2398	35	33	5.3%	0.05 [-0.42 , 0.52]
Mache 2015b	0	0.2143	42	43	6.6%	-0.08 [-0.50 , 0.34]
Mache 2016	0	0.2347	37	35	5.5%	0.11 [-0.35 , 0.57]
Mache 2017	0	0.2449	33	34	5.1%	0.25 [-0.23 , 0.73]
West 2014	0	0.2398	34	35	5.3%	0.00 [-0.47 , 0.47]
Subtotal (95% CI)			**251**	**254**	**38.8%**	**0.12 [-0.06 , 0.29]**
Heterogeneity: Tau² = 0.00; Chi² = 2.38, df = 6 (P = 0.88); I² = 0%						
Test for overall effect: Z = 1.32 (P = 0.19)						
Total (95% CI)			**710**	**703**	**100.0%**	**0.07 [-0.04 , 0.18]**
Heterogeneity: Tau² = 0.00; Chi² = 11.13, df = 11 (P = 0.43); I² = 1%						
Test for overall effect: Z = 1.23 (P = 0.22)						
Test for subgroup differences: Chi² = 0.40, df = 2 (P = 0.82), I² = 0%						

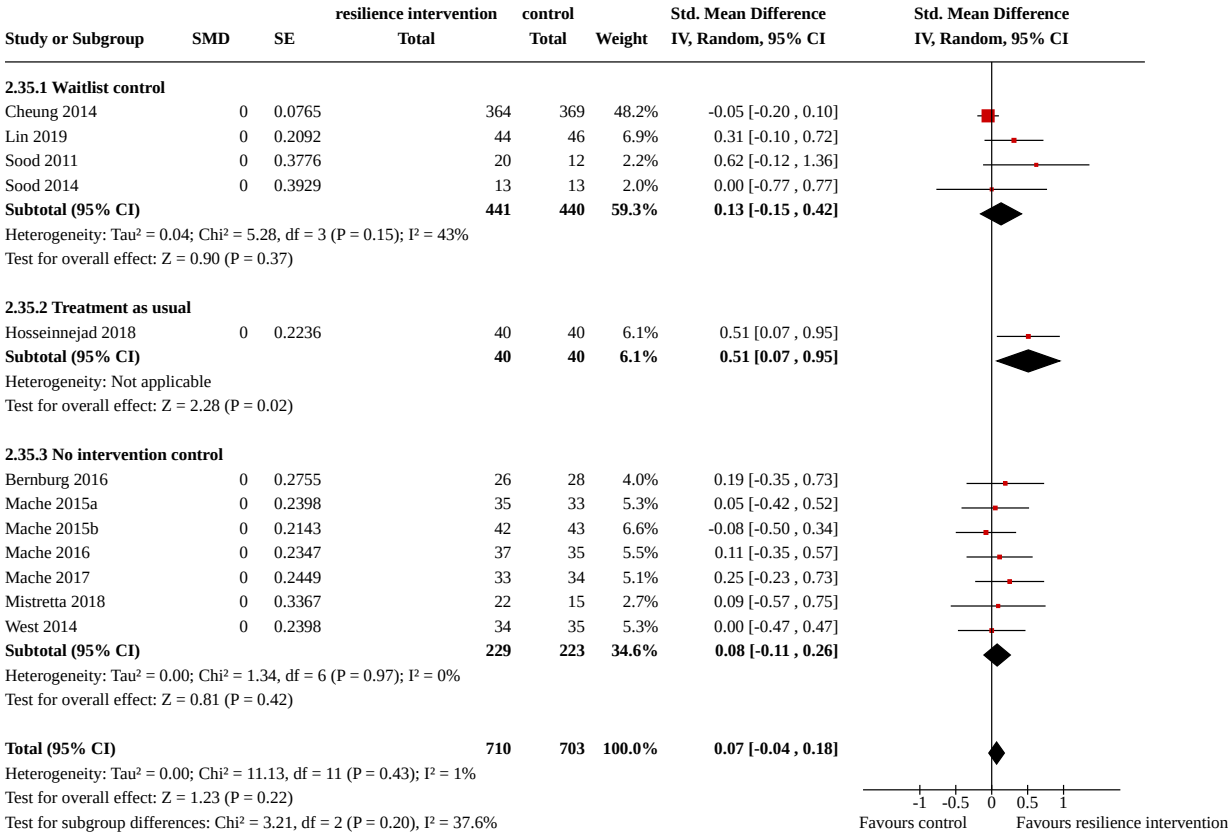


Analysis 2.34. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 34: Well-being or quality of life: short-term follow-up (≤ 3 months), subgroup analysis: theoretical foundation

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.34.1 Attention and interpretation therapy						
Sood 2011	0	0.3776	20	12	2.2%	0.62 [-0.12 , 1.36]
Sood 2014	0	0.3929	13	13	2.0%	0.00 [-0.77 , 0.77]
Subtotal (95% CI)			**33**	**25**	**4.1%**	**0.32 [-0.29 , 0.93]**
Heterogeneity: Tau² = 0.04; Chi² = 1.29, df = 1 (P = 0.26); I² = 23%						
Test for overall effect: Z = 1.03 (P = 0.30)						
2.34.2 Combination						
Bernburg 2016	0	0.2755	26	28	4.0%	0.19 [-0.35 , 0.73]
Lin 2019	0	0.2092	44	46	6.9%	0.31 [-0.10 , 0.72]
Mache 2015a	0	0.2398	35	33	5.3%	0.05 [-0.42 , 0.52]
Mache 2015b	0	0.2143	42	43	6.6%	-0.08 [-0.50 , 0.34]
Mache 2016	0	0.2347	37	35	5.5%	0.11 [-0.35 , 0.57]
Mache 2017	0	0.2449	33	34	5.1%	0.25 [-0.23 , 0.73]
Mistretta 2018	0	0.3367	22	15	2.7%	0.09 [-0.57 , 0.75]
West 2014	0	0.2398	34	35	5.3%	0.00 [-0.47 , 0.47]
Subtotal (95% CI)			**273**	**269**	**41.5%**	**0.12 [-0.05 , 0.28]**
Heterogeneity: Tau² = 0.00; Chi² = 2.38, df = 7 (P = 0.94); I² = 0%						
Test for overall effect: Z = 1.34 (P = 0.18)						
2.34.3 Unspecific resilience training						
Cheung 2014	0	0.0765	364	369	48.2%	-0.05 [-0.20 , 0.10]
Hosseinnejad 2018	0	0.2236	40	40	6.1%	0.51 [0.07 , 0.95]
Subtotal (95% CI)			**404**	**409**	**54.3%**	**0.19 [-0.35 , 0.73]**
Heterogeneity: Tau² = 0.13; Chi² = 5.61, df = 1 (P = 0.02); I² = 82%						
Test for overall effect: Z = 0.69 (P = 0.49)						
Total (95% CI)			**710**	**703**	**100.0%**	**0.07 [-0.04 , 0.18]**
Heterogeneity: Tau² = 0.00; Chi² = 11.13, df = 11 (P = 0.43); I² = 1%						
Test for overall effect: Z = 1.23 (P = 0.22)						
Test for subgroup differences: Chi² = 0.45, df = 2 (P = 0.80), I² = 0%						



Analysis 2.35. Comparison 2: Resilience intervention versus control condition for healthcare professionals: subgroup analyses (primary outcomes), Outcome 35: Well-being or quality of life: short-term follow-up (≤ 3 months), subgroup analysis: comparator



Comparison 3. Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
3.1 Resilience: post-intervention, sensitivity analysis for resilience scale (underlying state concept)	11	669	Std. Mean Difference (IV, Random, 95% CI)	0.45 [0.24, 0.67]
3.2 Resilience: post-intervention, sensitivity analysis for attrition bias (low or unclear risk of bias) including subgroup analysis	8	466	Std. Mean Difference (IV, Random, 95% CI)	0.50 [0.30, 0.71]
3.2.1 Low risk of attrition bias	7	432	Std. Mean Difference (IV, Random, 95% CI)	0.50 [0.27, 0.73]
3.2.2 Unclear risk of attrition bias	1	34	Std. Mean Difference (IV, Random, 95% CI)	0.51 [-0.18, 1.20]
3.3 Resilience: post-intervention, sensitivity analysis for trial registration (registered trials)	2	54	Std. Mean Difference (IV, Random, 95% CI)	-0.07 [-0.82, 0.67]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
3.4 Resilience: post-intervention, sensitivity analysis for level of missing data (< 10% missing data)	8	466	Std. Mean Difference (IV, Random, 95% CI)	0.50 [0.30, 0.71]
3.5 Resilience: post-intervention, sensitivity analysis for coping with missing data (< 10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)	7	393	Std. Mean Difference (IV, Random, 95% CI)	0.45 [0.25, 0.65]
3.6 Resilience: post-intervention, sensitivity analysis (fixed-effect analysis)	12	690	Std. Mean Difference (IV, Fixed, 95% CI)	0.47 [0.31, 0.62]
3.7 Resilience: short-term follow-up (≤ 3 months), sensitivity analysis for attrition bias (low risk of bias)	5	337	Std. Mean Difference (IV, Random, 95% CI)	0.31 [0.09, 0.54]
3.8 Resilience: short-term follow-up (≤ 3 months), sensitivity analysis for trial registration (registered trials)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
3.9 Resilience: short-term follow-up (≤ 3 months), sensitivity analysis for level of missing data (< 10% missing data)	4	311	Std. Mean Difference (IV, Random, 95% CI)	0.36 [0.13, 0.58]
3.10 Resilience: short-term follow-up (≤ 3 months), sensitivity analysis for coping with missing data (< 10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)	5	337	Std. Mean Difference (IV, Random, 95% CI)	0.31 [0.09, 0.54]
3.11 Resilience: short-term follow-up (≤ 3 months), sensitivity analysis (fixed-effect analysis)	11	1325	Std. Mean Difference (IV, Fixed, 95% CI)	0.18 [0.07, 0.29]
3.12 Depression: post-intervention, sensitivity analysis for attrition bias (low risk of bias)	5	169	Std. Mean Difference (IV, Random, 95% CI)	-0.41 [-0.72, -0.11]
3.13 Depression: post-intervention, sensitivity analysis for reporting bias (low risk of reporting bias)	10	510	Std. Mean Difference (IV, Random, 95% CI)	-0.30 [-0.61, 0.01]
3.14 Depression: post-intervention, sensitivity analysis for trial registration (registered trials)	6	289	Std. Mean Difference (IV, Random, 95% CI)	-0.10 [-0.33, 0.14]
3.15 Depression: post-intervention, sensitivity analysis for level of missing data (< 10% missing data)	6	239	Std. Mean Difference (IV, Random, 95% CI)	-0.34 [-0.60, -0.09]
3.16 Depression: post-intervention, sensitivity analysis for coping with missing data (<10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)	8	410	Std. Mean Difference (IV, Random, 95% CI)	-0.33 [-0.53, -0.14]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
3.17 Depression: post-intervention, sensitivity analysis (fixed-effect analysis)	14	788	Std. Mean Difference (IV, Fixed, 95% CI)	-0.28 [-0.43, -0.14]
3.18 Stress or stress perception: post-intervention, sensitivity analysis for attrition bias (low or unclear risk of bias) including subgroup analysis	10	621	Std. Mean Difference (IV, Random, 95% CI)	-0.75 [-1.47, -0.02]
3.18.1 Low risk of attrition bias	8	445	Std. Mean Difference (IV, Random, 95% CI)	-0.38 [-0.69, -0.07]
3.18.2 Unclear risk of attrition bias	2	176	Std. Mean Difference (IV, Random, 95% CI)	-2.27 [-6.61, 2.06]
3.19 Stress or stress perception: post-intervention, sensitivity analysis for reporting bias (low risk of bias)	13	822	Std. Mean Difference (IV, Random, 95% CI)	-0.81 [-1.38, -0.25]
3.20 Stress or stress perception: post-intervention, sensitivity analysis for trial registration (registered trials)	5	197	Std. Mean Difference (IV, Random, 95% CI)	-0.15 [-0.43, 0.14]
3.21 Stress or stress perception: post-intervention, sensitivity analysis for level of missing data (< 10% missing data)	11	690	Std. Mean Difference (IV, Random, 95% CI)	-0.64 [-1.30, 0.02]
3.22 Stress or stress perception: post-intervention, sensitivity analysis for coping with missing data (< 10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)	12	727	Std. Mean Difference (IV, Random, 95% CI)	-0.62 [-1.23, -0.01]
3.23 Stress or stress perception: post-intervention, sensitivity analysis (fixed-effect analysis)	17	997	Std. Mean Difference (IV, Fixed, 95% CI)	-0.56 [-0.70, -0.42]
3.24 Stress or stress perception: short-term follow-up (≤ 3 months), sensitivity analysis for attrition bias (low or unclear risk of bias) including subgroup analysis	7	427	Std. Mean Difference (IV, Random, 95% CI)	-0.30 [-0.52, -0.07]
3.24.1 Low risk of attrition bias	6	373	Std. Mean Difference (IV, Random, 95% CI)	-0.35 [-0.58, -0.11]
3.24.2 Unclear risk of attrition bias	1	54	Std. Mean Difference (IV, Random, 95% CI)	0.02 [-0.52, 0.55]
3.25 Stress or stress perception: short-term follow-up (≤ 3 months), sensitivity analysis for reporting bias (low risk of bias)	11	644	Std. Mean Difference (IV, Random, 95% CI)	-0.52 [-0.75, -0.29]
3.26 Stress or stress perception: short-term follow-up (≤ 3 months), sensitivity analysis for trial registration (registered trials)	3	144	Std. Mean Difference (IV, Random, 95% CI)	-0.22 [-0.71, 0.28]

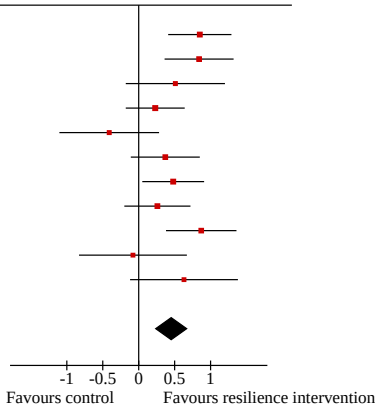
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
3.27 Stress or stress perception: short-term follow-up (≤ 3 months), sensitivity analysis for level of missing data (< 10% missing data)	7	471	Std. Mean Difference (IV, Random, 95% CI)	-0.27 [-0.53, -0.00]
3.28 Stress or stress perception: short-term follow-up (≤ 3 months), sensitivity analysis for coping with missing data (<10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)	9	534	Std. Mean Difference (IV, Random, 95% CI)	-0.27 [-0.49, -0.06]
3.29 Stress or stress perception: short-term follow-up (≤ 3 months), sensitivity analysis (fixed-effect analysis)	14	788	Std. Mean Difference (IV, Fixed, 95% CI)	-0.43 [-0.58, -0.29]
3.30 Well-being or quality of life: post-intervention, sensitivity analysis for attrition bias (low or unclear risk of bias) including subgroup analysis	8	1112	Std. Mean Difference (IV, Random, 95% CI)	0.15 [-0.06, 0.35]
3.30.1 Low risk of attrition bias	6	1024	Std. Mean Difference (IV, Random, 95% CI)	0.09 [-0.13, 0.31]
3.30.2 Unclear risk of attrition bias	2	88	Std. Mean Difference (IV, Random, 95% CI)	0.38 [-0.04, 0.80]
3.31 Well-being or quality of life: post-intervention, sensitivity analysis for reporting bias (low risk of bias)	9	628	Std. Mean Difference (IV, Random, 95% CI)	0.20 [0.03, 0.36]
3.32 Well-being or quality of life: post-intervention, sensitivity analysis for trial registration (registered trials)	3	834	Std. Mean Difference (IV, Random, 95% CI)	-0.04 [-0.18, 0.10]
3.33 Well-being or quality of life: post-intervention, sensitivity analysis for level of missing data (< 10% missing data)	7	412	Std. Mean Difference (IV, Random, 95% CI)	0.20 [-0.06, 0.46]
3.34 Well-being or quality of life: post-intervention, sensitivity analysis for coping with missing data (<10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)	9	1179	Std. Mean Difference (IV, Random, 95% CI)	0.11 [-0.08, 0.29]
3.35 Well-being or quality of life: post-intervention, sensitivity analysis (fixed-effect analysis)	13	1494	Std. Mean Difference (IV, Fixed, 95% CI)	0.08 [-0.02, 0.19]
3.36 Well-being or quality of life: short-term follow-up (≤ 3 months), sensitivity analysis for attrition bias (low or unclear risk of bias) including subgroup analysis	7	422	Std. Mean Difference (IV, Random, 95% CI)	0.14 [-0.05, 0.33]
3.36.1 Low risk of attrition bias	5	288	Std. Mean Difference (IV, Random, 95% CI)	0.03 [-0.20, 0.26]
3.36.2 Unclear risk of attrition bias	2	134	Std. Mean Difference (IV, Random, 95% CI)	0.38 [0.04, 0.72]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
3.37 Well-being or quality of life: short-term follow-up (≤ 3 months), sensitivity analysis for reporting bias (low risk of bias)	9	1227	Std. Mean Difference (IV, Random, 95% CI)	0.03 [-0.08, 0.14]
3.38 Well-being or quality of life: short-term follow-up (≤ 3 months), sensitivity analysis for trial registration (registered trials)	4	919	Std. Mean Difference (IV, Random, 95% CI)	0.10 [-0.17, 0.36]
3.39 Well-being or quality of life: short-term follow-up (≤ 3 months), sensitivity analysis for level of missing data (<10% missing data)	5	348	Std. Mean Difference (IV, Random, 95% CI)	0.04 [-0.17, 0.25]
3.40 Well-being or quality of life: short-term follow-up (≤ 3 months), sensitivity analysis for coping with missing data (<10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)	7	411	Std. Mean Difference (IV, Random, 95% CI)	0.04 [-0.15, 0.24]
3.41 Well-being or quality of life: short-term follow-up (≤ 3 months), sensitivity analysis (fixed-effect analysis)	12	1413	Std. Mean Difference (IV, Fixed, 95% CI)	0.06 [-0.04, 0.17]

Analysis 3.1. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 1: Resilience: post-intervention, sensitivity analysis for resilience scale (underlying state concept)

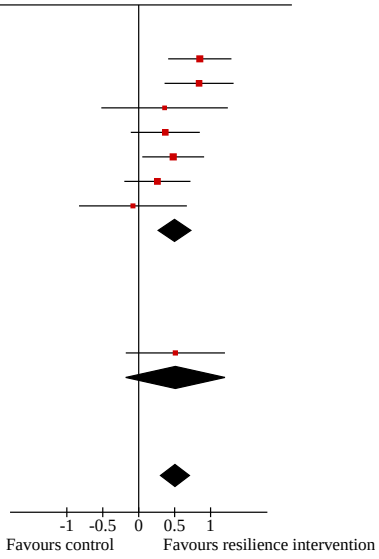
Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2019	0	0.2245	44	42	11.1%	0.85 [0.41 , 1.29]
Khoshnazary 2016	0	0.2449	35	38	10.2%	0.84 [0.36 , 1.32]
Klatt 2015	0	0.352	17	17	6.6%	0.51 [-0.18 , 1.20]
Lin 2019	0	0.2092	44	46	11.8%	0.23 [-0.18 , 0.64]
Loiselle 2018	0	0.3537	15	18	6.6%	-0.41 [-1.10 , 0.28]
Mache 2015a	0	0.2449	35	33	10.2%	0.37 [-0.11 , 0.85]
Mache 2015b	0	0.2194	42	43	11.3%	0.48 [0.05 , 0.91]
Mache 2016	0	0.2347	37	35	10.6%	0.26 [-0.20 , 0.72]
Mache 2017	0	0.25	37	35	10.0%	0.87 [0.38 , 1.36]
Mealer 2014	0	0.3827	13	14	5.9%	-0.08 [-0.83 , 0.67]
Schroeder 2016	0	0.3827	15	14	5.9%	0.63 [-0.12 , 1.38]
Total (95% CI)			**334**	**335**	**100.0%**	**0.45 [0.24 , 0.67]**

Heterogeneity: Tau² = 0.06; Chi² = 18.44, df = 10 (P = 0.05); I² = 46%
Test for overall effect: Z = 4.11 (P < 0.0001)
Test for subgroup differences: Not applicable



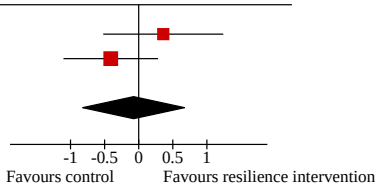
Analysis 3.2. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 2: Resilience: post-intervention, sensitivity analysis for attrition bias (low or unclear risk of bias) including subgroup analysis

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
3.2.1 Low risk of attrition bias						
Bernburg 2019	0	0.2245	44	42	17.1%	0.85 [0.41 , 1.29]
Khoshnazary 2016	0	0.2449	35	38	14.8%	0.84 [0.36 , 1.32]
Lebares 2018	0	0.449	12	9	5.0%	0.36 [-0.52 , 1.24]
Mache 2015a	0	0.2449	35	33	14.8%	0.37 [-0.11 , 0.85]
Mache 2015b	0	0.2194	42	43	17.8%	0.48 [0.05 , 0.91]
Mache 2016	0	0.2347	37	35	15.9%	0.26 [-0.20 , 0.72]
Mealer 2014	0	0.3827	13	14	6.7%	-0.08 [-0.83 , 0.67]
Subtotal (95% CI)			**218**	**214**	**92.2%**	**0.50 [0.27 , 0.73]**
Heterogeneity: Tau² = 0.02; Chi² = 8.08, df = 6 (P = 0.23); I² = 26%						
Test for overall effect: Z = 4.29 (P < 0.0001)						
3.2.2 Unclear risk of attrition bias						
Klatt 2015	0	0.352	17	17	7.8%	0.51 [-0.18 , 1.20]
Subtotal (95% CI)			**17**	**17**	**7.8%**	**0.51 [-0.18 , 1.20]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 1.45 (P = 0.15)						
Total (95% CI)			**235**	**231**	**100.0%**	**0.50 [0.30 , 0.71]**
Heterogeneity: Tau² = 0.01; Chi² = 8.08, df = 7 (P = 0.33); I² = 13%						
Test for overall effect: Z = 4.91 (P < 0.00001)						
Test for subgroup differences: Chi² = 0.00, df = 1 (P = 0.97), I² = 0%						



Analysis 3.3. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 3: Resilience: post-intervention, sensitivity analysis for trial registration (registered trials)

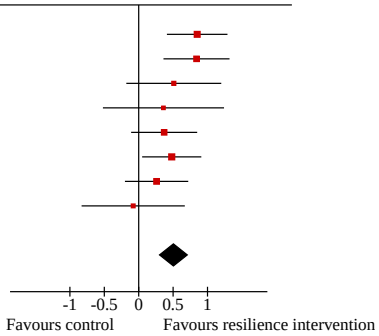
Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Lebares 2018	0	0.449	12	9	43.5%	0.36 [-0.52 , 1.24]
Loiselle 2018	0	0.3537	15	18	56.5%	-0.41 [-1.10 , 0.28]
Total (95% CI)			**27**	**27**	**100.0%**	**-0.07 [-0.82 , 0.67]**
Heterogeneity: Tau² = 0.13; Chi² = 1.81, df = 1 (P = 0.18); I² = 45%						
Test for overall effect: Z = 0.20 (P = 0.84)						
Test for subgroup differences: Not applicable						



Analysis 3.4. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 4: Resilience: post-intervention, sensitivity analysis for level of missing data (< 10% missing data)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2019	0	0.2245	44	42	17.1%	0.85 [0.41 , 1.29]
Khoshnazary 2016	0	0.2449	35	38	14.8%	0.84 [0.36 , 1.32]
Klatt 2015	0	0.352	17	17	7.8%	0.51 [-0.18 , 1.20]
Lebares 2018	0	0.449	12	9	5.0%	0.36 [-0.52 , 1.24]
Mache 2015a	0	0.2449	35	33	14.8%	0.37 [-0.11 , 0.85]
Mache 2015b	0	0.2194	42	43	17.8%	0.48 [0.05 , 0.91]
Mache 2016	0	0.2347	37	35	15.9%	0.26 [-0.20 , 0.72]
Mealer 2014	0	0.3827	13	14	6.7%	-0.08 [-0.83 , 0.67]
Total (95% CI)			**235**	**231**	**100.0%**	**0.50 [0.30 , 0.71]**

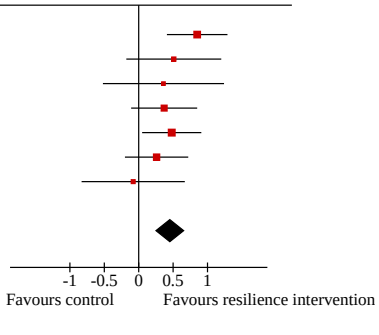
Heterogeneity: Tau² = 0.01; Chi² = 8.08, df = 7 (P = 0.33); I² = 13%
Test for overall effect: Z = 4.91 (P < 0.00001)
Test for subgroup differences: Not applicable



Analysis 3.5. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 5: Resilience: post-intervention, sensitivity analysis for coping with missing data (< 10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2019	0	0.2245	44	42	20.8%	0.85 [0.41 , 1.29]
Klatt 2015	0	0.352	17	17	8.5%	0.51 [-0.18 , 1.20]
Lebares 2018	0	0.449	12	9	5.2%	0.36 [-0.52 , 1.24]
Mache 2015a	0	0.2449	35	33	17.5%	0.37 [-0.11 , 0.85]
Mache 2015b	0	0.2194	42	43	21.8%	0.48 [0.05 , 0.91]
Mache 2016	0	0.2347	37	35	19.0%	0.26 [-0.20 , 0.72]
Mealer 2014	0	0.3827	13	14	7.2%	-0.08 [-0.83 , 0.67]
Total (95% CI)			**200**	**193**	**100.0%**	**0.45 [0.25 , 0.65]**

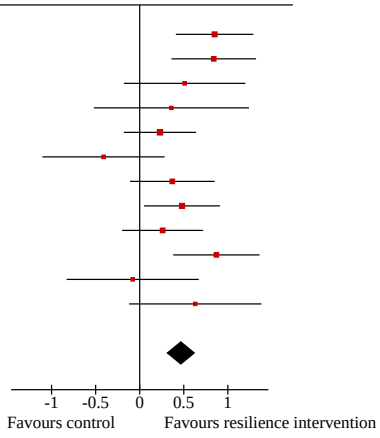
Heterogeneity: Tau² = 0.00; Chi² = 5.94, df = 6 (P = 0.43); I² = 0%
Test for overall effect: Z = 4.41 (P < 0.0001)
Test for subgroup differences: Not applicable



Analysis 3.6. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 6: Resilience: post-intervention, sensitivity analysis (fixed-effect analysis)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Bernburg 2019	0	0.2245	44	42	12.0%	0.85 [0.41 , 1.29]
Khoshnazary 2016	0	0.2449	35	38	10.1%	0.84 [0.36 , 1.32]
Klatt 2015	0	0.352	17	17	4.9%	0.51 [-0.18 , 1.20]
Lebares 2018	0	0.449	12	9	3.0%	0.36 [-0.52 , 1.24]
Lin 2019	0	0.2092	44	46	13.8%	0.23 [-0.18 , 0.64]
Loiselle 2018	0	0.3537	15	18	4.8%	-0.41 [-1.10 , 0.28]
Mache 2015a	0	0.2449	35	33	10.1%	0.37 [-0.11 , 0.85]
Mache 2015b	0	0.2194	42	43	12.5%	0.48 [0.05 , 0.91]
Mache 2016	0	0.2347	37	35	11.0%	0.26 [-0.20 , 0.72]
Mache 2017	0	0.25	37	35	9.7%	0.87 [0.38 , 1.36]
Mealer 2014	0	0.3827	13	14	4.1%	-0.08 [-0.83 , 0.67]
Schroeder 2016	0	0.3827	15	14	4.1%	0.63 [-0.12 , 1.38]
Total (95% CI)			**346**	**344**	**100.0%**	**0.47 [0.31 , 0.62]**

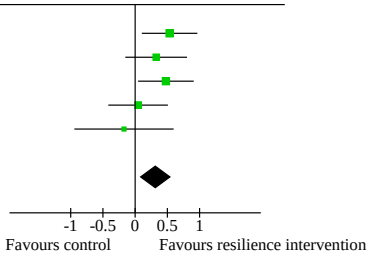
Heterogeneity: Chi² = 18.49, df = 11 (P = 0.07); I² = 41%
Test for overall effect: Z = 6.01 (P < 0.00001)
Test for subgroup differences: Not applicable



Analysis 3.7. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 7: Resilience: short-term follow-up (≤ 3 months), sensitivity analysis for attrition bias (low risk of bias)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2019	3.01	0.5	44	2.71	0.61	42	24.7%	0.53 [0.10 , 0.96]
Mache 2015a	61	17.4	35	55.3	17.1	33	20.4%	0.33 [-0.15 , 0.81]
Mache 2015b	61.5	17.9	42	52.9	17.8	43	24.7%	0.48 [0.05 , 0.91]
Mache 2016	57.2	17.2	37	56.4	17.2	35	21.8%	0.05 [-0.42 , 0.51]
Sood 2014	73	11.5	13	74.8	8.4	13	8.4%	-0.17 [-0.94 , 0.60]
Total (95% CI)			**171**			**166**	**100.0%**	**0.31 [0.09 , 0.54]**

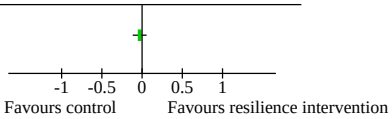
Heterogeneity: Tau² = 0.01; Chi² = 4.39, df = 4 (P = 0.36); I² = 9%
Test for overall effect: Z = 2.69 (P = 0.007)
Test for subgroup differences: Not applicable



Analysis 3.8. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 8: Resilience: short-term follow-up (≤ 3 months), sensitivity analysis for trial registration (registered trials)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Cheung 2014	2.42	0.63	364	2.45	0.56	369	-0.03 [-0.12 , 0.06]

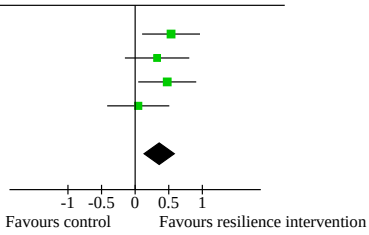
Test for subgroup differences: Not applicable



Analysis 3.9. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 9: Resilience: short-term follow-up (≤ 3 months), sensitivity analysis for level of missing data (< 10% missing data)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2019	3.01	0.5	44	2.71	0.61	42	27.2%	0.53 [0.10 , 0.96]
Mache 2015a	61	17.4	35	55.3	17.1	33	22.0%	0.33 [-0.15 , 0.81]
Mache 2015b	61.5	17.9	42	52.9	17.8	43	27.1%	0.48 [0.05 , 0.91]
Mache 2016	57.2	17.2	37	56.4	17.2	35	23.6%	0.05 [-0.42 , 0.51]
Total (95% CI)			**158**			**153**	**100.0%**	**0.36 [0.13 , 0.58]**

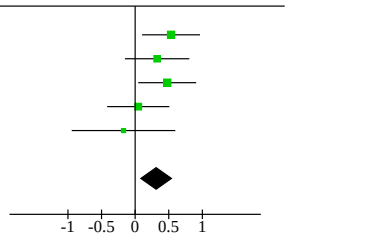
Heterogeneity: Tau² = 0.00; Chi² = 2.71, df = 3 (P = 0.44); I² = 0%
Test for overall effect: Z = 3.12 (P = 0.002)
Test for subgroup differences: Not applicable



Analysis 3.10. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 10: Resilience: short-term follow-up (≤ 3 months), sensitivity analysis for coping with missing data (< 10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2019	3.01	0.5	44	2.71	0.61	42	24.7%	0.53 [0.10 , 0.96]
Mache 2015a	61	17.4	35	55.3	17.1	33	20.4%	0.33 [-0.15 , 0.81]
Mache 2015b	61.5	17.9	42	52.9	17.8	43	24.7%	0.48 [0.05 , 0.91]
Mache 2016	57.2	17.2	37	56.4	17.2	35	21.8%	0.05 [-0.42 , 0.51]
Sood 2014	73	11.5	13	74.8	8.4	13	8.4%	-0.17 [-0.94 , 0.60]
Total (95% CI)			**171**			**166**	**100.0%**	**0.31 [0.09 , 0.54]**

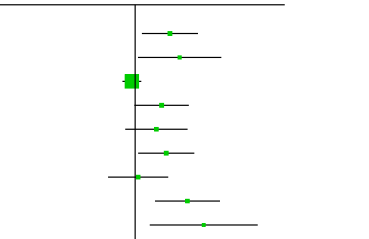
Heterogeneity: Tau² = 0.01; Chi² = 4.39, df = 4 (P = 0.36); I² = 9%
Test for overall effect: Z = 2.69 (P = 0.007)
Test for subgroup differences: Not applicable



Analysis 3.11. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 11: Resilience: short-term follow-up (≤ 3 months), sensitivity analysis (fixed-effect analysis)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Bernburg 2019	3.01	0.5	44	2.71	0.61	42	6.4%	0.53 [0.10 , 0.96]
Chesak 2015	79.74	11.82	19	72.52	8.83	21	2.9%	0.68 [0.04 , 1.32]
Cheung 2014	2.42	0.63	364	2.45	0.56	369	56.4%	-0.05 [-0.20 , 0.09]
Lin 2019	59.7	11.87	44	53.85	16.21	46	6.8%	0.41 [-0.01 , 0.82]
Mache 2015a	61	17.4	35	55.3	17.1	33	5.2%	0.33 [-0.15 , 0.81]
Mache 2015b	61.5	17.9	42	52.9	17.8	43	6.4%	0.48 [0.05 , 0.91]
Mache 2016	57.2	17.2	37	56.4	17.2	35	5.5%	0.05 [-0.42 , 0.51]
Mache 2017	4.1	0.71	33	3.51	0.74	34	4.8%	0.80 [0.30 , 1.30]
Schroeder 2016	24.15	5.47	13	18.28	5.32	13	1.7%	1.05 [0.22 , 1.88]
Sood 2011	79.4	11.3	20	67.2	11.6	12	2.0%	1.04 [0.28 , 1.81]
Sood 2014	73	11.5	13	74.8	8.4	13	2.0%	-0.17 [-0.94 , 0.60]
Total (95% CI)			**664**			**661**	**100.0%**	**0.18 [0.07 , 0.29]**

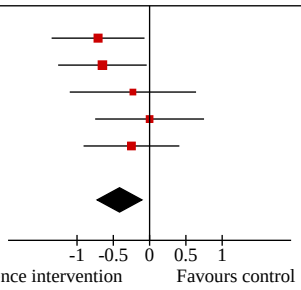
Heterogeneity: Chi² = 34.27, df = 10 (P = 0.0002); I² = 71%
Test for overall effect: Z = 3.18 (P = 0.001)
Test for subgroup differences: Not applicable



Analysis 3.12. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 12: Depression: post-intervention, sensitivity analysis for attrition bias (low risk of bias)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Alexander 2015	0	0.3265	20	20	23.2%	-0.71 [-1.35 , -0.07]
Ireland 2017	0	0.3112	23	21	25.5%	-0.65 [-1.26 , -0.04]
Lebares 2018	0	0.4439	12	9	12.6%	-0.23 [-1.10 , 0.64]
Mealer 2014	0	0.3827	13	14	16.9%	0.00 [-0.75 , 0.75]
Mistretta 2018	0	0.3367	22	15	21.8%	-0.25 [-0.91 , 0.41]
Total (95% CI)			**90**	**79**	**100.0%**	**-0.41 [-0.72 , -0.11]**

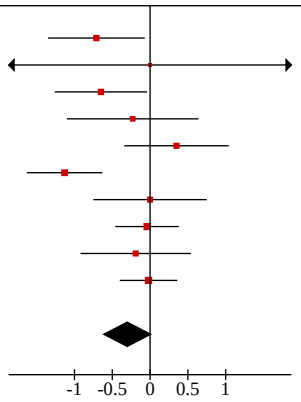
Heterogeneity: Tau² = 0.00; Chi² = 2.98, df = 4 (P = 0.56); I² = 0%
Test for overall effect: Z = 2.63 (P = 0.008)
Test for subgroup differences: Not applicable



Analysis 3.13. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 13: Depression: post-intervention, sensitivity analysis for reporting bias (low risk of reporting bias)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Alexander 2015	0	0.3265	20	20	10.6%	-0.71 [-1.35 , -0.07]
Calder Calisi 2017	0	3.366	24	22	0.2%	0.00 [-6.60 , 6.60]
Ireland 2017	0	0.3112	23	21	11.1%	-0.65 [-1.26 , -0.04]
Lebares 2018	0	0.4439	12	9	7.7%	-0.23 [-1.10 , 0.64]
Loiselle 2018	0	0.3526	15	18	9.9%	0.35 [-0.34 , 1.04]
Mache 2017	0	0.2551	37	35	12.9%	-1.13 [-1.63 , -0.63]
Mealer 2014	0	0.3827	13	14	9.1%	0.00 [-0.75 , 0.75]
Medisauskaite 2019	0	0.2143	39	52	14.3%	-0.04 [-0.46 , 0.38]
Schroeder 2016	0	0.3725	15	14	9.3%	-0.19 [-0.92 , 0.54]
West 2015	0	0.1939	51	56	15.0%	-0.02 [-0.40 , 0.36]
Total (95% CI)			**249**	**261**	**100.0%**	**-0.30 [-0.61 , 0.01]**

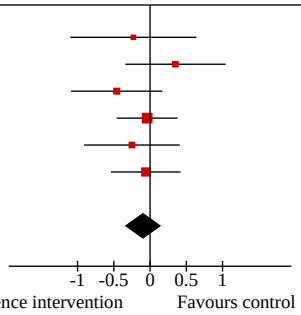
Heterogeneity: Tau² = 0.13; Chi² = 21.10, df = 9 (P = 0.01); I² = 57%
Test for overall effect: Z = 1.92 (P = 0.06)
Test for subgroup differences: Not applicable



Analysis 3.14. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 14: Depression: post-intervention, sensitivity analysis for trial registration (registered trials)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Lebares 2018	0	0.4439	12	9	7.2%	-0.23 [-1.10 , 0.64]
Loiselle 2018	0	0.3526	15	18	11.5%	0.35 [-0.34 , 1.04]
Luthar 2017	0	0.3214	21	19	13.8%	-0.46 [-1.09 , 0.17]
Medisauskaite 2019	0	0.2143	39	52	31.1%	-0.04 [-0.46 , 0.38]
Mistretta 2018	0	0.3367	22	15	12.6%	-0.25 [-0.91 , 0.41]
West 2014	0	0.2449	34	33	23.8%	-0.06 [-0.54 , 0.42]
Total (95% CI)			**143**	**146**	**100.0%**	**-0.10 [-0.33 , 0.14]**

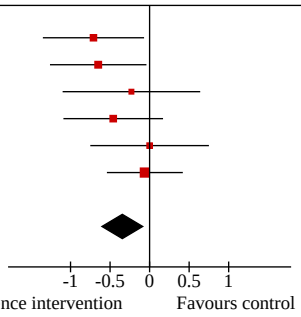
Heterogeneity: Tau² = 0.00; Chi² = 3.27, df = 5 (P = 0.66); I² = 0%
Test for overall effect: Z = 0.82 (P = 0.41)
Test for subgroup differences: Not applicable



Analysis 3.15. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 15: Depression: post-intervention, sensitivity analysis for level of missing data (< 10% missing data)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Alexander 2015	0	0.3265	20	20	16.2%	-0.71 [-1.35 , -0.07]
Ireland 2017	0	0.3112	23	21	17.8%	-0.65 [-1.26 , -0.04]
Lebares 2018	0	0.4439	12	9	8.8%	-0.23 [-1.10 , 0.64]
Luthar 2017	0	0.3214	21	19	16.7%	-0.46 [-1.09 , 0.17]
Mealer 2014	0	0.3827	13	14	11.8%	0.00 [-0.75 , 0.75]
West 2014	0	0.2449	34	33	28.8%	-0.06 [-0.54 , 0.42]
Total (95% CI)			**123**	**116**	**100.0%**	**-0.34 [-0.60 , -0.09]**

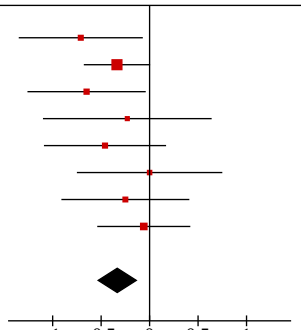
Heterogeneity: Tau² = 0.00; Chi² = 4.57, df = 5 (P = 0.47); I² = 0%
Test for overall effect: Z = 2.63 (P = 0.009)
Test for subgroup differences: Not applicable



Analysis 3.16. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 16: Depression: post-intervention, sensitivity analysis for coping with missing data (<10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Alexander 2015	0	0.3265	20	20	9.4%	-0.71 [-1.35 , -0.07]
Cieslak 2016	0	0.1745	72	62	33.0%	-0.34 [-0.68 , 0.01]
Ireland 2017	0	0.3112	23	21	10.4%	-0.65 [-1.26 , -0.04]
Lebares 2018	0	0.4439	12	9	5.1%	-0.23 [-1.10 , 0.64]
Luthar 2017	0	0.3214	21	19	9.7%	-0.46 [-1.09 , 0.17]
Mealer 2014	0	0.3827	13	14	6.9%	0.00 [-0.75 , 0.75]
Mistretta 2018	0	0.3367	22	15	8.9%	-0.25 [-0.91 , 0.41]
West 2014	0	0.2449	34	33	16.7%	-0.06 [-0.54 , 0.42]
Total (95% CI)			**217**	**193**	**100.0%**	**-0.33 [-0.53 , -0.14]**

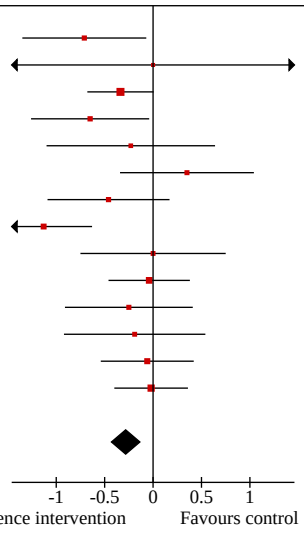
Heterogeneity: Tau² = 0.00; Chi² = 4.64, df = 7 (P = 0.70); I² = 0%
Test for overall effect: Z = 3.33 (P = 0.0009)
Test for subgroup differences: Not applicable



Analysis 3.17. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 17: Depression: post-intervention, sensitivity analysis (fixed-effect analysis)

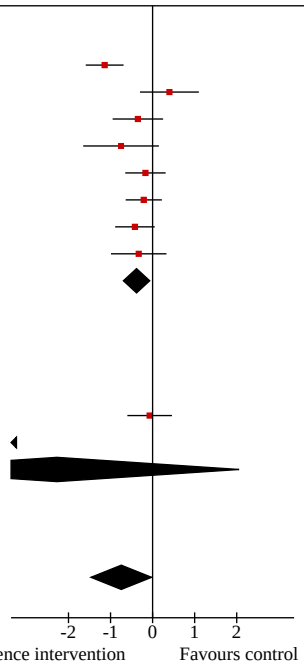
Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Alexander 2015	0	0.3265	20	20	5.2%	-0.71 [-1.35 , -0.07]
Calder Calisi 2017	0	3.366	24	22	0.0%	0.00 [-6.60 , 6.60]
Cieslak 2016	0	0.1745	72	62	18.4%	-0.34 [-0.68 , 0.01]
Ireland 2017	0	0.3112	23	21	5.8%	-0.65 [-1.26 , -0.04]
Lebares 2018	0	0.4439	12	9	2.8%	-0.23 [-1.10 , 0.64]
Loiselle 2018	0	0.3526	15	18	4.5%	0.35 [-0.34 , 1.04]
Luthar 2017	0	0.3214	21	19	5.4%	-0.46 [-1.09 , 0.17]
Mache 2017	0	0.2551	37	35	8.6%	-1.13 [-1.63 , -0.63]
Mealer 2014	0	0.3827	13	14	3.8%	0.00 [-0.75 , 0.75]
Medisauskaite 2019	0	0.2143	39	52	12.2%	-0.04 [-0.46 , 0.38]
Mistretta 2018	0	0.3367	22	15	4.9%	-0.25 [-0.91 , 0.41]
Schroeder 2016	0	0.3725	15	14	4.0%	-0.19 [-0.92 , 0.54]
West 2014	0	0.2449	34	33	9.3%	-0.06 [-0.54 , 0.42]
West 2015	0	0.1939	51	56	14.9%	-0.02 [-0.40 , 0.36]
Total (95% CI)			**398**	**390**	**100.0%**	**-0.28 [-0.43 , -0.14]**

Heterogeneity: Chi² = 22.34, df = 13 (P = 0.05); I² = 42%
Test for overall effect: Z = 3.78 (P = 0.0002)
Test for subgroup differences: Not applicable



Analysis 3.18. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 18: Stress or stress perception: post-intervention, sensitivity analysis for attrition bias (low or unclear risk of bias) including subgroup analysis

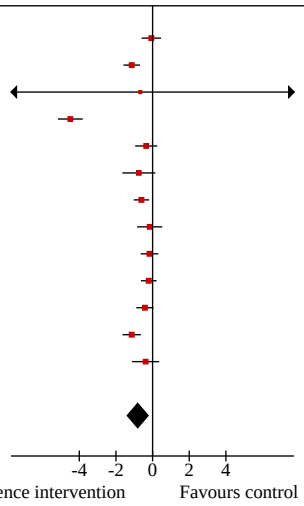
Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
3.18.1 Low risk of attrition bias						
Bernburg 2019	0	0.2296	44	42	10.3%	-1.14 [-1.59 , -0.69]
Duchemin 2015	0	0.3571	16	16	9.8%	0.40 [-0.30 , 1.10]
Ireland 2017	0	0.3061	23	21	10.0%	-0.35 [-0.95 , 0.25]
Lebares 2018	0	0.4592	12	9	9.2%	-0.75 [-1.65 , 0.15]
Mache 2015a	0	0.2449	35	33	10.3%	-0.17 [-0.65 , 0.31]
Mache 2015b	0	0.2194	42	43	10.4%	-0.21 [-0.64 , 0.22]
Mache 2016	0	0.2398	37	35	10.3%	-0.42 [-0.89 , 0.05]
Mistretta 2018	0	0.3367	22	15	9.9%	-0.33 [-0.99 , 0.33]
Subtotal (95% CI)			**231**	**214**	**80.0%**	**-0.38 [-0.69 , -0.07]**
Heterogeneity: Tau² = 0.12; Chi² = 17.69, df = 7 (P = 0.01); I² = 60%						
Test for overall effect: Z = 2.39 (P = 0.02)						
3.18.2 Unclear risk of attrition bias						
Bernburg 2016	0	0.2704	26	28	10.2%	-0.07 [-0.60 , 0.46]
Fei 2019	0	0.3469	61	61	9.8%	-4.49 [-5.17 , -3.81]
Subtotal (95% CI)			**87**	**89**	**20.0%**	**-2.27 [-6.61 , 2.06]**
Heterogeneity: Tau² = 9.67; Chi² = 100.99, df = 1 (P < 0.00001); I² = 99%						
Test for overall effect: Z = 1.03 (P = 0.30)						
Total (95% CI)			**318**	**303**	**100.0%**	**-0.75 [-1.47 , -0.02]**
Heterogeneity: Tau² = 1.26; Chi² = 151.01, df = 9 (P < 0.00001); I² = 94%						
Test for overall effect: Z = 2.03 (P = 0.04)						
Test for subgroup differences: Chi² = 0.73, df = 1 (P = 0.39), I² = 0%						



Analysis 3.19. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 19: Stress or stress perception: post-intervention, sensitivity analysis for reporting bias (low risk of bias)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	0	0.2704	26	28	8.4%	-0.07 [-0.60 , 0.46]
Bernburg 2019	0	0.2296	44	42	8.6%	-1.14 [-1.59 , -0.69]
Calder Calisi 2017	0	4.487	24	22	0.4%	-0.67 [-9.47 , 8.12]
Fei 2019	0	0.3469	61	61	8.0%	-4.49 [-5.17 , -3.81]
Ireland 2017	0	0.3061	23	21	8.3%	-0.35 [-0.95 , 0.25]
Lebares 2018	0	0.4592	12	9	7.4%	-0.75 [-1.65 , 0.15]
Lin 2019	0	0.2143	44	46	8.7%	-0.61 [-1.03 , -0.19]
Loiselle 2018	0	0.3502	15	18	8.0%	-0.16 [-0.85 , 0.53]
Mache 2015a	0	0.2449	35	33	8.5%	-0.17 [-0.65 , 0.31]
Mache 2015b	0	0.2194	42	43	8.7%	-0.21 [-0.64 , 0.22]
Mache 2016	0	0.2398	37	35	8.6%	-0.42 [-0.89 , 0.05]
Mache 2017	0	0.2551	37	35	8.5%	-1.14 [-1.64 , -0.64]
Schroeder 2016	0	0.3776	15	14	7.9%	-0.38 [-1.12 , 0.36]
Total (95% CI)			**415**	**407**	**100.0%**	**-0.81 [-1.38 , -0.25]**

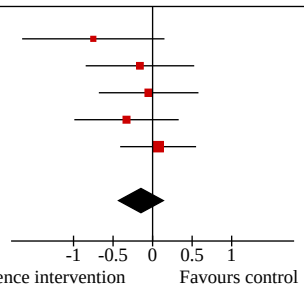
Heterogeneity: Tau² = 0.91; Chi² = 147.04, df = 12 (P < 0.00001); I² = 92%
Test for overall effect: Z = 2.82 (P = 0.005)
Test for subgroup differences: Not applicable



Analysis 3.20. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 20: Stress or stress perception: post-intervention, sensitivity analysis for trial registration (registered trials)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Lebares 2018	0	0.4592	12	9	9.9%	-0.75 [-1.65 , 0.15]
Loiselle 2018	0	0.3502	15	18	17.0%	-0.16 [-0.85 , 0.53]
Luthar 2017	0	0.3214	21	18	20.1%	-0.05 [-0.68 , 0.58]
Mistretta 2018	0	0.3367	22	15	18.3%	-0.33 [-0.99 , 0.33]
West 2014	0	0.2449	34	33	34.7%	0.07 [-0.41 , 0.55]
Total (95% CI)			**104**	**93**	**100.0%**	**-0.15 [-0.43 , 0.14]**

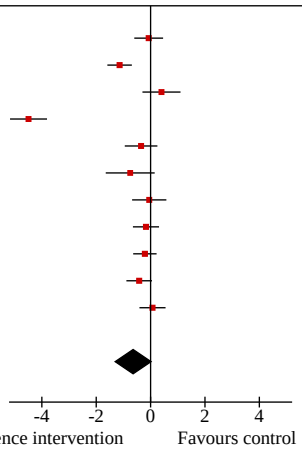
Heterogeneity: Tau² = 0.00; Chi² = 2.90, df = 4 (P = 0.58); I² = 0%
Test for overall effect: Z = 1.02 (P = 0.31)
Test for subgroup differences: Not applicable



Analysis 3.21. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 21: Stress or stress perception: post-intervention, sensitivity analysis for level of missing data (< 10% missing data)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	0	0.2704	26	28	9.2%	-0.07 [-0.60 , 0.46]
Bernburg 2019	0	0.2296	44	42	9.4%	-1.14 [-1.59 , -0.69]
Duchemin 2015	0	0.3571	16	16	8.8%	0.40 [-0.30 , 1.10]
Fei 2019	0	0.3469	61	61	8.9%	-4.49 [-5.17 , -3.81]
Ireland 2017	0	0.3061	23	21	9.1%	-0.35 [-0.95 , 0.25]
Lebares 2018	0	0.4592	12	9	8.3%	-0.75 [-1.65 , 0.15]
Luthar 2017	0	0.3214	21	18	9.0%	-0.05 [-0.68 , 0.58]
Mache 2015a	0	0.2449	35	33	9.3%	-0.17 [-0.65 , 0.31]
Mache 2015b	0	0.2194	42	43	9.4%	-0.21 [-0.64 , 0.22]
Mache 2016	0	0.2398	37	35	9.3%	-0.42 [-0.89 , 0.05]
West 2014	0	0.2449	34	33	9.3%	0.07 [-0.41 , 0.55]
Total (95% CI)			**351**	**339**	**100.0%**	**-0.64 [-1.30 , 0.02]**

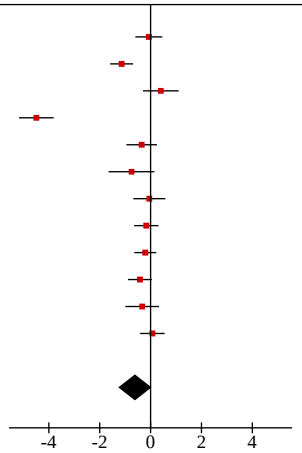
Heterogeneity: Tau² = 1.15; Chi² = 160.35, df = 10 (P < 0.00001); I² = 94%
Test for overall effect: Z = 1.91 (P = 0.06)
Test for subgroup differences: Not applicable



Analysis 3.22. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 22: Stress or stress perception: post-intervention, sensitivity analysis for coping with missing data (< 10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	0	0.2704	26	28	8.5%	-0.07 [-0.60 , 0.46]
Bernburg 2019	0	0.2296	44	42	8.6%	-1.14 [-1.59 , -0.69]
Duchemin 2015	0	0.3571	16	16	8.1%	0.40 [-0.30 , 1.10]
Fei 2019	0	0.3469	61	61	8.1%	-4.49 [-5.17 , -3.81]
Ireland 2017	0	0.3061	23	21	8.3%	-0.35 [-0.95 , 0.25]
Lebares 2018	0	0.4592	12	9	7.6%	-0.75 [-1.65 , 0.15]
Luthar 2017	0	0.3214	21	18	8.3%	-0.05 [-0.68 , 0.58]
Mache 2015a	0	0.2449	35	33	8.6%	-0.17 [-0.65 , 0.31]
Mache 2015b	0	0.2194	42	43	8.7%	-0.21 [-0.64 , 0.22]
Mache 2016	0	0.2398	37	35	8.6%	-0.42 [-0.89 , 0.05]
Mistretta 2018	0	0.3367	22	15	8.2%	-0.33 [-0.99 , 0.33]
West 2014	0	0.2449	34	33	8.6%	0.07 [-0.41 , 0.55]
Total (95% CI)			**373**	**354**	**100.0%**	**-0.62 [-1.23 , -0.01]**

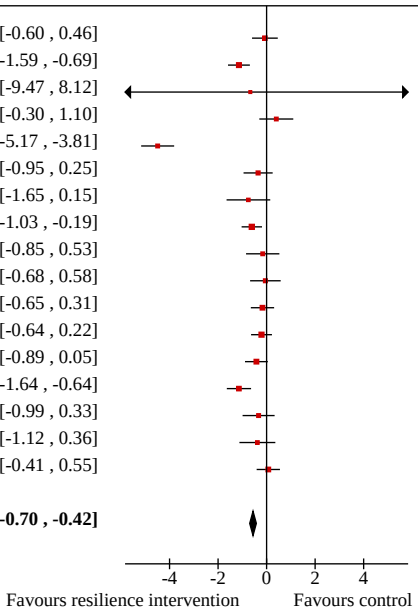
Heterogeneity: Tau² = 1.07; Chi² = 160.70, df = 11 (P < 0.00001); I² = 93%
Test for overall effect: Z = 1.98 (P = 0.05)
Test for subgroup differences: Not applicable



Analysis 3.23. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 23: Stress or stress perception: post-intervention, sensitivity analysis (fixed-effect analysis)

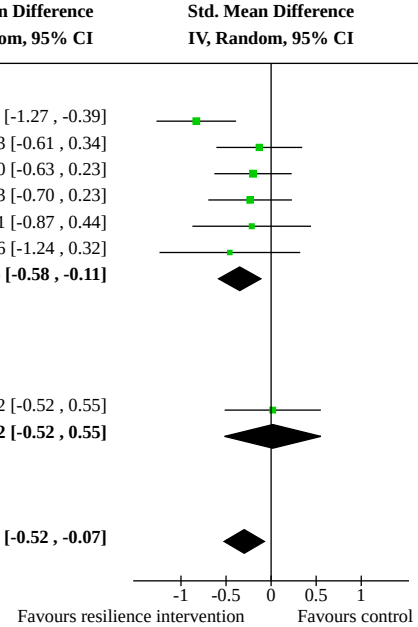
Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Bernburg 2016	0	0.2704	26	28	6.6%	-0.07 [-0.60 , 0.46]
Bernburg 2019	0	0.2296	44	42	9.2%	-1.14 [-1.59 , -0.69]
Calder Calisi 2017	0	4.487	24	22	0.0%	-0.67 [-9.47 , 8.12]
Duchemin 2015	0	0.3571	16	16	3.8%	0.40 [-0.30 , 1.10]
Fei 2019	0	0.3469	61	61	4.0%	-4.49 [-5.17 , -3.81]
Ireland 2017	0	0.3061	23	21	5.2%	-0.35 [-0.95 , 0.25]
Lebares 2018	0	0.4592	12	9	2.3%	-0.75 [-1.65 , 0.15]
Lin 2019	0	0.2143	44	46	10.5%	-0.61 [-1.03 , -0.19]
Loiselle 2018	0	0.3502	15	18	3.9%	-0.16 [-0.85 , 0.53]
Luthar 2017	0	0.3214	21	18	4.7%	-0.05 [-0.68 , 0.58]
Mache 2015a	0	0.2449	35	33	8.1%	-0.17 [-0.65 , 0.31]
Mache 2015b	0	0.2194	42	43	10.1%	-0.21 [-0.64 , 0.22]
Mache 2016	0	0.2398	37	35	8.4%	-0.42 [-0.89 , 0.05]
Mache 2017	0	0.2551	37	35	7.4%	-1.14 [-1.64 , -0.64]
Mistretta 2018	0	0.3367	22	15	4.3%	-0.33 [-0.99 , 0.33]
Schroeder 2016	0	0.3776	15	14	3.4%	-0.38 [-1.12 , 0.36]
West 2014	0	0.2449	34	33	8.1%	0.07 [-0.41 , 0.55]
Total (95% CI)			**508**	**489**	**100.0%**	**-0.56 [-0.70 , -0.42]**

Heterogeneity: Chi² = 167.66, df = 16 (P < 0.00001); I² = 90%
Test for overall effect: Z = 8.04 (P < 0.00001)
Test for subgroup differences: Not applicable



Analysis 3.24. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 24: Stress or stress perception: short-term follow-up (≤ 3 months), sensitivity analysis for attrition bias (low or unclear risk of bias) including subgroup analysis

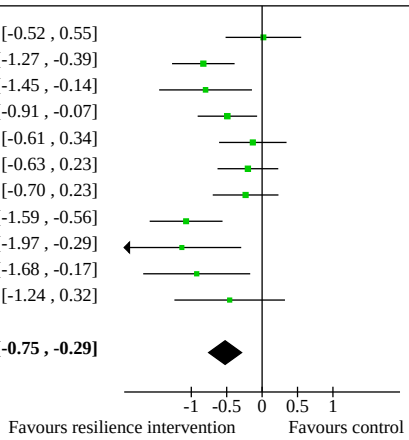
Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
3.24.1 Low risk of attrition bias								
Bernburg 2019	2.9	0.59	44	3.39	0.58	42	18.0%	-0.83 [-1.27 , -0.39]
Mache 2015a	54	19.1	35	56.5	18.57	33	16.1%	-0.13 [-0.61 , 0.34]
Mache 2015b	52.3	20.4	42	56.4	20.1	42	18.7%	-0.20 [-0.63 , 0.23]
Mache 2016	55.2	18.3	37	59.4	17.3	35	16.7%	-0.23 [-0.70 , 0.23]
Mistretta 2018	5.82	3.95	22	6.6	2.85	15	9.7%	-0.21 [-0.87 , 0.44]
Sood 2014	19.6	5.6	13	22.2	5.4	13	7.2%	-0.46 [-1.24 , 0.32]
Subtotal (95% CI)			**193**			**180**	**86.4%**	**-0.35 [-0.58 , -0.11]**
Heterogeneity: Tau² = 0.02; Chi² = 6.30, df = 5 (P = 0.28); I² = 21%								
Test for overall effect: Z = 2.91 (P = 0.004)								
3.24.2 Unclear risk of attrition bias								
Bernburg 2016	3.15	0.58	26	3.14	0.51	28	13.6%	0.02 [-0.52 , 0.55]
Subtotal (95% CI)			**26**			**28**	**13.6%**	**0.02 [-0.52 , 0.55]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 0.07 (P = 0.95)								
Total (95% CI)			**219**			**208**	**100.0%**	**-0.30 [-0.52 , -0.07]**
Heterogeneity: Tau² = 0.02; Chi² = 7.89, df = 6 (P = 0.25); I² = 24%								
Test for overall effect: Z = 2.62 (P = 0.009)								
Test for subgroup differences: Chi² = 1.52, df = 1 (P = 0.22), I² = 34.0%								



Analysis 3.25. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 25: Stress or stress perception: short-term follow-up (≤ 3 months), sensitivity analysis for reporting bias (low risk of bias)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	3.15	0.58	26	3.14	0.51	28	9.4%	0.02 [-0.52 , 0.55]
Bernburg 2019	2.9	0.59	44	3.39	0.58	42	11.2%	-0.83 [-1.27 , -0.39]
Chesak 2015	20.11	6.79	19	25.5	6.44	20	7.5%	-0.80 [-1.45 , -0.14]
Lin 2019	36.68	6.79	44	39.67	5.24	46	11.6%	-0.49 [-0.91 , -0.07]
Mache 2015a	54	19.1	35	56.5	18.57	33	10.5%	-0.13 [-0.61 , 0.34]
Mache 2015b	52.3	20.4	42	56.4	20.1	42	11.5%	-0.20 [-0.63 , 0.23]
Mache 2016	55.2	18.3	37	59.4	17.3	35	10.7%	-0.23 [-0.70 , 0.23]
Mache 2017	2.59	0.72	33	3.35	0.68	34	9.8%	-1.07 [-1.59 , -0.56]
Schroeder 2016	13.23	5.19	13	20.21	6.65	13	5.4%	-1.13 [-1.97 , -0.29]
Sood 2011	22.8	5.5	20	28.3	6.3	12	6.3%	-0.92 [-1.68 , -0.17]
Sood 2014	19.6	5.6	13	22.2	5.4	13	6.0%	-0.46 [-1.24 , 0.32]
Total (95% CI)			**326**			**318**	**100.0%**	**-0.52 [-0.75 , -0.29]**

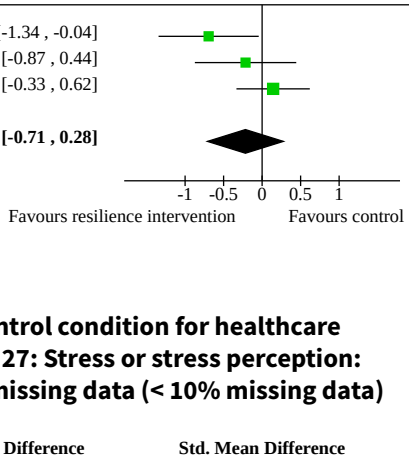
Heterogeneity: Tau² = 0.07; Chi² = 20.19, df = 10 (P = 0.03); I² = 50%
Test for overall effect: Z = 4.41 (P < 0.0001)
Test for subgroup differences: Not applicable



Analysis 3.26. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 26: Stress or stress perception: short-term follow-up (≤ 3 months), sensitivity analysis for trial registration (registered trials)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Luthar 2017	61.1	16.9	21	75.44	23.56	18	30.2%	-0.69 [-1.34 , -0.04]
Mistretta 2018	5.82	3.95	22	6.6	2.85	15	29.8%	-0.21 [-0.87 , 0.44]
West 2014	14.8	7.28	33	13.8	6.54	35	40.0%	0.14 [-0.33 , 0.62]
Total (95% CI)			**76**			**68**	**100.0%**	**-0.22 [-0.71 , 0.28]**

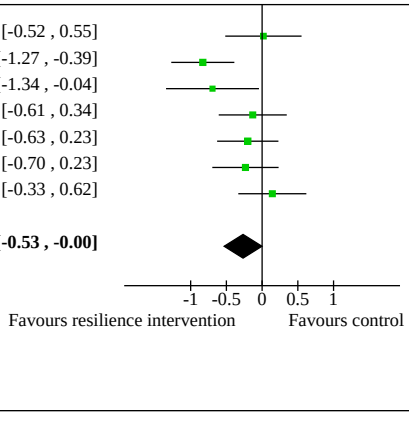
Heterogeneity: Tau² = 0.10; Chi² = 4.18, df = 2 (P = 0.12); I² = 52%
Test for overall effect: Z = 0.86 (P = 0.39)
Test for subgroup differences: Not applicable



Analysis 3.27. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 27: Stress or stress perception: short-term follow-up (≤ 3 months), sensitivity analysis for level of missing data (< 10% missing data)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	3.15	0.58	26	3.14	0.51	28	13.1%	0.02 [-0.52 , 0.55]
Bernburg 2019	2.9	0.59	44	3.39	0.58	42	15.8%	-0.83 [-1.27 , -0.39]
Luthar 2017	61.1	16.9	21	75.44	23.56	18	10.4%	-0.69 [-1.34 , -0.04]
Mache 2015a	54	19.1	35	56.5	18.57	33	14.7%	-0.13 [-0.61 , 0.34]
Mache 2015b	52.3	20.4	42	56.4	20.1	42	16.2%	-0.20 [-0.63 , 0.23]
Mache 2016	55.2	18.3	37	59.4	17.3	35	15.1%	-0.23 [-0.70 , 0.23]
West 2014	14.8	7.28	33	13.8	6.54	35	14.7%	0.14 [-0.33 , 0.62]
Total (95% CI)			**238**			**233**	**100.0%**	**-0.27 [-0.53 , -0.00]**

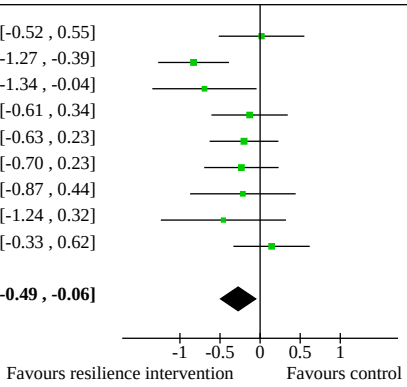
Heterogeneity: Tau² = 0.06; Chi² = 12.27, df = 6 (P = 0.06); I² = 51%
Test for overall effect: Z = 1.98 (P = 0.05)
Test for subgroup differences: Not applicable



Analysis 3.28. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 28: Stress or stress perception: short-term follow-up (≤ 3 months), sensitivity analysis for coping with missing data (<10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	3.15	0.58	26	3.14	0.51	28	10.9%	0.02 [-0.52 , 0.55]
Bernburg 2019	2.9	0.59	44	3.39	0.58	42	13.8%	-0.83 [-1.27 , -0.39]
Luthar 2017	61.1	16.9	21	75.44	23.56	18	8.3%	-0.69 [-1.34 , -0.04]
Mache 2015a	54	19.1	35	56.5	18.57	33	12.6%	-0.13 [-0.61 , 0.34]
Mache 2015b	52.3	20.4	42	56.4	20.1	42	14.2%	-0.20 [-0.63 , 0.23]
Mache 2016	55.2	18.3	37	59.4	17.3	35	13.0%	-0.23 [-0.70 , 0.23]
Mistretta 2018	5.82	3.95	22	6.6	2.85	15	8.2%	-0.21 [-0.87 , 0.44]
Sood 2014	19.6	5.6	13	22.2	5.4	13	6.3%	-0.46 [-1.24 , 0.32]
West 2014	14.8	7.28	33	13.8	6.54	35	12.6%	0.14 [-0.33 , 0.62]
Total (95% CI)			**273**			**261**	**100.0%**	**-0.27 [-0.49 , -0.06]**

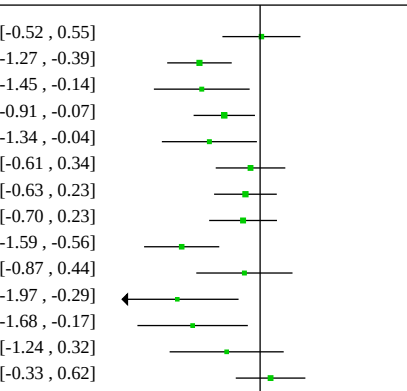
Heterogeneity: Tau² = 0.04; Chi² = 12.52, df = 8 (P = 0.13); I² = 36%
Test for overall effect: Z = 2.45 (P = 0.01)
Test for subgroup differences: Not applicable



Analysis 3.29. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 29: Stress or stress perception: short-term follow-up (≤ 3 months), sensitivity analysis (fixed-effect analysis)

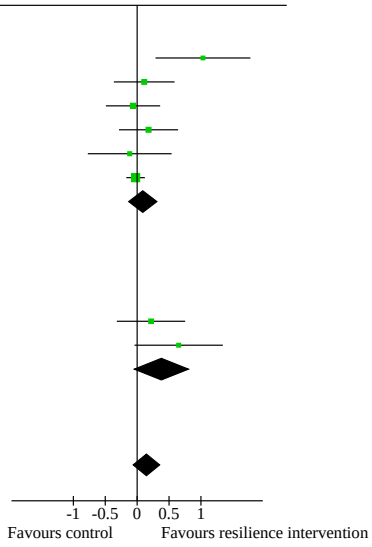
Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Bernburg 2016	3.15	0.58	26	3.14	0.51	28	7.2%	0.02 [-0.52 , 0.55]
Bernburg 2019	2.9	0.59	44	3.39	0.58	42	10.5%	-0.83 [-1.27 , -0.39]
Chesak 2015	20.11	6.79	19	25.5	6.44	20	4.8%	-0.80 [-1.45 , -0.14]
Lin 2019	36.68	6.79	44	39.67	5.24	46	11.6%	-0.49 [-0.91 , -0.07]
Luthar 2017	61.1	16.9	21	75.44	23.56	18	4.8%	-0.69 [-1.34 , -0.04]
Mache 2015a	54	19.1	35	56.5	18.57	33	9.0%	-0.13 [-0.61 , 0.34]
Mache 2015b	52.3	20.4	42	56.4	20.1	42	11.1%	-0.20 [-0.63 , 0.23]
Mache 2016	55.2	18.3	37	59.4	17.3	35	9.5%	-0.23 [-0.70 , 0.23]
Mache 2017	2.59	0.72	33	3.35	0.68	34	7.7%	-1.07 [-1.59 , -0.56]
Mistretta 2018	5.82	3.95	22	6.6	2.85	15	4.7%	-0.21 [-0.87 , 0.44]
Schroeder 2016	13.23	5.19	13	20.21	6.65	13	2.9%	-1.13 [-1.97 , -0.29]
Sood 2011	22.8	5.5	20	28.3	6.3	12	3.6%	-0.92 [-1.68 , -0.17]
Sood 2014	19.6	5.6	13	22.2	5.4	13	3.4%	-0.46 [-1.24 , 0.32]
West 2014	14.8	7.28	33	13.8	6.54	35	9.0%	0.14 [-0.33 , 0.62]
Total (95% CI)			**402**			**386**	**100.0%**	**-0.43 [-0.58 , -0.29]**

Heterogeneity: Chi² = 27.42, df = 13 (P = 0.01); I² = 53%
Test for overall effect: Z = 5.93 (P < 0.00001)
Test for subgroup differences: Not applicable



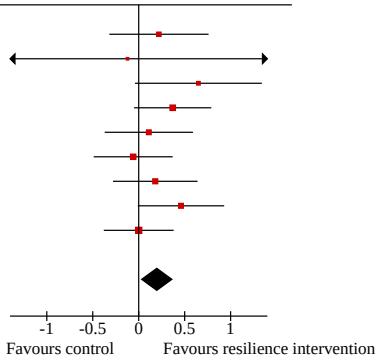
Analysis 3.30. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 30: Well-being or quality of life: post-intervention, sensitivity analysis for attrition bias (low or unclear risk of bias) including subgroup analysis

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
3.30.1 Low risk of attrition bias								
Duchemin 2015	43.2	4.1	16	37.7	6.1	16	6.3%	1.03 [0.29 , 1.78]
Mache 2015a	57.4	20.6	35	55.1	20.4	33	12.2%	0.11 [-0.37 , 0.59]
Mache 2015b	54.6	24.4	42	56.2	24.6	43	14.0%	-0.06 [-0.49 , 0.36]
Mache 2016	55.6	17.5	37	52.4	17.9	35	12.7%	0.18 [-0.28 , 0.64]
Mistretta 2018	14.45	4.94	22	15	4.09	15	7.7%	-0.12 [-0.77 , 0.54]
Strijk 2011	68.5	16.7	367	68.9	16.3	363	29.5%	-0.02 [-0.17 , 0.12]
Subtotal (95% CI)			**519**			**505**	**82.5%**	**0.09 [-0.13 , 0.31]**
Heterogeneity: Tau² = 0.03; Chi² = 8.38, df = 5 (P = 0.14); I² = 40%								
Test for overall effect: Z = 0.79 (P = 0.43)								
3.30.2 Unclear risk of attrition bias								
Bernburg 2016	3.45	0.69	26	3.31	0.58	28	10.4%	0.22 [-0.32 , 0.75]
Klatt 2015	1.049	1.8554	17	0.1068	0.7422	17	7.1%	0.65 [-0.04 , 1.34]
Subtotal (95% CI)			**43**			**45**	**17.5%**	**0.38 [-0.04 , 0.80]**
Heterogeneity: Tau² = 0.00; Chi² = 0.94, df = 1 (P = 0.33); I² = 0%								
Test for overall effect: Z = 1.76 (P = 0.08)								
Total (95% CI)			**562**			**550**	**100.0%**	**0.15 [-0.06 , 0.35]**
Heterogeneity: Tau² = 0.03; Chi² = 11.86, df = 7 (P = 0.11); I² = 41%								
Test for overall effect: Z = 1.37 (P = 0.17)								
Test for subgroup differences: Chi² = 1.43, df = 1 (P = 0.23), I² = 30.1%								



Analysis 3.31. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 31: Well-being or quality of life: post-intervention, sensitivity analysis for reporting bias (low risk of bias)

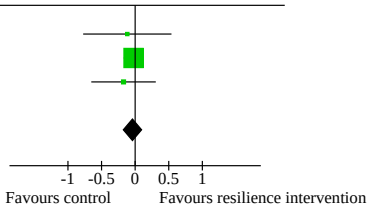
Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	0	0.2755	26	28	9.2%	0.22 [-0.32 , 0.76]
Calder Calisi 2017	0	4.088	24	22	0.0%	-0.12 [-8.13 , 7.89]
Klatt 2015	0	0.352	17	17	5.7%	0.65 [-0.04 , 1.34]
Lin 2019	0	0.2143	44	46	15.3%	0.37 [-0.05 , 0.79]
Mache 2015a	0	0.2449	35	33	11.7%	0.11 [-0.37 , 0.59]
Mache 2015b	0	0.2194	42	43	14.6%	-0.06 [-0.49 , 0.37]
Mache 2016	0	0.2347	37	35	12.7%	0.18 [-0.28 , 0.64]
Mache 2017	0	0.2398	37	35	12.2%	0.46 [-0.01 , 0.93]
West 2015	0	0.1939	51	56	18.6%	0.00 [-0.38 , 0.38]
Total (95% CI)			**313**	**315**	**100.0%**	**0.20 [0.03 , 0.36]**
Heterogeneity: Tau² = 0.00; Chi² = 6.06, df = 8 (P = 0.64); I² = 0%						
Test for overall effect: Z = 2.35 (P = 0.02)						
Test for subgroup differences: Not applicable						



Analysis 3.32. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 32: Well-being or quality of life: post-intervention, sensitivity analysis for trial registration (registered trials)

	resilience intervention			control				Std. Mean Difference	Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
Mistretta 2018	14.45	4.94	22	15	4.09	15	4.3%	-0.12 [-0.77 , 0.54]	
Strijk 2011	68.5	16.7	367	68.9	16.3	363	87.7%	-0.02 [-0.17 , 0.12]	
West 2014	7.2	1.63	34	7.5	1.8	33	8.0%	-0.17 [-0.65 , 0.31]	
Total (95% CI)			**423**			**411**	**100.0%**	**-0.04 [-0.18 , 0.10]**	

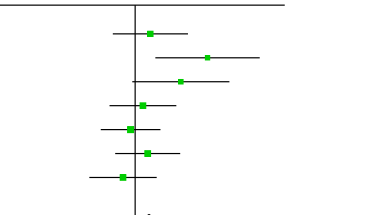
Heterogeneity: Tau² = 0.00; Chi² = 0.39, df = 2 (P = 0.82); I² = 0%
Test for overall effect: Z = 0.58 (P = 0.56)
Test for subgroup differences: Not applicable



Analysis 3.33. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 33: Well-being or quality of life: post-intervention, sensitivity analysis for level of missing data (< 10% missing data)

	resilience intervention			control				Std. Mean Difference	Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
Bernburg 2016	3.45	0.69	26	3.31	0.58	28	14.1%	0.22 [-0.32 , 0.75]	
Duchemin 2015	43.2	4.1	16	37.7	6.1	16	9.0%	1.03 [0.29 , 1.78]	
Klatt 2015	1.049	1.8554	17	0.1068	0.7422	17	10.0%	0.65 [-0.04 , 1.34]	
Mache 2015a	57.4	20.6	35	55.1	20.4	33	16.1%	0.11 [-0.37 , 0.59]	
Mache 2015b	54.6	24.4	42	56.2	24.6	43	18.1%	-0.06 [-0.49 , 0.36]	
Mache 2016	55.6	17.5	37	52.4	17.9	35	16.6%	0.18 [-0.28 , 0.64]	
West 2014	7.2	1.63	34	7.5	1.8	33	16.0%	-0.17 [-0.65 , 0.31]	
Total (95% CI)			**207**			**205**	**100.0%**	**0.20 [-0.06 , 0.46]**	

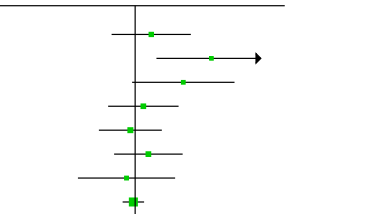
Heterogeneity: Tau² = 0.05; Chi² = 10.22, df = 6 (P = 0.12); I² = 41%
Test for overall effect: Z = 1.49 (P = 0.14)
Test for subgroup differences: Not applicable



Analysis 3.34. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 34: Well-being or quality of life: post-intervention, sensitivity analysis for coping with missing data (<10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)

	resilience intervention			control				Std. Mean Difference	Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
Bernburg 2016	3.45	0.69	26	3.31	0.58	28	9.0%	0.22 [-0.32 , 0.75]	
Duchemin 2015	43.2	4.1	16	37.7	6.1	16	5.4%	1.03 [0.29 , 1.78]	
Klatt 2015	1.049	1.8554	17	0.1068	0.7422	17	6.0%	0.65 [-0.04 , 1.34]	
Mache 2015a	57.4	20.6	35	55.1	20.4	33	10.7%	0.11 [-0.37 , 0.59]	
Mache 2015b	54.6	24.4	42	56.2	24.6	43	12.4%	-0.06 [-0.49 , 0.36]	
Mache 2016	55.6	17.5	37	52.4	17.9	35	11.1%	0.18 [-0.28 , 0.64]	
Mistretta 2018	14.45	4.94	22	15	4.09	15	6.6%	-0.12 [-0.77 , 0.54]	
Strijk 2011	68.5	16.7	367	68.9	16.3	363	28.3%	-0.02 [-0.17 , 0.12]	
West 2014	7.2	1.63	34	7.5	1.8	33	10.5%	-0.17 [-0.65 , 0.31]	
Total (95% CI)			**596**			**583**	**100.0%**	**0.11 [-0.08 , 0.29]**	

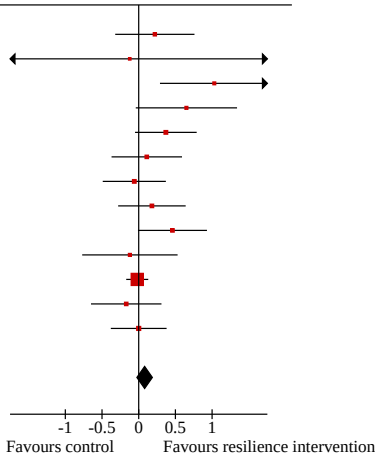
Heterogeneity: Tau² = 0.03; Chi² = 12.63, df = 8 (P = 0.13); I² = 37%
Test for overall effect: Z = 1.10 (P = 0.27)
Test for subgroup differences: Not applicable



Analysis 3.35. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 35: Well-being or quality of life: post-intervention, sensitivity analysis (fixed-effect analysis)

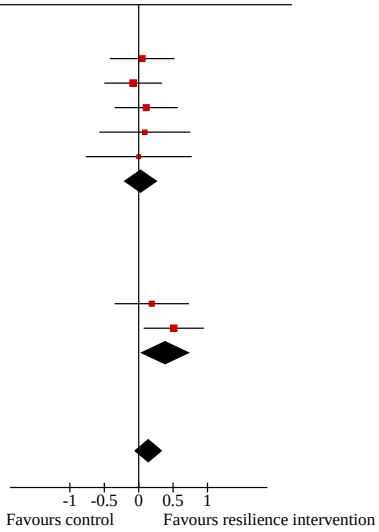
Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Bernburg 2016	0	0.2755	26	28	3.8%	0.22 [-0.32 , 0.76]
Calder Calisi 2017	0	4.088	24	22	0.0%	-0.12 [-8.13 , 7.89]
Duchemin 2015	0	0.3776	16	16	2.0%	1.03 [0.29 , 1.77]
Klatt 2015	0	0.352	17	17	2.3%	0.65 [-0.04 , 1.34]
Lin 2019	0	0.2143	44	46	6.3%	0.37 [-0.05 , 0.79]
Mache 2015a	0	0.2449	35	33	4.8%	0.11 [-0.37 , 0.59]
Mache 2015b	0	0.2194	42	43	6.0%	-0.06 [-0.49 , 0.37]
Mache 2016	0	0.2347	37	35	5.2%	0.18 [-0.28 , 0.64]
Mache 2017	0	0.2398	37	35	5.0%	0.46 [-0.01 , 0.93]
Mistretta 2018	0	0.3316	22	15	2.6%	-0.12 [-0.77 , 0.53]
Strijk 2011	0	0.0765	367	363	49.3%	-0.02 [-0.17 , 0.13]
West 2014	0	0.2449	34	33	4.8%	-0.17 [-0.65 , 0.31]
West 2015	0	0.1939	51	56	7.7%	0.00 [-0.38 , 0.38]
Total (95% CI)			**752**	**742**	**100.0%**	**0.08 [-0.02 , 0.19]**

Heterogeneity: Chi² = 17.44, df = 12 (P = 0.13); I² = 31%
Test for overall effect: Z = 1.50 (P = 0.13)
Test for subgroup differences: Not applicable



Analysis 3.36. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 36: Well-being or quality of life: short-term follow-up (≤ 3 months), sensitivity analysis for attrition bias (low or unclear risk of bias) including subgroup analysis

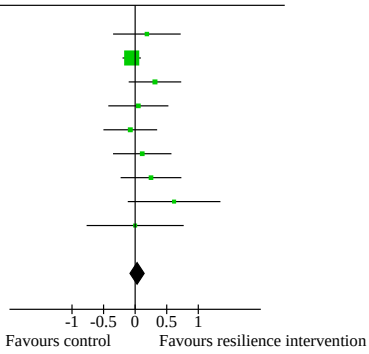
Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
3.36.1 Low risk of attrition bias						
Mache 2015a	0	0.2398	35	33	16.4%	0.05 [-0.42 , 0.52]
Mache 2015b	0	0.2143	42	43	20.6%	-0.08 [-0.50 , 0.34]
Mache 2016	0	0.2347	37	35	17.2%	0.11 [-0.35 , 0.57]
Mistretta 2018	0	0.3367	22	15	8.3%	0.09 [-0.57 , 0.75]
Sood 2014	0	0.3929	13	13	6.1%	0.00 [-0.77 , 0.77]
Subtotal (95% CI)			**149**	**139**	**68.6%**	**0.03 [-0.20 , 0.26]**
Heterogeneity: Tau² = 0.00; Chi² = 0.42, df = 4 (P = 0.98); I² = 0%						
Test for overall effect: Z = 0.23 (P = 0.82)						
3.36.2 Unclear risk of attrition bias						
Bernburg 2016	0	0.2755	26	28	12.5%	0.19 [-0.35 , 0.73]
Hosseinnejad 2018	0	0.2236	40	40	18.9%	0.51 [0.07 , 0.95]
Subtotal (95% CI)			**66**	**68**	**31.4%**	**0.38 [0.04 , 0.72]**
Heterogeneity: Tau² = 0.00; Chi² = 0.81, df = 1 (P = 0.37); I² = 0%						
Test for overall effect: Z = 2.20 (P = 0.03)						
Total (95% CI)			**215**	**207**	**100.0%**	**0.14 [-0.05 , 0.33]**
Heterogeneity: Tau² = 0.00; Chi² = 4.13, df = 6 (P = 0.66); I² = 0%						
Test for overall effect: Z = 1.42 (P = 0.16)						
Test for subgroup differences: Chi² = 2.89, df = 1 (P = 0.09), I² = 65.4%						



Analysis 3.37. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 37: Well-being or quality of life: short-term follow-up (≤ 3 months), sensitivity analysis for reporting bias (low risk of bias)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	3.39	0.54	26	3.28	0.62	28	4.4%	0.19 [-0.35 , 0.72]
Cheung 2014	4.63	1.14	364	4.69	1.06	369	60.0%	-0.05 [-0.20 , 0.09]
Lin 2019	102.14	15.55	44	96.59	19.25	46	7.3%	0.31 [-0.10 , 0.73]
Mache 2015a	55.7	19.1	35	54.7	19.8	33	5.6%	0.05 [-0.42 , 0.53]
Mache 2015b	54.4	23.9	42	56.2	22.5	43	7.0%	-0.08 [-0.50 , 0.35]
Mache 2016	55.8	18.2	37	53.7	18.8	35	5.9%	0.11 [-0.35 , 0.57]
Mache 2017	3.05	0.65	33	2.89	0.61	34	5.4%	0.25 [-0.23 , 0.73]
Sood 2011	8	1.3	20	7.2	1.2	12	2.3%	0.62 [-0.12 , 1.35]
Sood 2014	7.5	1.1	13	7.5	1.6	13	2.1%	0.00 [-0.77 , 0.77]
Total (95% CI)			**614**			**613**	**100.0%**	**0.03 [-0.08 , 0.14]**

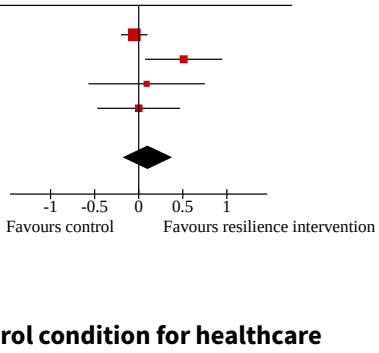
Heterogeneity: Tau² = 0.00; Chi² = 7.07, df = 8 (P = 0.53); I² = 0%
Test for overall effect: Z = 0.53 (P = 0.59)
Test for subgroup differences: Not applicable



Analysis 3.38. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 38: Well-being or quality of life: short-term follow-up (≤ 3 months), sensitivity analysis for trial registration (registered trials)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Cheung 2014	0	0.0765	364	369	45.9%	-0.05 [-0.20 , 0.10]
Hosseinnejad 2018	0	0.2236	40	40	21.7%	0.51 [0.07 , 0.95]
Mistretta 2018	0	0.3367	22	15	12.4%	0.09 [-0.57 , 0.75]
West 2014	0	0.2398	34	35	19.9%	0.00 [-0.47 , 0.47]
Total (95% CI)			**460**	**459**	**100.0%**	**0.10 [-0.17 , 0.36]**

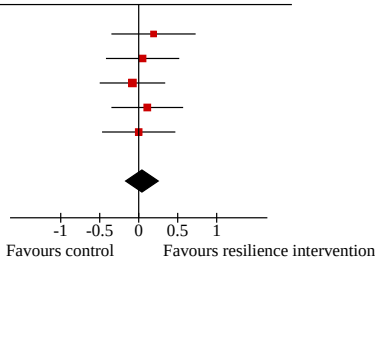
Heterogeneity: Tau² = 0.03; Chi² = 5.67, df = 3 (P = 0.13); I² = 47%
Test for overall effect: Z = 0.73 (P = 0.46)
Test for subgroup differences: Not applicable



Analysis 3.39. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 39: Well-being or quality of life: short-term follow-up (≤ 3 months), sensitivity analysis for level of missing data (<10% missing data)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	0	0.2755	26	28	15.0%	0.19 [-0.35 , 0.73]
Mache 2015a	0	0.2398	35	33	19.8%	0.05 [-0.42 , 0.52]
Mache 2015b	0	0.2143	42	43	24.8%	-0.08 [-0.50 , 0.34]
Mache 2016	0	0.2347	37	35	20.7%	0.11 [-0.35 , 0.57]
West 2014	0	0.2398	34	35	19.8%	0.00 [-0.47 , 0.47]
Total (95% CI)			**174**	**174**	**100.0%**	**0.04 [-0.17 , 0.25]**

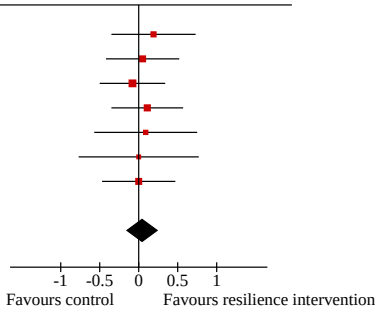
Heterogeneity: Tau² = 0.00; Chi² = 0.73, df = 4 (P = 0.95); I² = 0%
Test for overall effect: Z = 0.39 (P = 0.70)
Test for subgroup differences: Not applicable



Analysis 3.40. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 40: Well-being or quality of life: short-term follow-up (≤ 3 months), sensitivity analysis for coping with missing data (<10% missing data, imputation of missing data or accounting for missing data by model for longitudinal data)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Bernburg 2016	0	0.2755	26	28	12.8%	0.19 [-0.35 , 0.73]
Mache 2015a	0	0.2398	35	33	16.9%	0.05 [-0.42 , 0.52]
Mache 2015b	0	0.2143	42	43	21.1%	-0.08 [-0.50 , 0.34]
Mache 2016	0	0.2347	37	35	17.6%	0.11 [-0.35 , 0.57]
Mistretta 2018	0	0.3367	22	15	8.5%	0.09 [-0.57 , 0.75]
Sood 2014	0	0.3929	13	13	6.3%	0.00 [-0.77 , 0.77]
West 2014	0	0.2398	34	35	16.9%	0.00 [-0.47 , 0.47]
Total (95% CI)			**209**	**202**	**100.0%**	**0.04 [-0.15 , 0.24]**

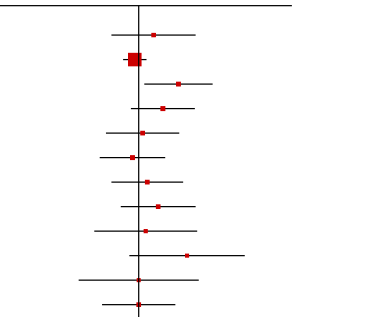
Heterogeneity: Tau² = 0.00; Chi² = 0.76, df = 6 (P = 0.99); I² = 0%
Test for overall effect: Z = 0.44 (P = 0.66)
Test for subgroup differences: Not applicable



Analysis 3.41. Comparison 3: Resilience intervention versus control condition for healthcare professionals: sensitivity analyses (primary outcomes), Outcome 41: Well-being or quality of life: short-term follow-up (≤ 3 months), sensitivity analysis (fixed-effect analysis)

Study or Subgroup	SMD	SE	resilience intervention Total	control Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Bernburg 2016	0	0.2755	26	28	3.9%	0.19 [-0.35 , 0.73]
Cheung 2014	0	0.0765	364	369	50.2%	-0.05 [-0.20 , 0.10]
Hosseinnejad 2018	0	0.2236	40	40	5.9%	0.51 [0.07 , 0.95]
Lin 2019	0	0.2092	44	46	6.7%	0.31 [-0.10 , 0.72]
Mache 2015a	0	0.2398	35	33	5.1%	0.05 [-0.42 , 0.52]
Mache 2015b	0	0.2143	42	43	6.4%	-0.08 [-0.50 , 0.34]
Mache 2016	0	0.2347	37	35	5.3%	0.11 [-0.35 , 0.57]
Mache 2017	0	0.2449	33	34	4.9%	0.25 [-0.23 , 0.73]
Mistretta 2018	0	0.3367	22	15	2.6%	0.09 [-0.57 , 0.75]
Sood 2011	0	0.3776	20	12	2.1%	0.62 [-0.12 , 1.36]
Sood 2014	0	0.3929	13	13	1.9%	0.00 [-0.77 , 0.77]
West 2014	0	0.2398	34	35	5.1%	0.00 [-0.47 , 0.47]
Total (95% CI)			**710**	**703**	**100.0%**	**0.06 [-0.04 , 0.17]**

Heterogeneity: Chi² = 11.13, df = 11 (P = 0.43); I² = 1%
Test for overall effect: Z = 1.17 (P = 0.24)
Test for subgroup differences: Not applicable



ADDITIONAL TABLES

Table 1. Unused methods table

Section	Proposed methods	Reason for non-use
Measures of treatment effect	**Dichotomous data** We planned to analyse dichotomous outcomes by calculating the risk ratio (RR) of a successful outcome (i.e. improvement in relevant variables) for each trial. We would have expressed uncertainty in each result using 95% confidence intervals (CIs).	We only identified two studies with dichotomous data for depression (West 2014; West 2015). Both studies also provided continuous primary outcome data relevant for this review (burnout) and could be combined in

Table 1. Unused methods table *(Continued)*

		meta-analysis with other studies reporting continuous outcomes.
Unit of analysis issues	**Cluster-randomised trials** In cluster-randomised trials, if the clustering had been ignored and the unit of analysis had been different from the unit of allocation ('unit-of-analysis error') (Whiting-O'Keefe 1984), P values might have been artificially small and resulted in false-positive conclusions (Higgins 2019b). Had we found such cases, we would have accounted for clustering in the data and followed the recommendations given in the literature (Higgins 2019b; White 2005). For those cluster-randomised trials that did not report correct standard errors, we would have tried to recover correct standard errors by applying the usual formula for the variance inflation factor 1 + (M - 1) ICC, where M is the average cluster size and ICC the intra-cluster correlation coefficient (Higgins 2019b). Had it not been possible to extract ICC values from the study, we would have used the average ICC of all cluster-randomised trials in our review that investigated the same primary outcome scale in a similar setting. Had this not been available, we would have used the average ICC of all other cluster-randomised trials in our review. If no such studies had been available, we would have used ICC = 0.05 as a conservative guess for the primary analysis, and added a sensitivity analysis using ICC = 0.10. We planned to conduct sensitivity analyses based on the unit of randomisation as well as the ICC estimate in cluster-randomised trials (see Sensitivity analysis).	No cluster-RCT was included in this review.
	Multiple treatment groups Had multiple groups in a study been relevant, we would have accounted for the correlation between the effect sizes from multi-arm studies in a pair-wise meta-analysis (Higgins 2019b). We would have treated each comparison between a control group and a treatment group as an independent study. We would have multiplied the standard errors of the effect estimates by an adjustment factor to account for correlation between effect estimates. In doing so, we would have acknowledged heterogeneity between different treatment groups.	For studies with multiple treatment groups, we considered only one intervention group to be relevant for the review and meta-analyses, on the basis of the independent judgement of two review authors. Thus, in a pair-wise meta-analysis we did not have to account for the correlation between the effect sizes for multi-arm studies.
	If there had been an adequate evidence base, we would have considered performing a network meta-analysis (see Data synthesis).	The evidence base was not sufficient to conduct a network meta-analysis.
Dealing with missing data	If standard deviations could neither be recovered from reported results nor obtained from the authors, we would have considered single imputation by pooling within-treatment standard deviations from all other studies, provided that fewer than five studies had missing standard deviations. If more than five studies had missing standard deviations, we would have performed multiple imputation on the basis of the hierarchical model fitted to the non-missing standard deviations.	We found no studies using the same scale that had missing standard deviations. In addition, missing standard deviations could always be recovered from alternative statistical values or could be obtained from the study authors.

Table 1. Unused methods table *(Continued)*

Data synthesis	Had a study reported more than one resilience scale, we would have used the scale with better psychometric qualities (as specified in Appendix 3 in Helmreich 2017), to calculate effect sizes.	All studies measuring resilience only used one resilience scale.
	If a study had provided data from two instruments used equally often in the included RCTs, two review authors (AK, IH) would have identified the appropriate measure through discussion (compare Stoffers-Winterling 2012).	This did not occur in this review.
	Network meta-analyses (NMAs) would have been merely exploratory and would only have been conducted if the review results had a sufficient and adequate evidence base. Network meta-analyses offer the possibility of comparing multiple treatments simultaneously (Caldwell 2005). They combine both direct (head-to-head) and indirect evidence (Caldwell 2005; Mills 2012), by using direct comparisons of interventions within RCTs, as well as indirect comparisons across trials on the basis of a common reference group (e.g. an identical control group) (Li 2011). As yet, a network meta-analysis on resilience-training programmes does not exist. According to Mills 2012, Linde 2016 and the *Cochrane Handbook for Systematic Reviews of Interventions* (Chaimani 2019), there are three important conditions for the conduct of NMAs: transitivity, homogeneity, consistency. Had an NMA been possible (i.e. the three conditions are fulfilled), we would have conducted an analysis, with expert statistical support as suggested by Cochrane (Chaimani 2019), using a frequentist approach in R (Rücker 2015; Viechtbauer 2010). For sensitivity analyses, the same models would have been fitted by the restricted maximum likelihood method (Piepho 2012; Piepho 2014; Rücker 2015). We would have considered categorising resilience training into seven groups, based on the underlying training concept: (1) cognitive behavioural therapy; (2) acceptance and commitment therapy; (3) mindfulness-based therapy; (4) attention and interpretation therapy; (5) problem-solving therapy; (6) stress inoculation therapy; and (7) multimodal resilience training. We might have included additional groups after the full literature search had been conducted. Reference groups that could have been included in the NMA were attention control, wait-list, treatment as usual or no intervention. We planned to investigate inconsistency and flow of evidence in accordance with recommendations in the literature (e.g. Dias 2008; Chaimani 2019; König 2013; Krahn 2013; Krahn 2014; Lu 2006; Lumley 2002; Rücker 2015; Salanti 2008; White 2012b).	The evidence base was not sufficient to support a network meta-analysis.
Summary of findings	Depending on the assessment of heterogeneity and possible effect modifiers (see Subgroup analysis and investigation of heterogeneity), we would have created several 'Summary of findings' tables; for example, for the clinical status of study populations or the comparator group.	We identified no consistent effect modifiers over the primary outcomes in subgroup analyses and therefore created no separate 'Summary of findings' tables.
Sensitivity analysis	If cluster-randomised trials had been included, we would have performed sensitivity analyses based on the ICC estimate in cluster-randomised trials that had not adjusted for clustering, by excluding cluster-RCTs where standard errors were not corrected or corrected only on the basis of an externally-estimated ICC. In an additional sensitivity analysis, we would have replaced all externally-estimated ICCs that were less than 0.10, by 0.10. Finally, we would have conducted a sensitivity analysis for the unit of randomisation, by limiting the analysis to individually-randomised trials.	No cluster-RCT was included in this review.

Table 1. Unused methods table *(Continued)*

ICC: Intra-cluster correlation coefficient; **RCT(s):** randomised controlled trial(s)

This table provides details of analyses that had been planned and described in the protocol (Helmreich 2017), including revisions made at review stage, but were not applied, as they were not required or not feasible.

Table 2. Primary outcomes: scales used

Outcomes	Number of studies	Studies and instruments
Resilience	21	• Bernburg 2019: Brief Resilient Coping Scale (BRCS) (Sinclair 2004) • Chesak 2015: Connor-Davidson Resilience Scale (CD-RISC) (Connor 2003) • Cheung 2014: CD-RISC (Connor 2003) • Cieslak 2016: Posttraumatic Growth Inventory-Short form (Cann 2010) • Khoshnazary 2016: CD-RISC (Connor 2003) • Klatt 2015: CD-RISC-10 (Connor 2003) • Lebares 2018: Block Ego-Resilience scale (Huey 1997; Moffitt 2011) • Lin 2019: CD-RISC (Connor 2003; Yu 2007) • Loiselle 2018: Brief Resilience Scale (BRS) (Smith 2008) • Mache 2015a: BRCS (Sinclair 2004) • Mache 2015b: BRCS (Sinclair 2004) • Mache 2016: BRCS (Sinclair 2004) • Mache 2017: BRCS (Sinclair 2004) • Mealer 2014: CD-RISC (Connor 2003) • Schroeder 2016: BRS (Smith 2008) • Smith 2019: CD-RISC-10 (Campbell-Sills 2007) • Sood 2011: CD-RISC (Connor 2003) • Sood 2014: CD-RISC (Connor 2003) • Wild 2016: CD-RISC (Connor 2003) • ISRCTN69644721: statements about resilience with Likert response options (reference not specified) • NCT03645798: CD-RISC (Connor 2003; Yu 2007)
Anxiety	12	• Calder Calisi 2017: State Trait Anxiety Inventory (STAI) (Spielberger 1970) • Chesak 2015: Generalized Anxiety Disorder 7-item scale (GAD-7) (Spitzer 2006) • Mealer 2014: anxiety subscale of Hospital Anxiety and Depression Scale (HADS) (Zigmond 1983) • Medisauskaite 2019: GAD-7 (Spitzer 2006) • Mistretta 2018: anxiety subscale of Depression Anxiety and Stress Scale (DASS-21) (Lovibond 1995) • Sood 2011: Smith Anxiety Scale (SAS) (Smith 2007) • Sood 2014: SAS (Piiparinen 2003; Smith 1990; Smith 1993; Smith 2007) • Stetz 2007: anxiety subscale Multiple Affect Adjective Check List-Revised (MAACL-R) (Zuckerman 1965) • Varker 2012: anxiety subscale of DASS-21 (Lovibond 1995) • Villani 2013: STAI (Spielberger 1970) • Wild 2016: GAD-7 (Spitzer 2006) • ISRCTN69644721: GAD-7 (Spitzer 2006)
Depression	24	• Alexander 2015: burnout - burnout subscales (emotional exhaustion, depersonalisation, personal accomplishment) Maslach Burnout Inventory (MBI) (Maslach 1986)

Table 2. Primary outcomes: scales used *(Continued)*

		• Berger 2011: burnout - burnout subscale of Professional Quality of Life scale (ProQOL) (Stamm 2005) • Calder Calisi 2017: depression - VAS/Semantic differential scales (Friborg 2006) • Cieslak 2016: burnout - Oldenburg Burnout Inventory (Demerouti 2003) • Clemow 2018 [a]: burnout - burnout subscales (emotional exhaustion, depersonalization, personal accomplishment) MBI (Maslach 1996); **depression - Centers for Epidemiological Studies–Depression Scale (CES-D)** (Radloff 1977) • Duchemin 2015: burnout – burnout subscale of ProQOL (Stamm 2005); burnout - burnout subscales (emotional exhaustion, depersonalization, personal accomplishment) MBI (Maslach 1996) • Ireland 2017: burnout - Copenhagen Burnout Inventory (Kristensen 2005b) • Lebares 2018 [a]: burnout - abbreviated MBI (aMBI) (McManus 2002); **depression - Patient Health Questionnaire (PHQ-9)** (Kroenke 2001) • Loiselle 2018 [a]: burnout - MBI subscale for health professionals (Raffety 1986); **depression - Beck Depression Inventory-II (BDI-II)** (Beck 1996) • Luthar 2017 [a]: burnout - burnout subscales (emotional exhaustion, depersonalization, personal accomplishment) Maslach Burnout Inventory (MBI) (Maslach 1996); **depression - BDI** (Beck 1972) • Mache 2017: burnout (emotional exhaustion) - Emotional exhaustion (EE subscale) MBI (Schaufeli 1996) • Mealer 2014 [a]: burnout - burnout subscales (emotional exhaustion, depersonalization, personal accomplishment) MBI (Maslach 1996); **depression - depression subscale of Hospital Anxiety and Depression Scale (HADS)** (Zigmond 1983) • Medisauskaite 2019: burnout - burnout subscales (emotional exhaustion, depersonalization, personal accomplishment) MBI-Human Services Survey (Maslach 1981) • Mistretta 2018 [a]: burnout - burnout subscales (emotional exhaustion, depersonalization, personal accomplishment) MBI-Human Services Survey (Maslach 1996); **depression subscale of Depression Anxiety and Stress Scale (DASS-21)** (Lovibond 1995) • Schroeder 2016: burnout - burnout subscales (emotional exhaustion, depersonalization, personal accomplishment) Maslach Burnout Inventory (Maslach 1996) • Smith 2019: burnout - burnout subscale of ProQOL5 (Stamm 2005) • Stetz 2007: depression subscale MAACL-R (Zuckerman 1965) • Varker 2012: depression subscale of DASS-21 (Lovibond 1995) • West 2014 [b]: depression - dichotomous 2-item PRME-MD depression screen (Spitzer 1994; Whooley 1997); **burnout - burnout subscales (emotional exhaustion, depersonalization) and overall burnout of MBI (** Maslach 1996) • West 2015 [b]: depression - dichotomous 2-item PRME-MD depression screen (Spitzer 1994; Whooley 1997); **burnout - burnout subscales (emotional exhaustion, depersonalization, personal accomplishment) and overall burnout of MBI (** Maslach 1996 **)** • Wild 2016: PHQ-9 (Kroenke 2001) • ISRCTN69644721: PHQ-9 (Kroenke 2001) • NCT02603133 [c]: burnout - emotional exhaustion MBI (Maslach 1996); **depression - CES-D-10** (Andresen 1994) • NCT03645798: burnout - MBI-General survey (Li 2003; Maslach 1981; Schaufeli 1996)
Stress or stress perception	22	• Bernburg 2016: perceived stress - Perceived Stress Questionnaire (PSQ) (Levenstein 1993)

Table 2. Primary outcomes: scales used *(Continued)*

		• Bernburg 2019: perceived stress - PSQ (Levenstein 1993) • Calder Calisi 2017: work-related stress - VAS/Semantic differential scales (Friborg 2006) • Chesak 2015: perceived stress - Perceived Stress Scale-14 (PSS-14) (Cohen 1983b) • Duchemin 2015: stress - stress subscale of DASS-21 (Lovibond 1995); **perceived stress -PSS-14** (Cohen 1983b) • Fei 2019: perceived stress - Chinese version of Perceived Stress Scale (Yang 2007) • Ireland 2017: perceived stress - Perceived Stress Scale-10 (PSS-10) (Cohen 1988a) • Lebares 2018: perceived stress - PSS-10 (Cohen 1988a) • Lin 2019: perceived stress - PSS-14 (Cohen 1983b) • Loiselle 2018: perceived stress - PSS-10 (Cohen 1988a) • Luthar 2017: Parenting Stress Inventory (Abidin 1990) • Mache 2015a: perceived stress - PSQ (Levenstein 1993) • Mache 2015b: perceived stress - PSQ (Levenstein 1993) • Mache 2016: perceived stress - PSQ (Levenstein 1993) • Mache 2017: perceived stress - PSQ (Levenstein 1993) • Mistretta 2018: stress - stress subscale of DASS-21 (Lovibond 1995) • Schroeder 2016: perceived stress - PSS-10 (Cohen 1988a) • Smith 2019: perceived stress - PSS-10 (Cohen 1994) • Sood 2011: perceived stress - PSS-14 (Cohen 1988a) • Sood 2014: perceived stress - PSS-14 (McEwen 1998; Smith 2007) • Varker 2012: stress subscale of DASS-21 (Lovibond 1995) • West 2014: perceived stress - PSS-10 (Cohen 1988a)
Well-being or quality of life	20	• Bernburg 2016: job satisfaction - Copenhagen Psychosocial Questionnaire (COPSOQ) (Kristensen 2005a; Nuebling 2010) • Calder Calisi 2017: well-being - VAS/Semantic differential scales (Friborg 2006) • Cheung 2014: life satisfaction - Satisfaction with Life Scale (Diener 1985) • Duchemin 2015 [d]: work satisfaction – scale not specified (results sent from authors); **quality of life – single item from satisfaction with life questionnaire (no citation indicated in publication)** • Hosseinnejad 2018: job satisfaction - COPSOQ (Kristensen 2005a) • Lin 2019: job satisfaction - McCloskey/Mueller Satisfaction Scale (He 2008; Mueller 1990) • Mache 2015a: job satisfaction - COPSOQ (Kristensen 2005a; Nuebling 2010) • Mache 2015b: job satisfaction - COPSOQ (Kristensen 2005a; Nuebling 2010) • Mache 2016: job satisfaction - COPSOQ (Kristensen 2005a; Nuebling 2010) • Mache 2017: job satisfaction - COPSOQ (Kristensen 2005a; Nuebling 2010) • Mistretta 2018: well-being - WHO (Five) Well-Being Index (Bech 2003) • Sood 2011: quality of life - Linear Analog Self-Assessment Scale (LASA) (Locke 2007) • Sood 2014: quality of life - LASA (Locke 2007; McEwen 2003) • Strijk 2011 [d]: work-related vitality - vitality scale of Utrecht Work Engagement Scale (Schaufeli 2003); **general vitality - RAND-36 vitality scale** (Van der Zee 1993) • West 2014 [d]: job satisfaction - Physician Job Satisfaction Scale (PJSS) (Williams 1999); **quality of life - single-item linear analogue question** (Gudex 1996)

Table 2. Primary outcomes: scales used *(Continued)*

- West 2015 [d]: job satisfaction - PJSS (Williams 1999); **quality of life - linear analogue self-assessment of overall quality of life (no reference specified)**
- Wild 2016: well-being - Warwick Edinburgh Mental Wellbeing scale (WEMWBS) (Tennant 2007)
- ISRCTN69644721: life satisfaction - statements about life satisfaction with Likert response options;**well-being - WEMWBS** (Tennant 2007)
- NCT02603133: happiness - Subjective Happiness Scale (Lyubomirsky 1999)
- NCT03645798: job satisfaction - Job Satisfaction Scale (Tao 2010)

[a]For depression, we preferred depression scales over burnout scales if both forms of measure were reported.
[b]In two trials (West 2014; West 2015) we preferred continuous measures of burnout over dichotomous measures of depression, as they offered the possibility of being combined with other trials reporting continuous outcomes in meta-analyses.
[c]The authors reportd that they would measure resilience with the emotional exhaustion subscale of the MBI. However, as this measure aims to assess burnout, we grouped the study under 'Depression' in this table.
[d]For trials reporting both general measures of well-being or quality of life and work-related assessments (e.g. job satisfaction, work-related vitality), we preferred general measures.

Table 3. Secondary outcomes: scales used

Outcomes	Number of studies	Studies and instruments
Social support (perceived)	3	• Cheung 2014: Multidimensional Scale of Perceived Social Support (Zhang 2002; Zimet 1988) • Clemow 2018: social support subscales tangible, belonging, **appraisal** of Interpersonal Support Evaluation List (ISEL) (Cohen 1983a) • Varker 2012: ISEL-12 (Cohen 1985)
Optimism	3	• Gelkopf 2008: single item modified from Children's Future Orientation Scale (Bleich 2003; Saigh 1997) • Mache 2015a: optimism subscale of Self-Efficacy, Optimism, and Pessimism (SWOP-K9) (Scholler 1999) • Mache 2015b: optimism subscale of SWOP-K9 (Scholler 1999)
Self-efficacy	11	• Berger 2011: Disaster-Helper Self-Efficacy Scale (DHSE) (Gelkopf 2008) • Bernburg 2019: self-efficacy subscale of SWOP-K9 (Scholler 1999) • Cheung 2014: 13-item self-efficacy scale (self-developed based on literature; Bandura 1997; Allen 2010) • Cieslak 2016: trauma self-efficacy - Secondary Trauma Self-Efficacy Scale (Cieslak 2013); **work stress and burnout management self-efficacy - Work Stress and Burnout Management Self-efficacy Scale** (Lua 2008) • Gelkopf 2008: personal sense of self-efficacy - single item (Bleich 2003); **professional self-efficacy - DHSE** (Gelkopf unpublished manuscript) • Mache 2015a: self-efficacy subscale of SWOP-K9 (Scholler 1999) • Mache 2015b: self-efficacy subscale of SWOP-K9 (Scholler 1999) • Mache 2016: self-efficacy subscale of SWOP-K9 (Scholler 1999) • Smith 2019: Occupational Coping Self-Efficacy Questionnaire for Nurses (Pisanti 2008) • Wild 2016: General Self-Efficacy Scale (Schwarzer 1995) • NCT03645798: General Self-Efficacy scale (no citation specified in trial registration)
Active coping	5	• Cheung 2014: adaptive coping subscale (items from 8 adaptive coping responses) from Brief Coping Orientations to Problems Experience scale (Brief COPE) (Carver 1997)

Table 3. Secondary outcomes: scales used *(Continued)*

		• Gelkopf 2008: subscale refocusing on planning of Cognitive Emotion Regulation Questionnaire (Garnefski 2002) • Medisauskaite 2019: active coping - Coping Mechanisms Scale (see trial registration); Brief COPE according to publication (Carver 1989) • Villani 2013: 2 items for active coping of Brief COPE (Carver 1997) • Wild 2016: ability to problem-solve and achieve goals - unpublished questionnaire; **active coping - subscale of Brief COPE** (Carver 1989)
Self-esteem	1	• Berger 2011: Rosenberg self-esteem scale (Rosenberg 1965)
Hardiness	1	• Tierney 1997: Third Generation Personal Views questionnaire (Personal Views Survey) (Dane unpublished manuscript)
Positive emotions	3	• Fei 2019: positive affect - positive affect subscale from positive affect subscale from Positive and Negative Affect Schedule (PANAS) (Huang 2003; Watson 2005) • Lin 2019: positive affect - positive affect subscale from positive affect subscale from PANAS (Huang 2003; Watson 1988) • Stetz 2007: positive affect - positive affect subscale MAACL-R (Zuckerman 1965)

APPENDICES

Appendix 1. Glossary

Glossary of relevant terms in this review

Acceptance and commitment therapy: form of psychotherapy (third wave of cognitive behaviour therapy) that uses acceptance and mindfulness strategies (e.g. being in contact with present moment) and commitment and behaviour-change skills (e.g. values, committed action) in order to increase psychological flexibility

Active control (in this review): alternative treatment (no standard care; for example, treatment developed specifically for the treatment study) that does not control for the amount of time and attention in the intervention group, and is not attention control in a narrow sense

Adverse event: an adverse outcome that occurs during or after the use of an intervention but is not necessarily caused by it

Arm (e.g. intervention arm, control arm): group of participants allocated to the intervention or control group

Attention and interpretation therapy: mindfulness-based approach to reduce stress and increase resilience that teaches to delay judgements and to focus the attention on the novelty of the world as well as higher-order principles (e.g. acceptance, gratitude)

Attention control: alternative treatment in the control group that mimics the amount of time and attention received (e.g. by the trainer) in the intervention group

Attrition: loss of participants during the course of a study (also referred to as loss to follow-up)

Attrition bias: systematic differences between comparison groups in withdrawals or exclusions of participants from the results of a study (e.g. number or reasons, or both)

Available-case analysis: analysis in which data are analysed for every participant for whom the outcome was obtained; subset may be defined after considering exposure to treatment, availability of measurements

Allied healthcare professionals: healthcare staff working in allied health professions distinct from medical care (e.g. psychologists, social workers, counsellors, physical therapists, occupational therapists, speech therapists, medical assistants, medical technicians)

Baseline characteristics: values of demographic, clinical and other variables collected for each participant at the beginning of a study, before the intervention is administered

Baseline comparability: data on the potential (statistical) differences between the study groups in baseline characteristics

Bias: a systematic error or deviation in results or inferences from the truth

Bibliotherapy: resilience intervention is delivered via a self-help book/self-help materials

Blinding: process of preventing those involved in a trial from knowing to which comparison group a particular participant belongs. The risk of bias is minimised when as few people as possible know who is receiving the experimental intervention and who the control intervention. Participants, outcome assessors, and analysts are all candidates for being blinded

Cluster randomised trial: a trial in which clusters of individuals (e.g. clinics, geographical areas), rather than individuals themselves, are randomised to different arms

Coaching: resilience intervention uses a coaching approach (e.g. executive coaching, life coaching); individual problems of one or several clients are discussed with a coach; coaching approaches often include goal setting

Cochrane Handbook for Systematic Reviews of Interventions **(formerly Cochrane Reviewers' Handbook):** document containing guidance and advice on how to prepare and maintain Cochrane reviews

Cognitive-behavioural therapy/training (CBT): form of psychotherapy that is based on the assumption that mental health problems (e.g. depression) result from dysfunctional thinking and therefore aims to modify cognitive processes (e.g. identify and challenge dysfunctional thoughts in order to find functional ones)

Combined setting: resilience interventions delivered as combination of group and individual setting

Combined theoretical foundation/combination: resilience interventions that are based on two or more explicit theoretical foundations, such as CBT and ACT or CBT and mindfulness

Comorbidity: presence of one or more diseases or conditions other than those of primary interest

Concealment of allocation: process used to ensure that the person deciding to enter a participant into a randomised controlled trial does not know the comparison group into which that individual will be allocated. This is distinct from blinding, and is aimed at preventing selection bias. Some attempts at concealing allocation are more prone to manipulation than others, and the method of allocation concealment is used as an assessment of the quality of a trial

Conference abstract: short summary of presentations at conferences, which may be published

Confidence interval: a measure of the uncertainty around the main finding of a statistical analysis. Estimates of an effect, such as the standardised mean difference comparing an experimental intervention with a control, are usually presented as a point estimate and a 95% confidence interval. This means that if someone were to keep repeating a study in other samples from the same population, 95% of the confidence intervals from those studies would contain the true value of the unknown quantity. Wider intervals indicate lower precision; narrow intervals, greater precision

Conflict of interest: personal, financial, or other interests that could have influenced a person's contributions to a study

Control group/control: comparison group that receives no intervention, identical training after waiting period or an alternative intervention

Degrees of freedom: concept that refers to the number of independent contributions to a sampling distribution (such as Chi^2 distribution)

Detection bias: systematic difference between comparison groups in how outcomes are ascertained, diagnosed or verified

Dichotomous data: data that can take one of two possible values, such as depressive/non-depressive (depending on cut-off for clinically relevant mental disorder)

Effect size: 1. generic term for the estimate of effect of treatment for a study; 2. dimensionless measure of effect used for continuous data when different scales (e.g. for measuring resilience) are used to measure an outcome

Estimate of effect: observed relationship between an intervention and an outcome expressed as standardised mean difference in this review

Face-to-face: resilience intervention delivered via face-to-face contact between trainer and one or several participants

F test: statistical hypothesis test derived from the F distribution; typically used to compare continuous data between more than two groups

False positive: a falsely drawn positive conclusion

Fixed-effect model (in meta-analysis): model that calculates a pooled effect estimate using the assumption that all observed variation between studies is caused by the play of chance; studies assumed to be measuring the same overall effect

Follow-up: observation over a period of time of study/trial participants to measure outcomes under investigation; in this review: short-term: three months or less; medium-term: more than three to six months; and long-term follow-up: more than six months

Forest plot: graphical representation of the individual results of each study included in a meta-analysis together with the combined meta-analysis result; plot also allows readers to see the heterogeneity among the results of the studies. The results of individual studies are shown as squares centred on each study's point estimate. A horizontal line runs through each square to show each study's confidence interval (in this review: 95% confidence interval). The overall estimate from the meta-analysis and its confidence interval are shown at the bottom, represented as a diamond. The centre of the diamond represents the pooled point estimate, and its horizontal tips represent the confidence interval.

Funnel plot: graphical display of some measure of study precision plotted against effect size that can be used to investigate whether there is a link between study size and treatment effect; one possible cause of an observed association is reporting bias

Grey literature: kind of material that is not published in easily accessible journals or databases (e.g. conference proceedings that include the abstracts of the research presented at conferences, unpublished theses, etc.)

Group setting: resilience intervention delivered in group of several participants

Hardiness: a (modifiable) personality characteristic ('a hardy person') that consists of three elements (challenge, commitment and control); partly used as synonym of resilience; in this review, hardiness is viewed as one of several resilience factors which partially determines resilience as outcome

Healthcare professionals: healthcare staff delivering direct medical care (e.g. nurses, physicians, hospital personnel)

Heterogeneity: 1. used in a general sense to describe the variation in, or diversity of, participants, interventions, and measurement of outcomes across a set of studies; 2. used specifically, as statistical heterogeneity, to describe the degree of variation in the effect estimates from a set of studies

Heterogeneous: used to describe a set of studies or participants with sizeable heterogeneity

Homogeneous: 1. used in a general sense to mean that the participants, interventions, and measurement of outcomes are similar across a set of studies; 2. used specifically to describe the effect estimates from a set of studies where they do not vary more than would be expected by chance

Individual setting: resilience interventions delivered in one-on-one setting

Intention to treat analysis: a strategy for analysing data from a randomised controlled trial; all participants are included in the arm to which they were allocated, whether or not they received (or completed) the intervention given to that arm. Intention-to-treat analysis prevents bias caused by the loss of participants, which may disrupt the baseline equivalence established by randomisation and which may reflect non-adherence to the protocol

Inter-rater reliability: degree of stability exhibited when a measurement is repeated under identical conditions by different raters; reliability refers to the degree to which the results obtained by a measurement procedure can be replicated. Lack of inter-rater reliability may arise from divergences between observers or instability of the attribute being measured

Interaction: situation in which the effect of one independent variable on the outcome is affected by the value of a second independent variable

Intervention: the process of intervening on people in an experimental study (in this review: by resilience-training programmes)

Intervention group: a group of participants in a study receiving a particular intervention (in this review: resilience intervention)

Laboratory delivery: resilience intervention is provided in the laboratory (under standardised conditions)

Mean: an average value, calculated by adding all the observations and dividing by the number of observations

Mean difference: difference between two estimated means (e.g. used in this review to present the results for single studies that could not be combined in meta-analysis together with other studies)

MeSH headings (Medical Subject Headings): terms used by the United States National Library of Medicine to index articles in Index Medicus and MEDLINE. The MeSH system has a tree structure in which broad subject terms branch into a series of progressively narrower subject terms.

Meta-analysis: use of statistical techniques in a systematic review to integrate the results of included studies

Mindfulness-based training: intervention that aims to foster mindfulness (i.e. non-judging awareness of the present moment and its accompanying mental phenomena, like body sensations, thoughts and emotions), by teaching formal and informal mindfulness practices (e.g. body scan, breathing awareness) (e.g. mindfulness-based stress reduction, MBSR)

Mixed samples: studies with samples including healthcare professionals and participants from the non-healthcare sector (e.g. ambulance personnel and firefighters)

Multimodal delivery: intervention is delivered by a combination of different formats (e.g. face-to-face and online)

No intervention control: control group that received no intervention

Online- or mobile-based delivery: resilience intervention is delivered online/internet-based or via smartphones (e.g. smartphone application)

Outcome: a component of a participant's clinical and functional status after an intervention has been applied, which is used to assess the effectiveness of an intervention

P value: the probability (ranging from zero to one) that the results observed in a study (or results more extreme) could have occurred by chance if in reality the null hypothesis was true. In a meta-analysis, the P value for the overall effect assesses the overall statistical significance of the difference between the intervention groups, whilst the P value for the heterogeneity statistic assesses the statistical significance of differences between the effects observed in each study.

Parallel group trial: a trial that compares two groups of people concurrently, one of which receives the intervention of interest and one of which is a control group; some parallel trials have more than two comparison groups

Participant: an individual who is studied in a trial

Per protocol analysis: an analysis of the subset of participants from a randomised controlled trial who completed the trial or complied with the protocol sufficiently (e.g. specific dose of treatment) to ensure that their data would be likely to exhibit the effect of treatment; this subset may be defined after considering exposure to treatment and absence of major protocol violations. The per protocol analysis strategy may be subject to bias as the reasons for non-compliance may be related to treatment.

Performance bias: systematic differences between intervention groups in care provided apart from the intervention being evaluated; for example, if participants know they are in the control group, they might act differently, and if intervention providers are aware of the group a particular participant is in, they might act differently. Blinding of study participants (both the recipients and providers of intervention) is used to protect against performance bias.

Positive psychology: scientific study of character strengths and positive aspects of human life (e.g. happiness) that allow individuals to thrive; interventions based on positive psychology aim to foster these factors

Post-traumatic growth (also stress-related growth): often used synonymously with resilience; however, in contrast to resilience (i.e. maintaining or restoring mental health after a stressor), post-traumatic or stress-related growth refers to increasing the level of functioning compared to that prior to the stressor

Post-test/post-intervention: the assessment immediately after the end of treatment (in this review: within one week after the end of training)

Precision: a measure of the likelihood of random errors in the results of the meta-analysis; the greater the precision, the less random error. Confidence intervals around the estimate of effect from each study are one way of expressing precision, with a narrower confidence interval meaning more precision.

Primary outcome: the outcome of greatest importance

Primary study: 'original research' in which data are collected

Problem-solving training: closely related to CBT; training based on problem-solving theory (e.g. to foster a positive problem orientation and to teach structured problem-solving)

Random allocation: method that uses the play of chance to assign participants to comparison groups in a trial, e.g. by using a random numbers table or a computer-generated random sequence. Random allocation implies that each individual or unit being entered into a trial has the same chance of receiving each of the possible interventions. It also implies that the probability that an individual will receive a particular intervention is independent of the probability that any other individual will receive the same intervention.

Random-effects model (in meta-analysis): a statistical model in which both within-study sampling error (variance) and between-studies variation are included in the assessment of the uncertainty (confidence interval) of the results of a meta-analysis; when there is

heterogeneity among the results of the included studies beyond chance, random-effects models will give wider confidence intervals than fixed-effect models

Randomisation: the process of randomly allocating participants into one of the arms of a controlled trial. There are two components to randomisation: the generation of a random sequence; and its implementation, ideally in a way so that those entering participants into a study are not aware of the sequence (concealment of allocation).

Randomised controlled trial: study in which two or more conditions, possibly including a control intervention or no intervention, are compared by being randomly allocated to participants

Reporting bias: bias caused by only a subset of all the relevant data being available. The publication of research can depend on the nature and direction of the study results. Studies in which an intervention is not found to be effective are sometimes not published. In addition, a published report might present a biased set of results (e.g. only outcomes or subgroups where a statistically significant difference was found).

Resilience: maintenance or fast recovery of mental health during or after substantial adversities; different definitions exist, however, there is a consensus about two essentials: 1. exposure to substantial stressors or adversities; 2. successful coping with these adversities

Resilience factor: psychological or social factors associated to resilience, e.g. optimism

Search strategy: 1. the methods used to identify trials within the review's scope (including searching electronic databases, trial registers, personal contact with researchers/study authors and checking reference lists); 2. the combination of terms used to identify studies in an electronic database such as MEDLINE

Secondary outcome: an outcome used to evaluate additional effects of the intervention deemed a priori as being less important than the primary outcomes

Selection bias: systematic differences between comparison groups in prognosis or responsiveness to treatment; random allocation with adequate concealment of allocation protects against selection bias. Other means of selecting who receives the intervention are more prone to bias because decisions may be related to prognosis or responsiveness to treatment

Sensitivity analysis: analysis used to determine how sensitive the results of the systematic review are to changes in how it was done; sensitivity analyses are used to assess how robust the results are to uncertain decisions or assumptions about the data and the methods that were used.

Single blind: single masked

Standard deviation: measure of the spread or dispersion of a set of observations, calculated as the average difference from the mean value in the sample

Standard error: standard deviation of the sampling distribution of a statistic; measurements taken from a sample of the population will vary from sample to sample. The standard error is a measure of the variation in the sample statistic over all possible samples of the same size. The standard error decreases as the sample size increases.

Standardised mean difference: difference between two estimated means divided by an estimate of the standard deviation; used to combine results from studies using different ways of measuring the same concept, e.g. resilience or mental health. By expressing the effects as a standardised value, the results can be combined since they have no units.

Stress inoculation: form of CBT; psychotherapeutic method to prepare participants to deal with stressors successfully and to achieve coping strategies by exposing them to milder forms of stress

Subgroup analysis: an analysis in which the intervention effect is evaluated in a defined subset of the participants/interventions in a trial, or in complementary subsets, such as by intervention setting or delivery format

Telephone delivery: resilience intervention that are provided via the telephone (e.g. calls between trainer and participant)

Training intensity: intensity of intervention as indicated by the number of sessions or the number of hours (i.e. duration); in this review: low intensity: total duration of ≤ five hours or ≤ three sessions; moderate intensity: > 5 hours to ≤ 12 hours or > 3 to ≤ 12 sessions; high intensity: > 12 hours or > 12 sessions

Treatment as usual (TAU): the control group receives a (established) standard treatment (synonyms: standard care, usual care)

t test: a statistical hypothesis test derived from the t distribution; used to compare continuous data in two groups

Trialist: refers to a person conducting or publishing a controlled trial

Type I error (also false positive): conclusion that a treatment works, when it actually does not work; the risk of a Type I error is often called alpha. In a statistical test, it describes the chance of rejecting the null hypothesis when it is in fact true.

Unspecific theoretical foundation/unspecific training programmes: resilience interventions fostering one or several resilience factors but without specifying any explicit theoretical foundation or where the underlying framework cannot be assigned to a certain theoretical approach

Unspecified/not specified setting, delivery, training intensity or comparator: no information on the respective intervention characteristic or the comparator are available and could not be received by the study authors

Variable: a factor that differs among and between groups of people, e.g. patient characteristics such as age, sex, and smoking, or measurements such as blood pressure or depression score; there can also be treatment or condition variables (e.g. length of treatment dose) and outcome variables

Wait-list control: control group receiving the training after a waiting period

Footnotes

This glossary is based, in part, on the glossary of the Cochrane Community (Cochrane Community 2020).

Appendix 2. Evidence rating of modifiable resilience factors

Although an immense number of factors have been discussed in the literature, only a set of psychosocial factors has been scientifically validated as being appropriate determinants of resilience by cross-sectional and longitudinal (frequently observational) studies in different populations (e.g. patients affected by physical diseases like cancer, diabetes, spinal cord injury, coronary heart disease, etc.; different caregiver groups; individuals after trauma exposure). Upon closer examination, only some of the discussed resilience factors may be viewed as well-evidenced factors that have also been found to be protective in systematic reviews and meta-analyses (level 1). These factors are most likely to be related to adult resilience, as they were proven in different populations facing various adversities and stressors. However, it has to be kept in mind that the chosen factors represent the current state of knowledge on psychosocial resilience-promoting factors, and that other factors, which are not yet well researched, could also contribute to resilience.

Level of evidence and criteria	Resilience factors
Level 1: strong evidence (SRs and MAs) • Factor has been studied for its association with resilience (i.e. mental health or well-being or psychological adaptation despite (acute or chronic) stressors, life events or traumas) in observational (cross-sectional or longitudinal) studies in adults • There is evidence from systematic reviews (SRs) AND meta-analyses (MAs)	

Level 1a: there is evidence for this factor from several SRs AND several MAs (both across different populations)	• **Active coping (e.g. problem-solving, planning)**
	  ◦ 2 MAs: Kvillemo 2014; Moskowitz 2009
	  ◦ 4 SRs: Bjørkløf 2013; Kneebone 2003; Senra 2015; Van Kessel 2013
	  ◦ Cross-sectional studies: e.g. Al-Yagon 2009; Dörfel 2008; Lechner 2007; Luo 2015; Marty 2010; Wang 2014
	  ◦ Longitudinal studies: e.g. Butler 2009; Silver 2002
	• **Self-efficacy**
	  ◦ 2 MAs: Jackson 2014; Lee 2013
	  ◦ 9 SRs: Allart 2013; Dias 2015; Korpershoek 2011; Luszczynska 2009; Morris 2013; Peter 2012; Stewart 2011; Van Kessel 2013; Van Leeuwen 2012
	  ◦ Cross-sectional studies: e.g. Barry 2003; Northouse 2002; Orengo 2001; Schwarzer 2008; Wright 2008
	  ◦ Longitudinal studies: e.g. DeRoon-Cassini 2010; Guest 2015; Hartley 2008
	• **Optimism or positive attributional style**
	  ◦ 4 MAs: Helgeson 2006; Lee 2013; Prati 2009; Shand 2015
	  ◦ 5 SRs: Dias 2015; Duits 1997; Peter 2012; Stewart 2011; Van Kessel 2013
	  ◦ Cross-sectional studies: e.g. Martin-Krumm 2003; Sumer 2005
	  ◦ Longitudinal studies: e.g. Ahmad 2010; Carver 2010; Fresco 2006; Grote 2007; Kivimäki 2005; Myhren 2010; Segovia 2012

(Continued)

	• **Social support** ○ 4 MAs: Lee 2013; Ozer 2003; Prati 2009; Shand 2015 ○ 11 SRs: Allart 2013; Casale 2013; Dias 2015; Duits 1997; McCann 2013; Morris 2013; Paterson 2013; Pragodpol 2013; Senra 2015; Stewart 2011; Van Kessel 2013 ○ Cross-sectional studies: e.g. Ahern 2004; Fuller-Iglesias 2008; Kaspersen 2003; Schumm 2006 ○ Longitudinal studies: e.g. Bartone 1989; Dyrbye 2010; Johnson 2009; Koenen 2003; Solomon 1988 • **Cognitive flexibility (e.g. positive reappraisal, acceptance of negative situations and emotions)** [a] ○ 6 MAs: Helgeson 2006; Kvillemo 2014; McIntosh 2012; Moskowitz 2009; Prati 2009; Shand 2015 ○ 11 SRs: Allart 2013; Bjørkløf 2013; Dias 2015; Guardino 2013; Kneebone 2003; Morris 2013; Nowlan 2015; Peter 2012; Senra 2015; Stewart 2011; Van Leeuwen 2012 ○ Cross-sectional studies: e.g. Bailey 2013; Farber 2003; Johnson 2015; Min 2013 ○ Longitudinal studies: e.g. Park 2008; Silver 2002; Wade 2001 • **Religiosity or spirituality or religious coping (e.g. frequent religious attendance)** [a] ○ 7 MAs: Ano 2005; Helgeson 2006; McIntosh 2012; Moskowitz 2009; Prati 2009; Salsman 2015; Shand 2015 ○ 7 SRs: Bjørkløf 2013; Guardino 2013; McCann 2013; Peter 2012; Senra 2015; Stewart 2011; Visser 2010 ○ Cross-sectional studies: e.g. Cruz 2016; Tsai 2015 ○ Longitudinal studies: e.g. Hebert 2007; Kasen 2014; Koenig 2007; Walsh 2002
Level 1b: there is evidence for this factor from several SRs AND a single MA (both across different populations)	• **Positive emotions or positive affect** ○ 1 MA: Lee 2013 ○ 2 SRs: Van Kessel 2013; Van Leeuwen 2012 ○ Cross-sectional studies: e.g. Cohen 2006; Gloria 2016; Ong 2006 ○ Longitudinal studies: e.g. Fredrickson 2003; Geschwind 2010; Quale 2010; Strand 2006; Zautra 2005 • **Hardiness** ○ 1 MA: Eschleman 2010 ○ 4 SRs: Brooks 2003; Dias 2015; McCann 2013; Stewart 2011 ○ Cross-sectional studies: e.g. Alexander 2001; Andrew 2008; Bernas 2000; Farber 2000; Hystad 2011; Judkins 2005; King 1998; Natvik 2011; Waysman 2001; Weiss 2002 ○ Longitudinal studies: e.g. Dolan 2006; Bartone 1989 • **Self-esteem** ○ 1 MA: Lee 2013 ○ 4 SRs: Allart 2013; Peter 2012; Stewart 2011; Van Leeuwen 2012 ○ Cross-sectional studies: e.g. Besser 2014; Fernández-Lansac 2012; Hayter 2014 ○ Longitudinal studies: e.g. Bookwala 2014
Level 1c: there is evidence for this factor from several SRs (across different populations) AND a single MA (in the same population)	• **Meaning in life or purpose in life** ○ 1 MA: Winger 2016 ○ 5 SRs: Allart 2013; Peter 2012; Van Kessel 2013; Van Leeuwen 2012; Visser 2010) ○ Cross-sectional studies: e.g. Alim 2008; Bauer-Wu 2005; Blackburn 2015; Feder 2013; Lyon 2001; Owens 2009; Pietrzak 2013; Schaefer 2013; Smith 2009; Tsai 2015 ○ Longitudinal studies: e.g. Krause 2007; Tsai 2016 • **Sense of coherence** ○ 1 MA: Winger 2016 ○ 7 SRs: Allart 2013; Bjørkløf 2013; Eriksson 2006; Peter 2012; Pragodpol 2013; Van Kessel 2013; Van Leeuwen 2012) ○ Cross-sectional studies: e.g. Al-Yagon 2009; Cohen 2003; Forstmeier 2009 ○ Longitudinal studies: e.g. Frommberger 1999; Schnyder 2008
Level 2: moderate evidence (only SRs or single MA)	

(Continued)

- Factor has been studied for its association with resilience (i.e. mental health or well-being or psychological adaptation despite (acute or chronic) stressors, life events or traumas) in observational (cross-sectional or longitudinal) studies in adults
- There is evidence from SR OR a single MA

Level 2a: there is evidence for this factor from several SRs (across different populations) OR there is no evidence from SRs, but from a MA (across different populations)	• **(Internal) Locus of control**
	  ○ 6 SRs: Bjørkløf 2013; Dias 2015; Saksvik 2011; Senra 2015; Stewart 2011; Van Leeuwen 2012
	  ○ Cross-sectional studies: e.g. Kilic 2013; Sattler 2014; Solomon 1988
	  ○ Longitudinal studies: e.g. Karstoft 2015; Lawler 1992; Milte 2015; White 2012a
	• **Coping flexibility**
	  ○ 1 MA: Cheng 2014
	  ○ Cross-sectional studies: e.g. Atal 2016; Bonanno 2011; Burton 2012; Park 2015
	  ○ Longitudinal studies: e.g. Bonanno 2004; Galatzer-Levy 2012

Level 2b: there is evidence for this factor from several SRs (in the same population)	• **Hope**
	  ○ 2 SRs: Peter 2012; Van Leeuwen 2012
	  ○ Cross-sectional studies: e.g. Besser 2014; Hernandez 2013; Ong 2006; Truitt 2012
	  ○ Longitudinal studies: e.g. Ho 2010

Level 2c: there is evidence for this factor from a single SR (in the same population)	• **Humour**
	  ○ 1 SR: McCann 2013
	  ○ Cross-sectional studies: e.g. Abel 2002a; Abel 2002b
	  ○ Longitudinal studies: e.g. Kuiper 1992; Nezu 1988

Level 3: weak evidence (no SR or MA) • Expert opinion without explicit critical appraisal • Factor has not been studied sufficiently for its association with resilience (i.e. mental health or well-being or psychological adaptation despite (acute or chronic) stressors, life events or traumas) in adults • Factor is only mentioned in unsystematic narrative reviews or discussion papers, or both	
	• **Altruism** ○ Narrative reviews or discussion papers: Haglund 2007; Southwick 2005; Wu 2013

MA: Meta-analysis; **SR:** Systematic review

Footnotes

Results of systematic reviews and meta-analyses based on a literature search for potentially modifiable resilience factors in MEDLINE (search strategy: respective resilience factor.tw. AND (review or meta-analy$).tw.; search limited to "All adults (19 plus years)" and 1990-2016).

[a]Cognitive flexibility and religiosity or spirituality are multidimensional concepts resulting in highly ambiguous operationalisations. Cognitive flexibility comprises several concepts, such as positive reappraisal and acceptance (Southwick 2005). Religiosity or spirituality combines affective, behavioural and cognitive dimensions, each measured differently (Ano 2005; Pargament 2000; Salsman 2015).

Appendix 3. Examples of training methods to address resilience factors

Evidence-based resilience factor	Examples of training methods to address the resilience factor
Meaning in life or purpose in life	Introduce the benefits of purpose in life; support individuals in identifying important sources of meaning (e.g. social relationships, work) as well as in setting priorities and guiding values for their life (e.g. Sood 2011)

(Continued)

Sense of coherence (comprehensibility, meaningfulness, manageability)	Promote the understanding of external life challenges, personal beliefs and emotions; encourage participants to reflect on personal (internal or external) resources and to use them more frequently (e.g. Tan 2016)
Positive emotions or positive affect	Psychoeducation on emotions; mindfulness techniques; support individuals in identifying pleasant activities to enhance positive emotions (e.g. Jennings 2013)
Hardiness (challenge, commitment, control)	Situational reconstruction (i.e. imagination of stressful circumstances); focusing (i.e. reflection on bodily sensations of emotional upset) (e.g. Maddi 1998; Maddi 2009)
Self-esteem	Support participants in identifying personal strengths
Active coping (e.g. problem-solving, planning)	Introduce the problem-solving model and familiarise participants with the use of active coping strategies in stressful situations (e.g. making action plans) (e.g. Abbott 2009; Bekki 2013; Sahler 2013)
Self-efficacy	Support participants in identifying personal strengths and other sources of self-efficacy (e.g. social connections); support individuals in realising previous successes (e.g. coping of negative situations)
Optimism or positive attributional style	Teach participants to adopt a more positive attributional style for stressful (i.e. external, unstable, specific) and pleasant events (i.e. internal, stable, global); encourage individuals to gain a brighter outlook for the future by enhancing their attention for and the discovery of positive aspects in their lives (e.g. Carver 2010; Sadow 1993)
Social support	Encourage the individual's reflection on his or her current network (i.e. magnitude of social network, positive or negative aspects in social relationships); enhance the individual's support network by providing them with communication techniques (e.g. Kent 2011; Schachman 2004; Sood 2011; Steinhardt 2008)
Cognitive flexibility (e.g. positive reappraisal, acceptance of negative situations and emotions)	Positive reappraisal: introduction of ABC (Activating Event, Belief, Consequence) Technique of Irrational Beliefs (Ellis 1957) of cognitive therapy; train participants in identifying and challenging maladaptive thoughts and replacing them by more positive ones (e.g. Abbott 2009; Farchi 2010; Songprakun 2012; Steinhardt 2008) Acceptance: relaxation or mindfulness techniques
Religiosity or spirituality or religious coping (e.g. frequent religious attendance)	Spiritual exercises like meditation or yoga; psychoeducation on coping strategies like regular praying or participating in religious community activities (e.g. worship) (e.g. Sood 2011)

Appendix 4. Previous systematic reviews and meta-analyses and their methodological weaknesses

Systematic reviews and meta-analyses of various types of interventions to foster healthcare professionals' mental health; e.g. CIPSRT 2016; Boellinghaus 2014; Buddeberg-Fischer 2006; Burton 2017; Car 2018; Carrieri 2018; Chesak 2019b; Cochran 2017; De Oliveira 2019; Edwards 2003; Guillaumie 2017; Hannigan 2004; Harris 2018; Jones 2000; Lamothe 2016; Maben 2018; McVicar 2003; Mimura 2003; Panagioti 2017; Paris 2010; Petrie 2019; Raj 2016; Regehr 2014; Romppanen 2017; Ruotsalainen 2015; Smith 2003; Trowbridge 2016; West 2016.

Systematic reviews and meta-analyses on resilience interventions in clinical and non-clinical adult populations

Category	Details of previous reviews/meta-analyses
Number of reviews and meta-analyses	• 13 systematic reviews: Bauer 2018; Macedo 2014; Massey 2019; Milne 2016; Pallavicini 2016; Petriwskyj 2016; Reyes 2018; Robertson 2015; Skeffington 2013; Tams 2016 [a]; Townshend 2016; Van Kessel 2014; Wainwright 2019

(Continued)

	• 5 meta-analyses, with only three being relevant due to meta-analyses for psychological outcomes (Joyce 2018; Leppin 2014; Vanhove 2016). Deady 2017 [a] conducted a meta-analysis on psychological symptoms but included primary studies that did not explicitly mention resilience, while Pesantes 2015 conducted no pooled analysis for psychological outcomes.
Methodological characteristics	*Eligibility critiera:* heterogeneous eligibility criteria (e.g. concerning study design) and definitions of resilience training (e.g. the aim of fostering resilience was not always stated in the included primary studies
	Search strategy: Some reviews used rather simple, limited search strategies to identify relevant studies (e.g. only resilience/hardiness combined with training terms in, for example, Joyce 2018; Robertson 2015; restriction to English language), which may bias the search results.
	Review protocol/registration: A review protocol or PROSPERO registration was available for four publications only (Bauer 2018; Leppin 2014; Townshend 2016; Wainwright 2019).
	Review according to guidelines: Most reviews report having been conducted according to the PRISMA or alternative guidelines such as the guidance for undertaking reviews in health care (CRD 2009; e.g. Milne 2016; Van Kessel 2014).
	Quality assessment of included studies: Most reviews performed a quality assessment of the primary studies (the exceptions being Milne 2016; Pallavicini 2016; Reyes 2018; Skeffington 2013; Vanhove 2016, who only judged publication bias; we were also unable to verify if Tams 2016 conducted a quality assessment because we could not retrieve the full text). For studies included in several reviews, the reported risk of bias also differed between publications (e.g. detection bias for Abbott 2009 differed between Leppin 2014 and Robertson 2015).

Footnotes

[a] Deady 2017 and Tams 2016 searched for 'resilience' and related constructs, but did not formulate specific eligibility criteria concerning resilience-training programmes.

Systematic reviews and meta-analyses on resilience interventions in healthcare professionals

Category	Details of previous reviews/meta-analyses
Number of reviews and meta-analyses	• 11 systematic reviews[a] (Cleary 2018; Concilio 2019; Delgado 2017; Elliott 2012; Foster 2019; Fox 2018; Gillman 2015; Gilmartin 2017; Robertson 2016; Rogers 2016; Wright 2017); two other reviews (Hunter 2016; Pezaro 2017) searched for resilience and identified resilience intervention studies but did not initially focus on identifying such programmes (e.g. no respective eligibility criteria) • 1 meta-analysis (Lavin Venegas 2019), but it was restricted to burnout outcomes, with a majority of observational studies in the pooled analyses • Three of these publications (Delgado 2017, Foster 2019; Robertson 2016) did not merely aim to identify resilience interventions but also had other review questions (e.g. concerning concepts or measures of resilience). Thus, the number of resilience intervention studies was limited (e.g. only one study in Foster 2019 or Robertson 2016).
Methodological characteristics	*Eligibility critiera:* • Each publication focused on different aspects of resilience training, using different definitions of resilience, and different inclusion and exclusion criteria for studies. • While some reviews only included training programmes with the stated intention to enhance resilience or provided concrete examples of resilience training (e.g. Cleary 2018; Fox 2018; Gillman 2015), the eligibility criteria for the types of intervention were not described in detail in a number of publications (e.g. Wright 2017 and reviews not focusing solely on interventions, e.g. Foster 2019).

(Continued)

- The 14 publications investigated healthcare staff in general, in primary or in dementia care (Cleary 2018; Elliott 2012; Robertson 2016); specific groups of healthcare workers such as physicians (Fox 2018; Lavin Venegas 2019), nurses (Concilio 2019; Delgado 2017; Foster 2019; Gillman 2015) or midwives (Wright 2017); combinations of these groups (Hunter 2016); or combinations of healthcare professionals and healthcare students (e.g. Gilmartin 2017; Pezaro 2017; Rogers 2016).

Search strategy:

- Each review varied in the breadth of the search strategy and the extent of reporting of the strategy used. For example, while some reviews searched for resilience and associated terms (e.g. hardiness; e.g. Foster 2019; Pezaro 2017), used specific intervention terms (e.g. stress management; e.g. Gilmartin 2017) and involved several terms for healthcare staff or the respective subgroup (e.g. Lavin Venegas 2019), others used a narrow search (e.g. resilience combined with one term for healthcare professionals; e.g. Delgado 2017).
- Most previous reviews were restricted to English-language publications and grey literature was not always considered.

Review protocol/registration: The absence of a published protocol or protocol registration for most of these reviews (the exceptions being Gillman 2015; Gilmartin 2017; Pezaro 2017; Lavin Venegas 2019) also reduces transparency and comparability in the reviews' procedures and potentially restricts the evidence found.

Review according to guidelines: Several reviews did not specify whether they had been conducted according to guidelines, such as PRISMA or Cochrane guidelines, or other validated frameworks (e.g. Elliott 2012; Gillman 2015; Hunter 2016; Robertson 2016; Rogers 2016; Wright 2017).

Quality assessment of included studies:

- The assessment and reporting of the risk of bias and quality of the included studies also differed between the reviews, as they often relied on different guidelines depending on the study design considered (e.g. Methods Appraisal Tool (Pace 2012), Downs and Black checklist (Downs 1998), Cochrane Collaboration 'Risk of bias' tool (Higgins 2011a)).
- Two reviews reported no 'Risk of bias' assessment (Hunter 2016; Robertson 2016).

Footnotes

[a] Taylor 2018 identified resilience training as an alternative intervention to assess the impact of Schwartz Center Rounds on healthcare staff. However, as the review aimed to synthesise the evidence base on Schwartz Center Rounds, we did not consider it to be a 'resilience review'.

Appendix 5. Potential instruments for the measurement of psychological resilience based on previous reviews (Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016) and additional literature searches[a]

N°	Measure	Theory and item selection	Internal consistency	Validity	Rating
1	Resilience Scale (RS-25) (Wagnild 1993)[b]	+	+++	+++	6#
2	Brief Resilience Scale (BRS) (Smith 2008)	+	+++	+++	6#
3	Ego Resiliency	+	++	+++	5#

(Continued)

	(Klohnen 1996)[b]				
4	Connor - Davidson Resilience Scale (CD-RISC) (Connor 2003)	+	++	+++	5#
5	Resilience Scale for Adults (RSA_{33}) (Friborg 2005)	+	++	+++	5#
6	Trauma Resilience Scale (TRS_{37}) (Madsen 2010)	+	+++	++	5#
7	Ego - Resiliency Scale (ER89) (Block 1996)[b]	-	++	+++	5#
8	Resilience Scale (RS-14) (Wagnild 2009)[b]	+	+++	+	4#
9	Resilience Scale for Adults (RSA_{37}) (Friborg 2003)	+	++	++	4#
10	Resilience at Work Scale (Winwood 2013)	+	++	++	4#
11	Workplace Resilience Inventory (WRI) (McLarnon 2013)	+	++	++	4#
12	Multidimensional Trauma Recovery and Resiliency Scale (MTRR) (Harvey 2003)	+	+++	+	4#
13	Resiliency Attitudes and Skills Profile (RASP) (Hurtes 2001)	+	+++	+	4#
14	Resilience Appraisals Scale (RAS) (Johnson 2010)	-	+++	+	4#
15	Revised Ego Resiliency 89 Scale (ER89-R) (Alessandri 2007)[b]	+	++	+	3#
16	Ego Resiliency (Bromley 2006)[b]	+	++	+	3#
17	Connor - Davidson Resilience Scale (CD-RISC-10) (Campbell-Sills 2007)	+	++	+	3#

(Continued)

18	Resilience Scale for Adults (RSA_{45}) (Hjemdal 2001)	+	+++	-	3#
19	Brief Resilient Coping Scale (BRCS) (Sinclair 2004)	+	+	++	3#
20	Trauma Resilience Scale (TRS_{48}) (Madsen 2010)	+	+++	-	3#
21	Child and Youth Resilience Measure - 28 (CYRM-28) (Liebenberg 2012; Ungar 2008)	+	+++	-	3#
22	Post-traumatic Growth Inventory (PTGI) (Tedeschi 1996)[c]	+	++	+	3#
23	Adolescent Resilience Scale (Oshio 2002; Oshio 2003)	-	++	+	3#
24	Resilience and Reintegration (20 items drawn from Spirit Core Scale) (Waite 2004)	-	+++	-	3#
25	Psychological resilience (Windle 2008)	+	++	-	2#
26	Child and Youth Resilience Measure - 12 (CYRM-12) (Liebenberg 2013)	+	++	-	2#
27	Resilience scale (Bekki 2013)	+	++	-	2#
28	Perceived resilience (Van der Kleij 2011)	-	++	-	2#
29	Romanian Scale of Resilience to Occupational Stress (SROS) (Aniţei 2012)	-	-	-	0#

Footnotes

The resilience scales are specified hierarchically according to psychometric quality criteria.

Theory & item selection: - (#): no description of theory or item selection process available; and + (#): description of theory or item selection process available.

Internal consistency (Cronbach's alpha): - (0): no information; + (1): $\alpha < 0.70$; ++ (2): $\alpha \geq 0.70$; and +++ (3): $\alpha > 0.90$.

Validity (convergent/divergent or criterion validity): - (0): no information; + (1): correlations (r) with construct-related measures or criterions available, all correlations < 0.50 or resilience measure only correlated with original instrument/long-form or no correlations but alternative results reported (e.g. odds ratio); ++ (2): correlations (r) with construct-related measures or criterions available, ≤ 50% of correlations ≥ 0.50; and +++ (3): correlations (r) with construct-related measures or criterions available, > 50% of correlations ≥ 0.50.

[a]At the time of prespecifying these measures and the publication of the protocol (Helmreich 2017), the systematic review of Joyce 2018 had not yet been published and was not considered in the development of this appendix.
[b]Scales assessing resilience as a personality characteristic.
[c]Scale assessing post-traumatic growth.

Appendix 6. Possible assessment instruments for the measurement of mental health and well-being based on intervention studies included in previous reviews and meta-analyses (Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016)[a]

- **Anxiety**
  - Depression Anxiety and Stress Scales (DASS-21) (Lovibond 1995)
  - Smith Anxiety Scale (SAS) (Smith 2007)
  - Beck Anxiety Inventory (BAI) (Beck 1993)
  - State-Trait Anxiety Inventory (STAI) (Spielberger 1970)
- **Depression**
  - Depression Anxiety and Stress Scales (DASS-21) (Lovibond 1995)
  - Center for Epidemiological Studies - Depression Scale (CES-D) (Radloff 1977)
  - Maslach Burnout Inventory (MBI) (Maslach 1997)
  - Oldenburg Burnout Inventory (Demerouti 2010)
  - Beck Depression Inventory (BDI) (Beck 1961)
  - Beck Depression Inventory - II (BDI-II) (Beck 1996)
  - Visual Analog Scale - Fatigue (VAS-Fatigue) (Wolfe 2004)
  - Patient Health Questionnaire for Depression (PHQ-D) (Spitzer 1999)
  - Hospital Anxiety and Depression Scale (HADS) (Zigmond 1983)
  - Time Urgency Scale (TUS) (Landy 1991)
- **Stress or stress perception**
  - Depression Anxiety and Stress Scales (DASS-21) (Lovibond 1995)
  - Perceived Stress Scale (PSS) (Cohen 1988a)
  - Personal Stress Scale (PSS) (self-developed) (Petree 2012)
  - Subjective Units of Distress (SUDS) (Wolpe 1958)
  - Visual Analog Scale (VAS) (Arnetz 1985; Hasson 2005)
  - Stress and Perception of Control Scale (SPOCS) (unpublished instrument) (Rose 2013)
- **Well-being or life satisfaction or quality of life or vitality or vigour**
  - Well-being
    - Ryff's Scales of Psychological Well-Being (Ryff 1989)
    - Workplace Well-being Index (WWBI) (Page 2005)
  - Life satisfaction:
    - Satisfaction with Life Scale (Diener 1985)
  - (Health-related) Quality of life (QOL):
    - Linear Analog Self-Assessment Scale (QOL-LASA) (Locke 2007)
    - Medical Outcomes Study (MOS) 36-item short-form health survey (SF-36) (Ware 1994)
    - World Health Organization Quality of Life – BREF (WHOQOL-BREF) (WHOQOL Group 1998)
  - Vitality
    - Subscale of the MOS 36-item short-form health survey (SF-36) (Ware 1994)
  - Vigour
    - Work Vigour subscale of the Utrecht Work Engagement scale (Schaufeli 2002)

[a]At the time of prespecifying these measures and the publication of the protocol, the systematic review of Joyce 2018 had not yet been published and was not considered in the development of this appendix.

Appendix 7. Possible assessment instruments for the measurement of resilience factors based on intervention studies included in previous reviews and meta-analyses (Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016)[a]

- **Social support**
  - Interpersonal Support Evaluation List - 12 (ISEL-12) (Cohen 1983a)
  - Personal Resources Questionnaire (PRQ-85) (Brandt 1981)
  - Social Provisions Scale (Cutrona 1987)
  - Subscale Interpersonal relations of the Health-Promoting Lifestyle Profile II (Walker 1987)
  - Interpersonal Relationship Inventory (IPR) (Tilden 1990)
  - Support questionnaire (Cushway 1996)
  - MOS Social Support Survey (Sherbourne 1991)
  - Total of four scales devised by Moos (1979) for perceived social support (Maddi 1998)
- **Optimism**
  - Life Orientation Test - Revised (LOT-R) (Scheier 1994)
- **Self-efficacy**
  - Coping self-efficacy (CSE) (Chesney 2003)
  - Self-efficacy scale (Sherer 1982)
  - Teachers' Sense of Efficacy Questionnaire (TSES) (Tschannen-Moran 2001)
  - New General Self-Efficacy Scale (NGSE) (Chen 2004)
  - Coping Efficacy Scale (self-developed) (Bekki 2013)
- **Active coping**
  - Brief Coping Orientations to Problems Experienced scale (Brief COPE) (Carver 1997)
  - Ways of Coping Questionnaire (WOC) (Folkman 1988)
  - Coping Styles Questionnaire (CSQ) (Williams 1997)
  - Coping Styles (self-developed) (Bekki 2013)
- **Self-esteem**
  - Rosenberg Self-Esteem Scale (RSES) (Rosenberg 1965)
  - Self-Esteem Rating Scale (SERS) (Nugent 1993)
- **Hardiness**
  - HardiSurvey III - R (Maddi 2001)
  - Personal Views Survey (Maddi 1987)
  - Hardiness Scale or College Student Hardiness Measure (CSHM) (Atri 2007a; Atri 2007b; Kanekar 2010)
  - Cognitive Hardiness Scale (Nowack 1990)
- **Positive emotions or positive affect**
  - Positive and Negative Affect Schedule (PANAS) (Watson 1988)
  - Positive and Negative Affect Schedule Expanded Form (PANAS-X) (Watson 1994)
  - Authentic Happiness Inventory (AHI; unpublished measure) (Abbott 2009)

[a]At the time of prespecifying these measures and the publication of the protocol (Helmreich 2017), the systematic review of Joyce 2018 had not yet been published and was not considered in the development of this appendix.

Appendix 8. Search strategies up to 2016

In order to get a comprehensive understanding of the evidence in the field of psychological resilience interventions, and to identify training programmes that can really be assumed to enhance resilience in adults based on scientific findings, we performed a literature search that combined and complemented the search approaches from previous reviews and meta-analyses.

In contrast to the search strategy of Joyce 2018, Leppin 2014, Robertson 2015 and Vanhove 2016, who used very narrow search terms (e.g. 'resilience programme' or 'hardiness training'), we also searched for broader intervention terms. These broader search terms were based on the search performed by Macedo 2014, but were also supplemented by new terms (e.g. 'acceptance and commitment therapy', 'stress management', 'mindfulness').

We searched the databases below in October 2016 using search strategies based on the original inclusion criteria for this review.

Cochrane Central Register of Controlled Trials (CENTRAL)

Searched 27 October 2016 [5168 records]

#1 [mh "Resilience, Psychological"]
#2 [mh "social adjustment"]
#3 [mh "Adaptation, Psychological"]
#4 ("post-traumatic growth" or "posttraumatic growth" or "stress-related growth")
#5 (positiv* near/1 (adapt* or adjust*))
#6 (psychol* near/1 (adapt* or adjust*))
#7 (resilien* or hardiness*)
#8 (cope or coping)
#9 ((withstand* or overcom* or resist* or recover* or thriv* or adapt* or adjust* or bounc* back) near/5 (stress* or trauma* or adversit*))
#10 {or #1-#9}
#11 [mh psychotherapy]
#12 MeSH descriptor: [Stress, Psychological] this term only and with qualifier(s): [Therapy - TH]
#13 (psychotherap* or psycho next therap*)
#14 (behav* near/3 (intervention* or program* or therap*))
#15 ((cognit* or cognitive next behavior* or CBT) near/3 (intervention* or program* or therap*))
#16 (psycho* near/3 (intervention* or program* or therap*))
#17 relaxation
#18 mindful*
#19 (counsel*ing or coaching)
#20 (third next wave next (psycho* or therap*))
#21 cognit* next restructur*
#22 positive next psychology
#23 (refram* or re next fram* or reapprais*)
#24 (stress near/1 (inoculation or manag* or reduc* or resist*))
#25 (anxiety near/3 manage*)
#26 "acceptance and commitment "
#27 [mh "Combined Modality Therapy"]
#28 (multimodal* or multi next modal* or combined modal*)
#29 [mh "Health promotion"]
#30 (health near/3 (educat* or promot*))
#31 {or #11-#30}
#32 #10 and #31, Publication Year from 1990 to 2016, in Trials

MEDLINE OVID

Searched 28 October 2016 [6723 records]

1 Resilience, Psychological/
2 social adjustment/
3 Adaptation, Psychological/
4 (post-traumatic growth or posttraumatic growth or stress-related growth).tw,kf.
5 (positiv$ adj1 (adapt$ or adjust$)).tw,kf.
6 (psychol$ adj1 (adapt$ or adjust$)).tw,kf.
7 (resilien$ or hardiness$).tw,kf.
8 (cope or coping).tw,kf.
9 ((withstand$ or overcom$ or resist$ or recover$ or thriv$ or adapt$ or adjust$ or bounc$ back) adj5 (stress$ or trauma$ or adversit$)).tw,kf.
10 or/1-9
11 exp psychotherapy/
12 Stress, Psychological/th
13 (psychotherap$ or psycho-therap$).tw,kf.
14 (behav$ adj3 (intervention$ or program$ or therap$)).tw,kf.
15 ((cognit$ or cognitive behavior$ or CBT) adj3 (intervention$ or program$ or therap$)).tw,kf.
16 (psycho$ adj3 (intervention$ or program$ or therap$)).tw,kf.
17 relaxation.tw,kf.
18 mindful$.tw,kf.
19 (counsel?ing or coaching).tw,kf.
20 (third wave adj (psycho$ or therap$)).tw,kf.
21 cognit$ restructur$.tw,kf.
22 positive psychology.tw,kf.
23 (refram$ or re-fram$ or reapprais$).tw,kf.

24 (stress adj1 (inoculation or manag$ or reduc$ or resist$)).tw,kf.
25 (anxiety adj3 manage$).tw,kf.
26 "acceptance and commitment ".tw,kf.
27 Combined Modality Therapy/
28 (multimodal or multi-modal or combined modal$).tw,kf.
29 exp Health promotion/
30 (health adj3 (educat$ or promot$)).tw,kf.
31 or/11-30
32 10 and 31
33 (resilien$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kf.
34 (hardiness$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kf.
35 or/32-34
36 randomized controlled trial.pt.
37 controlled clinical trial.pt.
38 randomi#ed.ab.
39 placebo$.ab.
40 drug therapy.fs.
41 randomly.ab.
42 trial.ab.
43 groups.ab.
44 or/36-43
45 exp animals/ not humans.sh.
46 44 not 45
47 35 and 46
48 limit 47 to yr="1990 -Current"

Embase OVID

Searched 26 October 2016 [6709 records]

1 exp coping behavior/
2 psychological adjustment/
3 social adaptation/
4 "personal resource"/
5 (post-traumatic growth or posttraumatic growth or stress-related growth).tw,kw.
6 (positiv$ adj1 (adapt$ or adjust$)).tw,kw.
7 (psychol$ adj1 (adapt$ or adjust$)).tw,kw.
8 (resilien$ or hardiness$).tw,kw.
9 (cope or coping).tw,kw.
10 ((withstand$ or overcom$ or resist$ or recover$ or thriv$ or adapt$ or adjust$ or bounc$ back) adj5 (stress$ or trauma$ or advers$)).tw,kw.
11 or/1-10
12 exp psychotherapy/
13 posttraumatic stress disorder/th [Therapy]
14 mental stress/th [Therapy]
15 (psychotherap$ or psycho-therap$).tw,kw.
16 (behav$ adj3 (intervention$ or program$ or therap$)).tw,kw.
17 ((cognit$ or cognitive behavior$ or CBT) adj3 (intervention$ or program$ or therap$)).tw,kw.
18 (psycho$ adj3 (intervention$ or program$ or therap$)).tw,kw.
19 mindful$.tw,kw.
20 exp counseling/
21 (counsel?ing or coaching).tw,kw.
22 mindfulness/
23 mindful$.tw,kw.
24 (third wave adj (psycho$ or therap$)).tw,kw.
25 cognit$ restructur$.tw,kw.
26 positive psychology.tw,kw.
27 (reframe$ or re-fram$ or reapprais$).tw,kw.
28 (stress adj1 (inoculation or manag$ or reduc$ or resist$)).tw,kw.
29 (anxiety adj3 manage$).tw,kw.
30 "acceptance and commitment ".tw,kw.

31 (multimodal$ or multi-modal$ or combined modal$).tw,kw.
32 exp health promotion/
33 (health adj3 (educat$ or promot$)).tw,kw.
34 or/12-33
35 11 and 34
36 (resilien$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kw.
37 (hardiness$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kw.
38 or/35-37
39 Randomized controlled trial/
40 controlled clinical trial/
41 Single blind procedure/
42 Double blind procedure/
43 triple blind procedure/
44 Crossover procedure/
45 (crossover or cross-over).tw.
46 ((singl$ or doubl$ or tripl$ or trebl$) adj1 (blind$ or mask$)).tw.
47 Placebo/
48 placebo.tw.
49 prospective.tw.
50 factorial$.tw.
51 random$.tw.
52 assign$.ab.
53 allocat$.tw.
54 volunteer$.ab.
55 or/39-54
56 38 and 55
57 limit 56 to yr="1990 -Current"
58 exp animals/ or exp invertebrate/ or animal experiment/ or animal model/ or animal tissue/ or animal cell/ or nonhuman/
59 human/ or normal human/ or human cell/ (18144770)
60 58 and 59
61 58 not 60
62 57 not 61

PsycINFO OVID

Searched 27 October 2016 [5005 records]

1 "resilience (psychological)"/
2 "adaptability (personality)"/
3 emotional adjustment/
4 coping behavior/
5 posttraumatic growth/
6 protective factors/
7 (post-traumatic growth or posttraumatic growth or stress-related growth).tw.
8 (positiv$ adj1 (adapt$ or adjust$)).tw.
9 (psychol$ adj1 (adapt$ or adjust$)).tw.
10 (resilien$ or hardiness$).tw.
11 (cope or coping).tw.
12 ((withstand$ or overcom$ or resist$ or recover$ or thriv$ or adapt$ or adjust$ or bounc$ back) adj3 (stress$ or trauma$ or advers$)).tw.
13 or/1-12
14 exp psychotherapy/
15 exp cognitive techniques/
16 psychotherapeutic techniques/
17 relaxation therapy/
18 mindfulness/
19 stress management/
20 (psychotherap$ or psycho-therap$).tw.
21 (behav$ adj3 (intervention$ or program$ or therap$)).tw.
22 ((cognit$ or cognitive behavior$ or CBT) adj3 (intervention$ or program$ or therap$)).tw.
23 (psycho$ adj3 (intervention$ or program$ or therap$)).tw.
24 relaxation.tw.

25 mindful$.tw.
26 (counsel?ing or coaching).tw.
27 (third wave adj (psycho$ or therap$)).tw.
28 cognit$ restructur$.tw.
29 positive psychology.tw.
30 (refram$ or re-fram$ or reapprais$).tw.
31 (stress adj1 (inoculation or manag$ or reduc$ or resist$)).tw.
32 (anxiety adj3 manage$).tw.
33 "acceptance and commitment".tw.
34 multimodal treatment approach/
35 (multimodal$ or multi-modal$ or combined modal$).tw.
36 health promotion/
37 (health adj3 (educat$ or promot$)).tw.
38 or/14-37
39 13 and 38
40 (resilien$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw.
41 (hardiness$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw.
42 or/39-41
43 clinical trials/
44 longitudinal studies/
45 exp program evaluation/
46 treatment effectiveness evaluation/
47 random$.tw.
48 (allocat$ or assign$).tw.
49 ((clinic$ or control$) adj trial$).tw.
50 ((control$ or experiment$ or intervention$) adj3 group$).tw.
51 ((singl$ or doubl$ or trebl$ or tripl$) adj3 (blind$ or mask$)).tw.
52 (crossover$ or "cross over$").tw.
53 (placebo$ or (usual adj1 treatment$) or wait$ list).tw.
54 prospectiv$.tw.
55 (crossover or cross-over).tw.
56 ((singl$ or doubl$ or tripl$ or trebl$) adj1 (blind$ or mask$)).tw.
57 ((effectiveness or evaluat$) adj3 (stud$ or research$)).tw.
58 or/43-57
59 42 and 58
60 limit 59 to yr="1990 -Current"

CINAHL EBSCO

Searched 28 October 2016 [1355 records]

1 (MH "Hardiness")
2 (MH "Social Adjustment")
3 (MH "Adaptation, Psychological")
4 TI ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth")
5 TI (positiv* N1 (adapt* OR adjust*)) OR AB (positiv* N1 (adapt* OR adjust*))
6 TI (psychol* N1 (adapt* OR adjust*)) OR AB (psychol* N1 (adapt* OR adjust*))
7 TI (resilien* OR hardiness*) OR AB (resilien* OR hardiness*)
8 (MH "Coping")
9 TI (cope OR coping) OR AB (cope OR coping)
10 TI ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR AB ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*))
11 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10
12 (MH "Psychotherapy+")
13 (MH "Stress, Psychological/TH")
14 TI (psychotherap* OR psychotherap*) OR AB (psychotherap* OR psychotherap*)
15 TI (behav* N3 (intervention* OR program* OR therap*)) OR AB (behav* N3 (intervention* OR program* OR therap*))
16 TI ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR AB ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*))

17 TI (psycho* N3 (intervention* OR program* OR therap*)) OR AB (psycho* N3 (intervention* OR program* OR therap*))
18 TI relaxation OR AB relaxation
19 TI mindful* OR AB mindful*
20 TI (counsel?ing OR coaching) OR AB (counsel?ing OR coaching)
21 TI ("third wave" N1 (psycho* OR therap*)) OR AB ("third wave" N1 (psycho* OR therap*))
22 TI "cognit* restructur*" OR AB "cognit* restructur*"
23 TI "positive psychology" OR AB "positive psychology"
24 TI (reframe* OR reframe* OR reapprais*) OR AB (reframe* OR reframe* OR reapprais*)
25 TI (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR AB (stress N1 (inoculation OR manag* OR reduc* OR resist*))
26 TI (anxiety N3 manage*) OR AB (anxiety N3 manage*)
27 TI "acceptance and commitment" OR AB "acceptance and commitment"
28 (MH "Combined Modality Therapy")
29 TI (multimodal OR multimodal OR "combined modal*") OR AB (multimodal OR multimodal OR "combined modal*")
30 (MH "Health Promotion+")
31 TI (health N3 (educat* OR promot*)) OR AB (health N3 (educat* OR promot*))
32 S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31
33 S11 AND S32
34 TI (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
35 TI (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
36 S33 S34 OR S35
37 PT randomized controlled trial
38 TI "randomi?ed control* trial*" OR AB "randomi?ed control* trial*"
39 TI "control* clinical trial*" OR AB "control* clinical trial*"
40 AB randomi?ed
41 AB placebo*
42 AB randomly
43 AB trial
44 S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43
45 S36 AND S44
46 S36 AND S44, Limiters Published Date: 1990010120161031

PSYNDEX EBSCO

Searched 27 October 2016 [156 records]

1 DE "Resilience (Psychological)"
2 DE "Emotional Adjustment" OR DE "Social Adjustment"
3 DE "Posttraumatic Growth"
4 TI ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR SU ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")
5 TI (positiv* N1 (adapt* OR adjust*)) OR AB (positiv* N1 (adapt* OR adjust*)) OR SU (positiv* N1 (adapt* OR adjust*))
6 TI (psychol* N1 (adapt* OR adjust*)) OR AB (psychol* N1 (adapt* OR adjust*)) OR SU (psychol* N1 (adapt* OR adjust*))
7 TI (resilien* OR hardiness*) OR AB (resilien* OR hardiness*) OR SU (resilien* OR hardiness*)
8 DE "Coping Behavior"
9 TI (cope OR coping) OR AB (cope OR coping) OR SU (cope OR coping)
10 TI ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR AB ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR SU ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*))
11 DE "Psychological Stress"
12 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11
13 DE "Psychotherapy" OR DE "Adlerian Psychotherapy" OR DE "Adolescent Psychotherapy" OR DE "Affirmative Therapy" OR DE "Analytical Psychotherapy" OR DE "Autogenic Training" OR DE "Behavior Therapy" OR DE "Brief Psychotherapy" OR DE "Brief Relational Therapy" OR DE "Child Psychotherapy" OR DE "Client Centered Therapy" OR DE "Cognitive Behavior Therapy" OR DE "Conversion Therapy" OR DE "Eclectic Psychotherapy" OR DE "Emotion Focused Therapy" OR DE "Existential Therapy" OR DE "Experiential Psychotherapy" OR DE "Expressive Psychotherapy" OR DE "Eye Movement Desensitization Therapy" OR DE "Feminist Therapy" OR DE "Geriatric Psychotherapy" OR DE "Gestalt Therapy" OR DE "Group Psychotherapy" OR DE "Guided Imagery" OR DE "Humanistic Psychotherapy" OR DE "Hypnotherapy" OR DE "Individual Psychotherapy" OR DE "Insight Therapy" OR DE "Integrative Psychotherapy"

OR DE "Interpersonal Psychotherapy" OR DE "Logotherapy" OR DE "Narrative Therapy" OR DE "Network Therapy" OR DE "Persuasion Therapy" OR DE "Primal Therapy" OR DE "Psychoanalysis" OR DE "Psychodrama" OR DE "Psychodynamic Psychotherapy" OR DE "Psychotherapeutic Counseling" OR DE "Rational Emotive Behavior Therapy" OR DE "Reality Therapy" OR DE "Relationship Therapy" OR DE "Solution Focused Therapy" OR DE "Supportive Psychotherapy" OR DE "Transactional Analysis" OR DE Individualpsychologische Therapie" OR DE "Jugendlichenpsychotherapie" OR DE "Affirmative Therapie" OR DE "Analytische Psychotherapie (C. G. Jung)" OR DE "Autogenes Training" OR DE "Verhaltenstherapie" OR DE "Kurzpsychotherapie" OR DE "Beziehungsorientierte Kurzpsychotherapie" OR DE "Kinderpsychotherapie" OR DE "Klientenzentrierte Psychotherapie" OR DE "Kognitive Verhaltenstherapie" OR DE "Konversionstherapie (Homosexualität)" OR DE "Eklektische Psychotherapie" OR DE "Emotionsfokussierte Therapie" OR DE "Existenzialtherapie" OR DE "Erfahrungsorientierte Psychotherapie" OR DE "Expressive Psychotherapie" OR DE "Augenbewegungsdesensibilisierung" OR DE "Feministische Therapie" OR DE "Geriatrische Psychotherapie" OR DE "Gestalttherapie" OR DE "Gruppenpsychotherapie" OR DE "Geleitete Fantasievorstellung" OR DE "Humanistische Psychotherapie" OR DE "Hypnotherapie" OR DE "Einzelpsychotherapie" OR DE "Einsichtstherapie" OR DE "Integrative Psychotherapie" OR DE "Interpersonelle Psychotherapie" OR DE "Logotherapie" OR DE "Narrative Therapie" OR DE "Netzwerktherapie" OR DE "Persuasionstherapie" OR DE "Primärtherapie" OR DE "Psychoanalytische Therapie" OR DE "Psychodrama" OR DE "Psychodynamische Psychotherapie" OR DE "Psychotherapeutische Beratung" OR DE "Rational-Emotive Verhaltenstherapie" OR DE "Realitätstherapie" OR DE "Relationship Therapy" OR DE "Lösungsorientierte Therapie" OR DE "Unterstützende Psychotherapie" OR DE "Transaktionsanalyse"
14 TI (psychotherap* OR psycho-therap*) OR AB (psychotherap* OR psycho-therap*) OR SU (psychotherap* OR psychotherap*)
15 TI (behav* N3 (intervention* OR program* OR therap*)) OR AB (behav* N3 (intervention* OR program* OR therap*))
16 TI ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR AB ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR SU ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*))
17 TI (psycho* N3 (intervention* OR program* OR therap*)) OR AB (psycho* N3 (intervention* OR program* OR therap*)) OR SU (psycho* N3 (intervention* OR program* OR therap*))
18 TI relaxation OR AB relaxation OR SU relaxation
19 TI mindful* OR AB mindful* OR SU mindful*
20 TI (counsel?ing OR coaching) OR AB (counsel?ing OR coaching) OR SU (counsel?ing OR coaching)
21 TI ("third wave" N1 (psycho* OR therap*)) OR AB ("third wave" N1 (psycho* OR therap*)) OR SU ("third wave" N1 (psycho* OR therap*))
22 TI "cognit* restructur*" OR AB "cognit* restructur*" OR SU "cognit* restructur*"
23 TI "positive psychology" OR AB "positive psychology" OR SU "positive psychology"
24 TI (reframe* OR re-frame* OR reapprais*) OR AB (reframe* OR re-frame* OR reapprais*) OR SU (reframe* OR re-frame* OR reapprais*)
25 TI (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR AB (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR SU (stress N1 (inoculation OR manag* OR reduc* OR resist*))
26 TI (anxiety N3 manage*) OR AB (anxiety N3 manage*) OR SU (anxiety N3 manage*)
27 TI "acceptance and commitment" OR AB "acceptance and commitment" OR SU "acceptance and commitment"
28 TI (multimodal OR multi-modal OR "combined modal*") OR AB (multimodal OR multi-modal OR "combined modal*") OR SU (multimodal OR multi-modal OR "combined modal*")
29 DE "Health Promotion"
30 TI (health N3 (educat* OR promot*)) OR AB (health N3 (educat* OR promot*)) OR SU (health N3 (educat* OR promot*))
31 S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30
32 S12 AND S31
33 TI (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR SU (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
34 TI (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR SU (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
35 S32 OR S33 OR S34
36 TI "randomi?ed control* trial*" OR AB "randomi?ed control* trial*"
37 TI "control* clinical trial*" OR AB "control* clinical trial*"
38 AB randomi?ed
39 AB placebo*
40 AB randomly
41 AB trial
42 S36 OR S37 OR S38 OR S39 OR S40 OR S41
43 S35 AND S42

Web of Science Core Collection (SCI, SSCI, CPCI-S, CPCI-SSH)

Searched 1990 to 2 November 2016 [2812 records]

# 19 #17 AND #16 Refined by: WEB OF SCIENCE CATEGORIES: (PSYCHIATRY OR PUBLIC ENVIRONMENTAL OCCUPATIONAL HEALTH OR PSYCHOLOGY CLINICAL OR PSYCHOLOGY MULTIDISCIPLINARY OR PSYCHOLOGY OR PSYCHOLOGY DEVELOPMENTAL OR NURSING OR SOCIAL WORK OR EDUCATION EDUCATIONAL RESEARCH)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 18 #17 AND #16
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 17 TS=(random* or trial* or assign* or control* or group* or placebo* or blind* or prospectiv* or longitudinal* or meta-analys* or systematic review*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 16 #14 or #15
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 15 TS=((resilience or hardiness) near/3 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 14 #13 AND #6
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 13 #12 OR #11 OR #10 OR #9 OR #8 OR #7
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 12 TS=(health near/3 (educat* or promot*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 11 TS= ((multimodal* or "multi modal*" or "combined modal*") NEAR/3 (treat* or therap* or intervention* or program*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 10 TS=("acceptance and commitment")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 9 TS=((anxiety near/1 manag*) or relaxation or mindful* or counsel*ing or coaching or "third wave" or reframe* or "re fram*" or "cognitive restructur*" or "positive psychology")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 8 TS=(stress near/3 (inoculat* or manag* or reduc* or resist*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 7 TS=((psychotherap* or "psycho therap*") or CBT or mindful* or (behav* near/3 (intervention* or program* or therap*)) OR ((cognit* or "cognitive behavior*" or CBT) near/3 (intervention* or program* or therap*)) OR (psycho* near/3 (intervention* or program* or therap*)))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 6 #5 OR #4 OR #3 OR #2 OR #1
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 5 TS= ((withstand* or overcom* or resist* or recover* or thriv* or adapt* or adjust* or "bounc* back") near/1 (stress* or trauma* or advers*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 4 TS=(psychol* near/1 (adapt* or adjust*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 3 TS=(positiv* near/1 (adapt* or adjust*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 2 TS=("post traumatic growth" or "posttraumatic growth" or "stress related growth")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 1 TS=(resilien* or hardiness*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016

International Bibliography of the Social Sciences (IBSS) PROQUEST

Searched 3 November 2016 [593 records]

((MAINSUBJECT.EXACT("Coping") OR TI(resilien* OR hardiness) OR AB(resilien* OR hardiness)) OR (TI((psychol* OR social) NEAR/1 (adapt* OR adjust*)) OR AB((psychol* OR social) NEAR/1 (adapt* OR adjust*))) OR (TI(positiv* NEAR/1 (adapt* OR adjust*)) OR AB(positiv* NEAR/1 (adapt* OR adjust*))) OR (TI("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (TI(cope OR coping) OR AB(cope OR coping)) OR (TI((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") NEAR/5 (stress* OR trauma* OR adversit*)) OR AB((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") NEAR/5 (stress* OR trauma* OR adversit*)))) AND ((MAINSUBJECT.EXACT("Psychotherapy") OR MAINSUBJECT.EXACT("Cognitive therapy") OR MAINSUBJECT.EXACT("Group therapy") OR TI(psychotherap* OR psycho-therap*) OR AB(psychotherap* OR psycho-therap*) OR TI(behav* NEAR/3 (intervention* OR program* OR therap*)) OR AB(behav* NEAR/3 (intervention* OR program* OR therap*)) OR TI(cognit* OR "cognitive behavior*" OR CBT) OR AB(cognit* OR "cognitive behavior*" OR CBT) OR TI(psycho* NEAR/3 (intervention* OR program* OR therap*)) OR AB(psycho* NEAR/3 (intervention* OR program* OR therap*)) OR TI(relaxation OR mindful* OR counsel?ing OR coaching OR

"third wave") OR AB(relaxation OR mindful* OR counsel?ing OR coaching OR "third wave") OR TI(cognit* NEAR/1 restructur*) OR AB(cognit* NEAR/1 restructur*) OR TI("positive psychology") OR AB("positive psychology")) AND yr(1960-2019)) AND (MAINSUBJECT.EXACT("Clinical trials") OR (TI(control* OR group OR random* OR placebo* OR longitudinal OR prospective* OR blind* OR trial*) OR AB(control* OR group OR random* OR placebo* OR longitudinal OR prospective* OR blind* OR trial*))) Limited to 1990 to 2016

Applied Social Sciences Index & Abstracts ProQuest (ASSIA) PROQUEST

Searched 28 October 2016 [634 records]

1 SU.EXACT("Resilience")
2 SU.EXACT("Hardiness")
3 SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")
4 SU.EXACT("Adaptation")
5 ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")
6 ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*)))
7 ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*)))
8 ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)
9 ti(cope OR coping) OR ab(cope OR coping)
10 ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))
11 SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")
12 SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")
13 SU.EXACT("Psychotherapy")
14 ti((psychotherap* OR psychotherap*)) OR ab((psychotherap* OR psychotherap*))
15 ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*)))
16 ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))
17 ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*)))
18 ti(relaxation) OR ab(relaxation)
19 ti(mindful*) OR ab(mindful*)
20 ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching)
21 ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1 (psycho* OR therap*)))
22 ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*))
23 ti(("positive psychology")) OR ab(("positive psychology"))
24 ti((reframe* OR re-fram* OR reapprais*)) OR ab((reframe* OR re-fram* OR reapprais*))
25 ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))
26 ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*))
27 ti("acceptance and commitment") OR ab("acceptance and commitment")
28 ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*"))
29 SU.EXACT("Health promotion" OR "Mental health promotion")
30 ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*)))
31 SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation)) OR (ti(mindful*) OR ab(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1 (psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology"))) OR (ti((reframe* OR re-fram* OR reapprais*)) OR ab((reframe* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation

OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))))
32 (SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation)) OR (ti(mindful*) OR ab(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1 (psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology"))) OR (ti((reframe* OR re-fram* OR reapprais*)) OR ab((reframe* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*)))))
33 ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
34 ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
35 (SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation)) OR (ti(mindful*) OR ab(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1 (psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology"))) OR (ti((reframe* OR re-fram* OR reapprais*)) OR ab((reframe* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
36 ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)
37 ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)

38 ti(randomi?ed) OR ab(randomi?ed)
39 ti(placebo*) OR ab(placebo*)
40 ti(randomly) OR ab(randomly)
41 ti(trial) OR ab(trial)
42 (ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial))
43 ((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation)) OR (ti(mindful*) OR ab(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1 (psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology"))) OR (ti((reframe* OR re-fram* OR reapprais*)) OR ab((reframe* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))
44 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation)) OR (ti(mindful*) OR ab(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1 (psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology"))) OR (ti((reframe* OR re-fram* OR reapprais*)) OR ab((reframe* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR

learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial))) AND pd(19900101-20161231)

ProQuest Dissertations & Theses (PQDT) PROQUEST

Searched 28 October 2016 [989 records]

1 SU.EXACT("Resilience")
2 SU.EXACT("Hardiness")
3 SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")
4 SU.EXACT("Adaptation")
5 ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR diskw("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")
6 ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*))) OR diskw((positiv* N/1 (adapt* OR adjust*)))
7 ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*))) OR diskw((psychol* N/1 (adapt* OR adjust*)))
8 ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*) OR diskw(resilien* OR hardiness*)
9 ti(cope OR coping) OR ab(cope OR coping) OR diskw(cope OR coping)
10 ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR diskw((withstand* OR overcom* OR resist* OR recover* OR OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))
11 SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")
12 SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR diskw("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*))) OR diskw((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*))) OR diskw((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*) OR diskw(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping) OR diskw(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR diskw((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")
13 SU.EXACT("Psychotherapy")
14 ti((psychotherap* OR psychotherap*)) OR ab((psychotherap* OR psychotherap*))
15 ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*))) OR diskw((behav* N/3 (intervention* OR program* OR therap*)))
16 ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR diskw(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))
17 ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 intervention* OR program* OR therap*))) OR diskw((psycho* N/3 (intervention* OR program* OR therap*)))
18 ti(relaxation) OR ab(relaxation) OR diskw(relaxation)
19 ti(mindful*) OR ab(mindful*) OR diskw(mindful*)
20 ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching) OR diskw(counsel?ing OR coaching
21 ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1(psycho* OR therap*))) OR diskw(("third wave" N/1(psycho* OR therap*)))
22 ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*)) OR diskw((cognit* N/1 restructur*))
23 ti(("positive psychology")) OR ab(("positive psychology")) OR diskw(("positive psychology"))
24 ti((reframe* OR re-fram* OR reapprais*)) OR ab((reframe* OR re-fram* OR reapprais*)) OR diskw((reframe* OR re-fram* OR reapprais*))
25 ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR diskw((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))
26 ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*)) OR diskw((anxiety N/3 manage*))
27 ti("acceptance and commitment") OR ab("acceptance and commitment") OR diskw("acceptance and commitment")

28 ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")) OR diskw((multimodal OR multimodal OR "combined modal*"))
29 SU.EXACT("Health promotion" OR "Mental health promotion")
30 ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))) OR diskw((health N/3 (educat* OR promot*)))
31 SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*))) OR diskw((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR diskw(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*))) OR diskw((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation) OR diskw(relaxation)) OR (ti(mindful*) OR ab(mindful*) OR diskw(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching) OR diskw(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1(psycho* OR therap*))) OR diskw(("third wave" N/1(psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*)) OR diskw((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology")) OR diskw(("positive psychology"))) OR (ti((refram* OR re-fram* OR reapprais*)) OR ab((refram* OR re-fram* OR reapprais*)) OR diskw((refram* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR diskw((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*)) OR diskw((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment") OR diskw("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")) OR diskw((multimodal OR multimodal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))) OR diskw((health N/3 (educat* OR promot*))))
32 (SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR diskw("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*))) OR diskw((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*))) OR diskw((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*) OR diskw(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping) OR diskw(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR diskw((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*))) OR diskw((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR diskw(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*))) OR diskw((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation) OR diskw(relaxation)) OR (ti(mindful*) OR ab(mindful*) OR diskw(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching) OR diskw(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1(psycho* OR therap*))) OR diskw(("third wave" N/1(psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*)) OR diskw((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology")) OR diskw(("positive psychology"))) OR (ti((refram* OR re-fram* OR reapprais*)) OR ab((refram* OR re-fram* OR reapprais*)) OR diskw((refram* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR diskw((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*)) OR diskw((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment") OR diskw("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")) OR diskw((multimodal OR multimodal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))) OR diskw((health N/3 (educat* OR promot*)))))
33 ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
34 ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))

35 (SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR diskw("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*))) OR diskw((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*))) OR diskw((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*) OR diskw(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping) OR diskw(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR diskw((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*))) OR diskw((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR diskw(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*))) OR diskw((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation) OR diskw(relaxation)) OR (ti(mindful*) OR ab(mindful*) OR diskw(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching) OR diskw(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1(psycho* OR therap*))) OR diskw(("third wave" N/1(psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*)) OR diskw((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology")) OR diskw(("positive psychology"))) OR (ti((reframe* OR re-fram* OR reapprais*)) OR ab((reframe* OR re-fram* OR reapprais*)) OR diskw((reframe* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR diskw((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*)) OR diskw((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment") OR diskw("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")) OR diskw((multimodal OR multimodal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))) OR diskw((health N/3 (educat* OR promot*))))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
36 ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)
37 ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)
38 ti(randomi?ed) OR ab(randomi?ed)
39 ti(placebo*) OR ab(placebo*)
40 ti(randomly) OR ab(randomly)
41 ti(trial) OR ab(trial)
42 (ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial))
43 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR diskw("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*))) OR diskw((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*))) OR diskw((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*) OR diskw(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping) OR diskw(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR diskw((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR

therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*))) OR diskw((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR diskw(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*))) OR diskw((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation) OR diskw(relaxation)) OR (ti(mindful*) OR ab(mindful*) OR diskw(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching) OR diskw(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1(psycho* OR therap*))) OR diskw(("third wave" N/1(psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*)) OR diskw((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology")) OR diskw(("positive psychology"))) OR (ti((refram* OR re-fram* OR reapprais*)) OR ab((refram* OR re-fram* OR reapprais*)) OR diskw((refram* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR diskw((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*)) OR diskw((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment") OR diskw("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")) OR diskw((multimodal OR multimodal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))) OR diskw((health N/3 (educat* OR promot*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)

44 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR diskw("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*))) OR diskw((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*))) OR diskw((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*) OR diskw(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping) OR diskw(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR diskw((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*))) OR diskw((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR diskw(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*))) OR diskw((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation) OR diskw(relaxation)) OR (ti(mindful*) OR ab(mindful*) OR diskw(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching) OR diskw(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1(psycho* OR therap*))) OR diskw(("third wave" N/1(psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*)) OR diskw((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology")) OR diskw(("positive psychology"))) OR (ti((refram* OR re-fram* OR reapprais*)) OR ab((refram* OR re-fram* OR reapprais*)) OR diskw((refram* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR diskw((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*)) OR diskw((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment") OR diskw("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")) OR diskw((multimodal OR multimodal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))) OR diskw((health N/3 (educat* OR promot*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas*

OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial))) AND pd(19900101-20161231

Cochrane Database of Systematic Reviews (CDSR)

Searched 27 October 2016 [57 records]

#1(resilien* or hardiness*):ti,ab
#2(post next traumatic growth or posttraumatic growth or stress next related growth)
#3(positiv* near/1 (adapt* or adjust*)):ti,ab
#4(psychol* near/1 (adapt* or adjust*)):ti,ab
#5{or #1-#4}
#6(behav* or psycho* or cbt or cognit* or mindful* or reframe* or re next fram*):ti,ab
#7(stress near/3 (inoculat* or manag* or reduc* or resist*)):ti,ab
#8(anxiety near/3 manag*):ti,ab
#9"acceptance and commitment":ti,ab
#10(multimodal* or multi next modal* or combined next modal*):ti,ab
#11(health near/3 (educat* or promot*)):ti,ab
#12{or #6-#11} Publication Year from 1990 to 2016, in Cochrane Reviews (Reviews and Protocols)
#13#5 and #12

Database of Abstracts of Reviews of Effects (DARE)

Searched 27 October 2016 [3 records]

#1(resilien* or hardiness*):ti,ab
#2(post next traumatic growth or posttraumatic growth or stress next related growth)
#3(positiv* near/1 (adapt* or adjust*)):ti,ab
#4(psychol* near/1 (adapt* or adjust*)):ti,ab
#5{or #1-#4}
#6(behav* or psycho* or cbt or cognit* or mindful* or reframe* or re next fram*):ti,ab
#7(stress near/3 (inoculat* or manag* or reduc* or resist*)):ti,ab
#8(anxiety near/3 manag*):ti,ab
#9"acceptance and commitment":ti,ab
#10(multimodal* or multi next modal* or combined next modal*):ti,ab
#11(health near/3 (educat* or promot*)):ti,ab
#12{or #6-#11} Publication Year from 1990 to 2016, in Other Reviews
#13#5 and #12

Epistemonikos (epistemonikos.org)

Searched 28 October 2016 [173 records]

1 (title:(resilien* OR hardiness*) OR abstract:(resilien* OR hardiness*))
2 (title:("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR abstract:("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth"))
3 (title:("positive adaptation" OR "positive adjustment") OR abstract:("positive adaptation" OR "positive adjustment"))
4 (title:("psychological adaptation" OR "psychological adjustment") OR abstract:("psychological adaptation" OR "psychological adjustment"))
5 OR/#1-#4
6 #5; Publication year (Custom year range): 1990 – 2016; Publication type: Systematic Review; Systematic review question: All; Cochrane review: All; Type of meta-analysis: All

ERIC EBSCO

Searched 28 October 2016 [206 records]

1 DE "Resilience (Psychology)"
2 DE "Social Adjustment" OR DE "Emotional Adjustment"
3 TI ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth")
4 TI (positiv* N1 (adapt* OR adjust*)) OR AB (positiv* N1 (adapt* OR adjust*))

5 TI (psychol* N1 (adapt* OR adjust*)) OR AB (psychol* N1 (adapt* OR adjust*))
6 TI (resilien* OR hardiness*) OR AB (resilien* OR hardiness*) OR SU (resilien*
7 TI (cope OR coping) OR AB (cope OR coping) OR SU (cope OR coping)
8 TI ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR AB ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*))
9 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8
10 DE "Psychotherapy" OR DE "Milieu Therapy" OR DE "Relaxation Training"
11 TI (psychotherap* OR psychotherap*) OR AB (psychotherap* OR psychotherap*) OR SU (psychotherap* OR psychotherap*)
12 TI (behav* N3 (intervention* OR program* OR therap*)) OR AB (behav* N3 (intervention* OR program* OR therap*))
13 TI ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR AB ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*))
14 TI (psycho* N3 (intervention* OR program* OR therap*)) OR AB (psycho* N3 (intervention* OR program* OR therap*))
15 TI relaxation OR AB relaxation OR SU relaxation
16 TI mindful* OR AB mindful*
17 TI (counsel?ing OR coaching) OR AB (counsel?ing OR coaching) OR SU (counsel?ing OR coaching)
18 TI ("third wave" N1 (psycho* OR therap*)) OR AB ("third wave" N1 (psycho* OR therap*))
19 TI "cognit* restructur*" OR AB "cognit* restructur*" OR SU "cognit* restructur*"
20 TI "positive psychology" OR AB "positive psychology"
21 TI (refram* OR refram* OR reapprais*) OR AB (refram* OR refram* OR reapprais*)
22 TI (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR AB (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR SU (stress N1 (inoculation OR manag* OR reduc* OR resist*))
23 TI (anxiety N3 manage*) OR AB (anxiety N3 manage*)
24 TI "acceptance and commitment" OR AB "acceptance and commitment"
25 TI (multimodal OR multimodal OR "combined modal*") OR AB (multimodal OR multimodal OR "combined modal*")
26 TI (health N3 (educat* OR promot*)) OR AB (health N3 (educat* OR promot*)) OR SU (health N3 (educat* OR promot*))
27 S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26
28 S9 AND S27
29 TI (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
30 TI (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
31 S28 OR S29 OR S30
32 TI "randomi?ed control* trial*" OR AB "randomi? ed control* trial*"
33 TI "control* clinical trial*" OR AB "control* clinical trial*"
34 AB randomi?ed
35 AB placebo*
36 AB randomly
37 AB trial
38 S32 OR S33 OR S34 OR S35 OR S36 OR S37
39 S31 AND S38
40 S31 AND S38, Limiters Date Published:1990010120161031

Current Controlled Trials (ISRCTN registry; http://www.isrctn.com)

Searched 24 November 2016 [47 records]

Text search:
(((resilience OR hardiness OR "posttraumatic growth" OR stress OR trauma) AND (psychotherap OR relaxation OR mindfulness OR coaching OR "positive psychology" OR reappraisal OR "stress inoculation" OR "stress management" OR multimodal OR "health promotion")) OR ((resilience OR hardiness) AND (training OR program OR intervention OR promot OR prevent OR enhanc OR learn OR teach OR educat OR increas or develop OR manag OR therap OR protocol OR treat)))

ClinicalTrials.gov (clinicaltrials.gov)

Searched 24 November 2016 [675 records]

title = resilience OR hardiness OR posttraumatic growth OR stress OR trauma condition = resilience OR hardiness OR posttraumatic growth OR stress OR trauma intervention = resilience training OR hardiness training OR psychotherapy OR relaxation OR mindfulness OR coaching OR positive psychology OR reappraisal OR stress inoculation OR stress management OR multimodal OR health promotion Limitation: 01/01/1990 – 03/11/2016

WHO ICTRP (apps.who.int/trialsearch)

Searched 24 November 2016 [879 records]

title = resilience OR hardiness OR posttraumatic growth OR stress OR trauma
condition = resilience OR hardiness OR posttraumatic growth OR stress OR trauma
intervention = resilience training OR hardiness training OR psychotherapy OR relaxation OR mindfulness OR coaching OR positive psychology OR reappraisal OR stress inoculation OR stress management OR multimodal OR health promotion
Recruitment status: ALL
Limitation: 01/01/1990 – 03/11/2016

Appendix 9. Search strategies 2016 onwards

Cochrane Central Register of Controlled Trials (CENTRAL)

Searched 26 June 2019 [218 records]

#1 [mh "Resilience, Psychological"]
#2 [mh "social adjustment"]
#3 [mh "Adaptation, Psychological"]
#4 ("post-traumatic growth" or "posttraumatic growth" or "stress-related growth")
#5 (positiv* near/1 (adapt* or adjust*))
#6 (psychol* near/1 (adapt* or adjust*))
#7 (resilien* or hardiness*)
#8 (cope or coping)
#9 ((withstand* or overcom* or resist* or recover* or thriv* or adapt* or adjust* or bounc* back) near/5 (stress* or trauma* or adversit*))
#10 {or #1-#9}
#11 [mh psychotherapy]
#12 MeSH descriptor: [Stress, Psychological] this term only and with qualifier(s): [therapy - TH]
#13 (psychotherap* or psycho next therap*)
#14 (behav* near/3 (intervention* or program* or therap*))
#15 ((cognit* or cognitive next behavior* or CBT) near/3 (intervention* or program* or therap*))
#16 (psycho* near/3 (intervention* or program* or therap*))
#17 relaxation
#18 mindful*
#19 (counsel*ing or coaching)
#20 (third next wave next (psycho* or therap*))
#21 cognit* next restructur*
#22 positive next psychology
#23 (refram* or re next fram* or reapprais*)
#24 (stress near/1 (inoculation or manag* or reduc* or resist*))
#25 (anxiety near/3 manage*)
#26 "acceptance and commitment"
#27 [mh "Combined Modality Therapy"]
#28 (multimodal* or multi next modal* or combined modal*)
#29 [mh "Health promotion"]
#30 (health near/3 (educat* or promot*))
#31 {or #11-#30}
#32 MeSH descriptor: [Health Personnel] explode all trees
#33 (health* NEAR/3 (personnel or profession* or worker* or practitioner* or provider* or staff))
#34 (medical NEAR/3 (personnel or profession* or worker* or practitioner* or provider* or staff))
#35 (care* NEAR/1 (personnel or profession* or worker* or practitioner* or provider* or staff))
#36 (doctor* or physician* or general practitioner* or ("primary care" NEAR/2 practitioner*) or surgeon*)
#37 (nurse* or nursing)
#38 ((hospital or ambulance) NEAR/1 (staff or personnel))
#39 ((intensive NEAR/2 care) or ICU)
#40 ((allied NEXT health*) NEAR/2 (personnel* or profession* or worker* or practitioner* or provider* or staff))
#41 (psychologist* or psychotherapist* or psychiatrist* or mental NEXT health NEXT clinician* or mental NEXT health NEXT profession* or mental NEXT health NEXT worker* or social NEXT worker*)
#42 (paramedic* or para NEXT medic* or ambulance)
#43 (first or emergency or disaster) NEAR/1 (response or responder*)
#44 (professional NEAR/1 (caregiver* or care-giver*))
#45 (anesthetist* or anaesthetist* or audiologist* or dental NEXT hygienist* or dentist* or dietitian* or midwi*e* or nutritionist* or pathologist* or physiologist* or physiotherapist* or therapist or osteopath* or sonographer* or radiographer* or radiotherapist* or

((radiology or radiation) NEAR/1 (technician* or technologist* or assistant* or scientist*)) or ((anesthesia or anesthesiologist) NEAR/1 (technician* or assistant*)) or (surgical NEAR/1 (technician* or technologist*)) or orthotist* or orthoptist* or podiatrist* or perfusionist*)
#46 (counsellor* or counselor*)
#47 ((clinical or medical*) NEAR/1 (technician* or technologist* or assistant* or scientist*))
#48 (public NEXT health NEXT service* or public NEXT health NEXT agenc*)
#49 (secondary NEXT trauma* or (work* NEAR/2 trauma NEXT survivor*))
#50 ((nursing or medical or midwifery or premedical or paramedic or psychology or physical NEXT therapy or occupational NEXT therapy) NEAR/2 student*)
#51 college NEXT student*
#52 {OR #32-#51}
#53 #10 and #31 with Publication Year from 1990 to 2016, in Trials [Note: Final line 2016]
#54 #10 and #31 AND #52 with Publication Year from 2016 to 2019, in Trials [Note: Final line 2019]

MEDLINE OVID

Searched 25 June 2019 [725 records]

1 Resilience, Psychological/
2 social adjustment/
3 Adaptation, Psychological/
4 (post-traumatic growth or posttraumatic growth or stress-related growth).tw,kf.
5 (positiv$ adj1 (adapt$ or adjust$)).tw,kf.
6 (psychol$ adj1 (adapt$ or adjust$)).tw,kf.
7 (resilien$ or hardiness$).tw,kf.
8 (cope or coping).tw,kf.
9 ((withstand$ or overcom$ or resist$ or recover$ or thriv$ or adapt$ or adjust$ or bounc$ back) adj5 (stress$ or trauma$ or adversit$)).tw,kf.
10 or/1-9
11 exp psychotherapy/
12 Stress, Psychological/th
13 (psychotherap$ or psycho-therap$).tw,kf.
14 (behav$ adj3 (intervention$ or program$ or therap$)).tw,kf.
15 ((cognit$ or cognitive behavior$ or CBT) adj3 (intervention$ or program$ or therap$)).tw,kf.
16 (psycho$ adj3 (intervention$ or program$ or therap$)).tw,kf.
17 relaxation.tw,kf.
18 mindful$.tw,kf.
19 (counsel?ing or coaching).tw,kf.
20 (third wave adj (psycho$ or therap$)).tw,kf.
21 cognit$ restructur$.tw,kf.
22 positive psychology.tw,kf.
23 (reframe$ or re-fram$ or reapprais$).tw,kf.
24 (stress adj1 (inoculation or manag$ or reduc$ or resist$)).tw,kf.
25 (anxiety adj3 manage$).tw,kf.
26 "acceptance and commitment ".tw,kf.
27 Combined Modality Therapy/
28 (multimodal or multi-modal or combined modal$).tw,kf.
29 exp Health promotion/
30 (health adj3 (educat$ or promot$)).tw,kf.
31 or/11-30
32 10 and 31
33 (resilien$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kf.
34 (hardiness$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kf.
35 or/32-34
36 randomized controlled trial.pt.
37 controlled clinical trial.pt.
38 randomi#ed.ab.
39 placebo$.ab.
40 drug therapy.fs.
41 randomly.ab.
42 trial.ab.
43 groups.ab.
44 or/36-43

45 exp animals/ not humans.sh.
46 44 not 45
47 35 and 46
48 Health personnel/
49 (health$ adj3 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw,kf.
50 ((medical care adj3 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)) or (medical adj3 (personnel or profession $ or worker$ or practitioner$ or provider$ or staff))).tw,kf.
51 (care adj1 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw,kf.
52 (doctor$ or physician$ or general practitioner$ or (primary care adj2 practitioner$) or surgeon$).tw,kf.
53 (nurse$ or (nursing adj3 assistant$) or (nursing adj3 staff)).tw,kf.
54 nursing.tw,kf.
55 ((hospital or ambulance) adj1 personnel).tw,kf.
56 ((intensive adj2 care) or ICU or (intensive adj2 care adj2 unit adj3 personnel$)).tw,kf.
57 ((allied health$) adj2 (personnel or profession$ or worker$ or practitioner* or provider$ or staff)).tw,kf.
58 (psychologist$ or psychotherapist$ or psychiatrist$ or (mental health adj2 clinician$) or (mental health adj2 profession$) or (mental health adj2 worker$)).tw,kf.
59 (social worker$).tw,kf.
60 (paramedic$ or ambulance or medic$ or ((first or emergency or disaster) adj1 (response or responder$))).tw,kf.
61 (professional adj1 (caregiver$ or care-giver$)).tw,kf.
62 ((physical therapist$) or physiotherapist$ or occupational therapist$ or recreational therapist$ or music therapist$ or art therapist$ or dietitian$ or nutritionist$ or ((speech and language) adj1 therapist$) or speech pathologist$ or audiologist$ or exercise physiologist$ or osteopath$ or sonographer$ or radiographer$ or radiotherapist$ or ((radiology or radiation) adj1 (therapist$ or technician$ or technologist $ or assistant$ or scientist$)) or respiratory therapist$ or ((anesthesia or anesthesiologist) adj1 (technician$ or assistant$)) or dental hygienist$ or (surgical adj1 (technician$ or technologist$)) or orthotist$ or orthoptist$ or podiatrist$ or perfusionist$).tw,kf.
63 counsel?or$.tw,kf.
64 ((clinical or clinical laboratory or medical$ or medical$ laboratory) adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw,kf.
65 ((human or health) adj1 service adj3 profession$).tw,kf.
66 (public health adj2 (service or agency)).tw,kf.
67 (secondary traumati?ation or (work$ adj2 (trauma survivor$))).tw,kf.
68 ((nursing or medical or premedical or paramedic or psychology or physical therapy or occupational therapy) adj2 student$).tw,kf.
69 (college adj2 student$).tw,kf.
70 ((nurs$ adj1 (graduate$ or education)) or (medic$ adj1 train$) or (student adj1 nurse$)).tw,kf.
71 or/48-70
72 47 and 71
73 limit 72 to yr="1990 -Current"
74 limit 73 to yr="2016 -Current"

Embase Ovid

Searched 25 June 2019 [991 records]

1 exp coping behavior/
2 psychological adjustment/
3 Psychological resilience/ [Annotation: New Emtree term in 2017]
4 social adaptation/
5 "personal resource"/
6 (post-traumatic growth or posttraumatic growth or stress-related growth).tw,kw.
7 (positiv$ adj1 (adapt$ or adjust$)).tw,kw.
8 (psychol$ adj1 (adapt$ or adjust$)).tw,kw.
9 (resilien$ or hardiness$).tw,kw.
10 (cope or coping).tw,kw.
11 ((withstand$ or overcom$ or resist$ or recover$ or thriv$ or adapt$ or adjust$ or bounc$ back) adj5 (stress$ or trauma$ or advers $)).tw,kw.
12 or/1-11
13 exp psychotherapy/
14 posttraumatic stress disorder/th [Therapy]
15 mental stress/th [Therapy]
16 (psychotherap$ or psycho-therap$).tw,kw.
17 (behav$ adj3 (intervention$ or program$ or therap$)).tw,kw.
18 ((cognit$ or cognitive behavior$ or CBT) adj3 (intervention$ or program$ or therap$)).tw,kw.
19 (psycho$ adj3 (intervention$ or program$ or therap$)).tw,kw.
20 mindful$.tw,kw.
21 exp counseling/

22 (counsel?ing or coaching).tw,kw.
23 mindfulness/
24 mindful$.tw,kw.
25 (third wave adj (psycho$ or therap$)).tw,kw.
26 cognit$ restructur$.tw,kw.
27 positive psychology.tw,kw.
28 (refram$ or re-fram$ or reapprais$).tw,kw.
29 (stress adj1 (inoculation or manag$ or reduc$ or resist$)).tw,kw.
30 (anxiety adj3 manage$).tw,kw.
31 "acceptance and commitment ".tw,kw.
32 (multimodal$ or multi-modal$ or combined modal$).tw,kw.
33 exp health promotion/
34 (health adj3 (educat$ or promot$)).tw,kw.
35 or/13-34
36 12 and 35
37 (resilien$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kw.
38 (hardiness$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kw.
39 or/36-38
40 exp health care personnel/
41 (health$ adj3 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw,kw.
42 (medical adj3 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw,kw.
43 (care adj1 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw,kw.
44 (doctor$ or physician$ or general practitioner$ or (primary care adj2 practitioner$) or surgeon$).tw,kw.
45 (nurse$1 or nursing).tw,kw.
46 ((hospital or ambulance) adj1 personnel).tw,kw.
47 ((intensive adj2 care) or ICU).tw,kw.
48 (allied health$ adj2 (personnel$ or profession$ or worker$ or practitioner$ or provider$ or staff)).tw,kw.
49 (psychologist$ or psychotherapist$ or psychiatrist$ or mental health clinician$ or mental health profession$ or mental health worker $).tw,kw.
50 social worker$.tw,kw.
51 (paramedic$ or ambulance or medic$).tw,kw.
52 ((first or emergency or disaster) adj1 (response or responder$)).tw,kw.
53 (professional adj (caregiver$ or care-giver$)).tw,kw.
54 (physical therapist$ or physiotherapist$ or occupational therapist$ or recreational therapist$ or music therapist$ or art therapist$ or dietitian$ or nutritionist$ or ((speech and language) adj1 therapist$) or speech pathologist$ or audiologist$ or exercise physiologist$ or osteopath$ or sonographer$ or radiographer$ or radiotherapist$ or ((radiology or radiation) adj1 (therapist$ or technician$ or technologist $ or assistant$ or scientist$)) or respiratory therapist$ or ((anesthesia or anesthesiologist) adj1 (technician$ or assistant$)) or dental hygienist$ or (surgical adj1 (technician$ or technologist$)) or orthotist$ or orthoptist$ or podiatrist$ or perfusionist$).tw,kw.
55 counsel?or$.tw,kw.
56 (clinical adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw,kw.
57 (clinical laboratory adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw,kw.
58 (medical$ adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw,kw.
59 (medical$ laboratory adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw,kw.
60 (public health service$ or public health agenc$).tw,kw.
61 (secondary traumati?ation or (work$ adj2 trauma survivor$)).tw,kw.
62 ((nursing or medical or premedical or paramedic or psychology or physical therapy or occupational therapy) adj2 student$).tw,kw.
63 college student$.tw,kw.
64 ((nurs$ adj1 graduate$) or (nurs$ adj1 education) or (medic$ adj1 train$)).tw,kw.
65 or/40-64
66 39 and 65
67 Randomized controlled trial/
68 controlled clinical trial/
69 Single blind procedure/
70 Double blind procedure/
71 triple blind procedure/
72 Crossover procedure/
73 (crossover or cross-over).tw.
74 ((singl$ or doubl$ or tripl$ or trebl$) adj1 (blind$ or mask$)).tw.
75 Placebo/
76 placebo.tw.

77 prospective.tw.
78 factorial$.tw.
79 random$.tw.
80 assign$.ab.
81 allocat$.tw.
82 volunteer$.ab.
83 or/67-82
84 66 and 83
85 limit 84 to yr="2016 -Current"

PsycINFO Ovid

Searched 26 June 2019 [454 records]

All years searched in 2019 to correct for possible errors in the 2016 search

1 "resilience (psychological)"/
2 "adaptability (personality)"/
3 emotional adjustment/
4 coping behavior/
5 posttraumatic growth/
6 protective factors/
7 (post-traumatic growth or posttraumatic growth or stress-related growth).tw.
8 (positiv$ adj1 (adapt$ or adjust$)).tw.
9 (psychol$ adj1 (adapt$ or adjust$)).tw.
10 (resilien$ or hardiness$).tw.
11 (cope or coping).tw.
12 ((withstand$ or overcom$ or resist$ or recover$ or thriv$ or adapt$ or adjust$ or bounc$ back) adj3 (stress$ or trauma$ or advers$)).tw.
13 or/1-12
14 exp psychotherapy/)
15 exp cognitive techniques/
16 psychotherapeutic techniques/
17 relaxation therapy/
18 mindfulness/
19 stress management/
20 (psychotherap$ or psycho-therap$).tw.
21 (behav$ adj3 (intervention$ or program$ or therap$)).tw.
22 ((cognit$ or cognitive behavior$ or CBT) adj3 (intervention$ or program$ or therap$)).tw.
23 (psycho$ adj3 (intervention$ or program$ or therap$)).tw.
24 relaxation.tw.
25 mindful$.tw.
26 (counsel?ing or coaching).tw.
27 (third wave adj (psycho$ or therap$)).tw.
28 cognit$ restructur$.tw.
29 positive psychology.tw.
30 (reframe$ or re-frame$ or reapprais$).tw.
31 (stress adj1 (inoculation or manag$ or reduc$ or resist$)).tw.
32 (anxiety adj3 manage$).tw.
33 "acceptance and commitment".tw.
34 multimodal treatment approach/
35 (multimodal$ or multi-modal$ or combined modal$).tw.
36 health promotion/
37 (health adj3 (educat$ or promot$)).tw.
38 or/14-37
39 13 and 38
40 (resilien$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw.
41 (hardiness$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw.
42 or/39-41
43 exp health personnel/
44 exp therapists/
45 exp clinicians/

46 exp counselors/
47 home care personnel/
48 professional measures/
49 rescue workers/
50 exp social workers/
51 (health$ adj3 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw.
52 (medical adj3 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw.
53 (care adj1 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw.
54 (doctor$ or physician$ or general practitioner$ or (primary care adj2 practitioner$) or surgeon$).tw.
55 (nurse$1 or nursing).tw.
56 ((hospital or ambulance) adj1 personnel).tw.
57 ((intensive adj2 care) or ICU).tw.
58 (allied health$ adj2 (personnel$ or profession$ or worker$ or practitioner$ or provider$ or staff)).tw.
59 (psychologist$ or psychotherapist$ or psychiatrist$ or mental health clinician$ or mental health profession$ or mental health worker $).tw.
60 social worker$.tw.
61 (paramedic$ or ambulance or medic$).tw.
62 ((first or emergency or disaster) adj1 (response or responder$)).tw.
63 (professional adj (carer$ or caregiver$ or care-giver$)).tw.
64 (physical therapist$ or physiotherapist$ or occupational therapist$ or recreational therapist$ or music therapist$ or art therapist$ or dietitian$ or nutritionist$ or ((speech and language) adj1 therapist$) or speech pathologist$ or audiologist$ or exercise physiologist$ or midwi?e$ or osteopath$ or sonographer$ or radiographer$ or radiotherapist$ or ((radiology or radiation) adj1 (therapist$ or technician$ or technologist$ or assistant$ or scientist$)) or respiratory therapist$ or ((anesthesia or anesthesiologist) adj1 (technician$ or assistant$)) or dental hygienist$ or (surgical adj1 (technician$ or technologist$)) or orthotist$ or orthoptist$ or podiatrist$ or perfusionist$).tw.
65 counsel?or$.tw.
66 (clinical adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw.
67 (clinical laboratory adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw.
68 (medical$ adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw.
69 (medical$ laboratory adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw.
70 (public health service$ or public health agenc$).tw.
71 (secondary trauma$ or (work$ adj2 trauma survivor$)).tw.
72 ((nursing or medical or premedical or paramedic or psychology or physical therapy or occupational therapy) adj2 student$).tw.
73 ((nursing or medical or midwifery or premedical or paramedic or psychology or physical therapy or occupational therapy) adj2 student $).tw.
74 college student$.tw. (154347)
75 ((nurs$ adj1 graduate$) or (nurs$ adj1 education) or (medic$ adj1 train$)).tw. (7743)
76 or/43-75
77 42 and 76
78 clinical trials/
79 longitudinal studies/
80 exp program evaluation/
81 treatment effectiveness evaluation/
82 random$.tw.
83 (allocat$ or assign$).tw.
84 ((clinic$ or control$) adj trial$).tw.
85 ((control$ or experiment$ or intervention$) adj3 group$).tw.
86 ((singl$ or doubl$ or trebl$ or tripl$) adj3 (blind$ or mask$)).tw.
87 (crossover$ or "cross over$").tw.
88 (placebo$ or (usual adj1 treatment$) or wait$ list).tw.
89 prospectiv$.tw.
90 (crossover or cross-over).tw.
91 ((singl$ or doubl$ or tripl$ or trebl$) adj1 (blind$ or mask$)).tw.
92 ((effectiveness or evaluat$) adj3 (stud$ or research$)).tw.
93 or/78-92
94 77 and 93
95 limit 94 to yr="2016 -Current"

CINAHL EBSCO

Searched 24 June 2019 [476 records]

1 (MH "Hardiness")
2 (MH "Social Adjustment")

3 (MH "Adaptation, Psychological")
4 TI ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth")
5 TI (positiv* N1 (adapt* OR adjust*)) OR AB (positiv* N1 (adapt* OR adjust*))
6 TI (psychol* N1 (adapt* OR adjust*)) OR AB (psychol* N1 (adapt* OR adjust*))
7 TI (resilien* OR hardiness*) OR AB (resilien* OR hardiness*)
8 (MH "Coping")
9 TI (cope OR coping) OR AB (cope OR coping)
10 TI ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR AB ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*))
11 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10
12 (MH "Psychotherapy+")
13 (MH "Stress, Psychological/TH")
14 TI (psychotherap* OR psychotherap*) OR AB (psychotherap* OR psychotherap*)
15 TI (behav* N3 (intervention* OR program* OR therap*)) OR AB (behav* N3 (intervention* OR program* OR therap*))
16 TI ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR AB ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*))
17 TI (psycho* N3 (intervention* OR program* OR therap*)) OR AB (psycho* N3 (intervention* OR program* OR therap*))
18 TI relaxation OR AB relaxation
19 TI mindful* OR AB mindful*
20 TI (counsel?ing OR coaching) OR AB (counsel?ing OR coaching)
21 TI ("third wave" N1 (psycho* OR therap*)) OR AB ("third wave" N1 (psycho* OR therap*))
22 TI "cognit* restructur*" OR AB "cognit* restructur*"
23 TI "positive psychology" OR AB "positive psychology"
24 TI (refram* OR refram* OR reapprais*) OR AB (refram* OR refram* OR reapprais*)
25 TI (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR AB (stress N1 (inoculation OR manag* OR reduc* OR resist*))
26 TI (anxiety N3 manage*) OR AB (anxiety N3 manage*)
27 TI "acceptance and commitment" OR AB "acceptance and commitment"
28 (MH "Combined Modality Therapy")
29 TI (multimodal OR multimodal OR "combined modal*") OR AB (multimodal OR multimodal OR "combined modal*")
30 (MH "Health Promotion+")
31 TI (health N3 (educat* OR promot*)) OR AB (health N3 (educat* OR promot*))
32 S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31
33 S11 AND S32
34 TI (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
35 TI (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
36 S33 OR S34 OR S35
37 MH randomized controlled trials
38 MH double-blind studies
39 MH single-blind studies
40 MH random assignment
41 MH pretest-posttest design
42 MH cluster sample
43 TI (randomised OR randomized)
44 AB (random*)
45 TI (trial)
46 MH (sample size) AND AB (assigned OR allocated OR control)
47 MH (placebos)
48 PT (randomized controlled trial)
49 AB (control W5 group)
50 MH (crossover design) OR MH (comparative studies)
51 AB (cluster W3 RCT)
52 MH animals+
53 MH (animal studies)
54 TI (animal model*)
55 S52 OR S53 OR S54

56 MH (human)
57 S55 NOT S56
58 S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51
59 S58 NOT S57
60 S36 AND S59
61 (MH "Health Personnel") OR (MH "Health professional")
62 TI (health* N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR AB (health* N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR SU (health* N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))
63 TI (“medical care” N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR AB (“medical care” N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR SU (“medical care” N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR TI (medical N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR AB (medical N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR SU (medical N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))
64 TI (care N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR AB (care N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR SU (care N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))
65 TI (doctor* OR physician* OR "general practitioner" OR ("primary care" N2 practitioner*) OR surgeon*) OR AB (doctor* OR physician* OR "general practitioner" OR ("primary care" N2 practitioner*) or surgeon*) OR SU (doctor* OR physician* OR "general practitioner" OR ("primary care" N2 practitioner*) or surgeon*)
66 TI (nurse* OR (nursing N1 assistant*) OR (nursing N1 staff)) OR AB (nurse* OR (nursing N1 assistant*) OR (nursing N1 staff)) OR SU (nurse* OR (nursing N1 assistant*) OR (nursing N1 staff))
67 (MH "nursing")
68 TI nursing OR AB nursing OR SU nursing
69 TI ((hospital OR ambulance) N1 personnel) OR AB ((hospital OR ambulance) N1 personnel) OR SU ((hospital OR ambulance) N1 personnel)
70 TI ((intensive N1 care) OR ICU OR (intensive N1 care N1 unit N1 personnel*)) OR AB ((intensive N1 care) OR ICU OR (intensive N1 care N1 unit N1 personnel*)) OR SU ((intensive N1 care) OR ICU OR (intensive N1 care N1 unit N1 personnel*))
71 TI ((allied N1 health) N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR AB ((allied N1 health) N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR SU ((allied N1 health) N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))
72 TI (psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”) OR AB (psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”) OR SU (psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”)
73 TI (social N1 worker*) OR AB (social N1 worker*) OR SU (social N1 worker*)
74 TI (paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N1 responder*)) OR AB (paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N1 responder*)) OR SU (paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N1 responder*))
75 TI (professional N1 caregiver*) OR AB (professional N1 caregiver*) OR SU (professional N1 caregiver*)
76 TI ((physical N1 therapist*) OR physiotherapist* OR (occupational N1 therapist*) OR (recreational N1 therapist*) OR (music N1 therapist*) OR (art N1 therapist*) OR dietitian* OR nutritionist* OR ((speech and language) N1 therapist*) OR (speech N1 pathologist*) OR audiologist* OR (exercise N1 physiologist*) OR osteopath* OR (sonographer* OR radiographer* OR radiotherapist*) OR ((radiology OR radiation) N1 (therapist* OR technician* OR technologist* OR assistant* OR scientist*)) OR (respiratory N1 therapist*) OR ((anesthesia OR anesthesiologist) N1 (technician* OR assistant*)) OR (dental N1 hygienist*) OR (surgical N1 (technician* OR technologist*)) OR orthotist* OR orthoptist* OR podiatrist* OR perfusionist*) OR AB ((physical N1 therapist*) OR physiotherapist* OR (occupational N1 therapist*) OR (recreational N1 therapist*) OR (music N1 therapist*) OR (art N1 therapist*) OR dietitian* OR nutritionist* OR ((speech and language) N1 therapist*) OR (speech N1 pathologist*) OR audiologist* OR (exercise N1 physiologist*) OR osteopath* OR (sonographer* OR radiographer* OR radiotherapist*) OR ((radiology OR radiation) N1 (therapist* OR technician* OR technologist* OR assistant* OR scientist*)) OR (respiratory N1 therapist*) OR ((anesthesia OR anesthesiologist) N1 (technician* OR assistant*)) OR (dental N1 hygienist*) OR (surgical N1 (technician* OR technologist*)) OR orthotist* OR orthoptist* OR podiatrist* OR perfusionist*) OR SU ((physical N1 therapist*) OR physiotherapist* OR (occupational N1 therapist*) OR (recreational N1 therapist*) OR (music N1 therapist*) OR (art N1 therapist*) OR dietitian* OR nutritionist* OR ((speech and language) N1 therapist*) OR (speech N1 pathologist*) OR audiologist* OR (exercise N1 physiologist*) OR osteopath* OR (sonographer* OR radiographer* OR radiotherapist*) OR ((radiology OR radiation) N1 (therapist* OR technician* OR technologist* OR assistant* OR scientist*)) OR (respiratory N1 therapist*) OR ((anesthesia OR anesthesiologist) N1 (technician* OR assistant*)) OR (dental N1 hygienist*) OR (surgical N1 (technician* OR technologist*)) OR orthotist* OR orthoptist* OR podiatrist* OR perfusionist*)
77 TI counsel?or* OR AB counsel?or* OR SU counsel?or*
78 TI ((clinical OR (clinical N1 laboratory) OR medical OR (medical N1 laboratory)) N1 (technician* OR technologist* OR assistant* OR scientist*)) OR AB ((clinical OR (clinical N1 laboratory) OR medical OR (medical N1 laboratory)) N1 (technician* OR technologist* OR assistant* OR scientist*)) OR SU ((clinical OR (clinical N1 laboratory) OR medical OR (medical N1 laboratory)) N1 (technician* OR technologist* OR assistant* OR scientist*))

79 TI ((human or health) N1 service N1 profession*) OR AB ((human or health) N1 service N1 profession*) OR SU ((human or health) N1 service N1 profession*)
80 TI (public N1 health N1 (service or agency)) OR AB (public N1 health N1 (service or agency)) OR SU (public N1 health N1 (service or agency))
81 TI ("secondary traumati?ation" or (work* N2 (trauma survivor*))) OR AB ("secondary traumati?ation" or (work* N2 (trauma survivor*))) OR SU ("secondary traumati?ation" or (work* N2 (trauma survivor*)))
82 TI ((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N1 therapy) OR (occupational N1 therapy)) N1 student*) OR AB ((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N1 therapy) OR (occupational N1 therapy)) N1 student*) OR SU ((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N1 therapy) OR (occupational N1 therapy)) N1 student*)
83 TI (college N1 student*) OR AB (college N1 student*) OR SU (college N1 student*)
84 TI (nursing N1 (graduates OR education)) OR AB (nursing N1 (graduates OR education)) OR SU (nursing N1 (graduates OR education)) OR TI (medical N2 train*) OR AB (medical N2 train*) OR SU (medical N2 train*) OR TI (student N1 nurse*) OR AB (student N1 nurse*) OR SU (student N1 nurse*)
85 S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77 OR S78 OR S79 OR S80 OR S81 OR S82 OR S83 OR S84
86 S60 AND S85
87 S60 AND S85, Limiters - Published Date: 19900101-20190631
88 S60 AND S85, Limiters - Published Date: 20161001-20190631

PSYNDEX EBSCO

Searched 24 June 2019 [31 records]

1 DE "Resilience (Psychological)"
2 DE "Adaptability (Personality)"
3 DE "Emotional Adjustment" OR DE "Social Adjustment"
4 DE "Coping Behavior"
5 DE "Posttraumatic Growth"
6 DE "Protective Factors"
7 TI ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR SU ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")
8 TI (positiv* N1 (adapt* OR adjust*)) OR AB (positiv* N1 (adapt* OR adjust*)) OR SU (positiv* N1 (adapt* OR adjust*))
9 TI (psychol* N1 (adapt* OR adjust*)) OR AB (psychol* N1 (adapt* OR adjust*)) OR SU (psychol* N1 (adapt* OR adjust*))
10 TI (resilien* OR hardiness*) OR AB (resilien* OR hardiness*) OR SU (resilien* OR hardiness*)
11 TI (cope OR coping) OR AB (cope OR coping) OR SU (cope OR coping)
12 TI ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR AB ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR SU ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*))
13 DE "Psychological Stress"
14 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13
15 DE "Psychotherapy" OR DE "Adlerian Psychotherapy" OR DE "Adolescent Psychotherapy" OR DE "Affirmative Therapy" OR DE "Analytical Psychotherapy" OR DE "Autogenic Training" OR DE "Behavior Therapy" OR DE "Brief Psychotherapy" OR DE "Brief Relational Therapy" OR DE "Child Psychotherapy" OR DE "Client Centered Therapy" OR DE "Cognitive Behavior Therapy" OR DE "Conversion Therapy" OR DE "Eclectic Psychotherapy" OR DE "Emotion Focused Therapy" OR DE "Existential Therapy" OR DE "Experiential Psychotherapy" OR DE "Expressive Psychotherapy" OR DE "Eye Movement Desensitization Therapy" OR DE "Feminist Therapy" OR DE "Geriatric Psychotherapy" OR DE "Gestalt Therapy" OR DE "Group Psychotherapy" OR DE "Guided Imagery" OR DE "Humanistic Psychotherapy" OR DE "Hypnotherapy" OR DE "Individual Psychotherapy" OR DE "Insight Therapy" OR DE "Integrative Psychotherapy" OR DE "Interpersonal Psychotherapy" OR DE "Logotherapy" OR DE "Narrative Therapy" OR DE "Network Therapy" OR DE "Persuasion Therapy" OR DE "Primal Therapy" OR DE "Psychoanalysis" OR DE "Psychodrama" OR DE "Psychodynamic Psychotherapy" OR DE "Psychotherapeutic Counseling" OR DE "Rational Emotive Behavior Therapy" OR DE "Reality Therapy" OR DE "Relationship Therapy" OR DE "Solution Focused Therapy" OR DE "Supportive Psychotherapy" OR DE "Transactional Analysis" OR DE "Individualpsychologische Therapie" OR DE "Jugendlichenpsychotherapie" OR DE "Affirmative Therapie" OR DE "Analytische Psychotherapie (C. G. Jung)" OR DE "Autogenes Training" OR DE "Verhaltenstherapie" OR DE "Kurzpsychotherapie" OR DE "Beziehungsorientierte Kurzpsychotherapie" OR DE "Kinderpsychotherapie" OR DE "Klientenzentrierte Psychotherapie" OR DE "Kognitive Verhaltenstherapie" OR DE "Konversionstherapie (Homosexualität)" OR DE "Eklektische Psychotherapie" OR DE "Emotionsfokussierte Therapie" OR DE "Existenzialtherapie" OR DE "Erfahrungsorientierte Psychotherapie" OR DE "Expressive Psychotherapie" OR DE "Augenbewegungsdesensibilisierung" OR DE "Feministische Therapie" OR DE "Geriatrische Psychotherapie" OR DE "Gestalttherapie" OR DE "Gruppenpsychotherapie" OR DE "Geleitete Fantasievorstellung" OR DE "Humanistische Psychotherapie" OR DE "Hypnotherapie" OR DE "Einzelpsychotherapie" OR DE "Einsichtstherapie" OR DE "Integrative Psychotherapie" OR DE "Interpersonelle Psychotherapie" OR DE "Logotherapie" OR DE "Narrative Therapie" OR DE "Netzwerktherapie" OR DE "Persuasionstherapie" OR DE "Primärtherapie" OR DE "Psychoanalytische Therapie" OR DE "Psychodrama" OR DE "Psychodynamische Psychotherapie" OR DE "Psychotherapeutische Beratung" OR DE "Rational-Emotive

Verhaltenstherapie" OR DE "Realitätstherapie" OR DE "Relationship Therapy" OR DE "Lösungsorientierte Therapie" OR DE "Unterstützende Psychotherapie" OR DE "Transaktionsanalyse"
16 DE "Cognitive Techniques"
17 DE "Psychotherapeutic Techniques"
18 DE "Relaxation Therapy"
19 DE "Mindfulness"
20 DE "Stress Management"
21 TI (psychotherap* OR psycho-therap*) OR AB (psychotherap* OR psycho-therap*) OR SU (psychotherap* OR psycho-therap*)
22 TI (behav* N3 (intervention* OR program* OR therap*)) OR AB (behav* N3 (intervention* OR program* OR therap*)) OR SU (behav* N3 (intervention* OR program* OR therap*))
23 TI ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR AB ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR SU ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*))
24 TI (psycho* N3 (intervention* OR program* OR therap*)) OR AB (psycho* N3 (intervention* OR program* OR therap*)) OR SU (psycho* N3 (intervention* OR program* OR therap*))
25 TI relaxation OR AB relaxation OR SU relaxation
26 TI mindful* OR AB mindful* OR SU mindful*
27 TI (counsel?ing OR coaching) OR AB (counsel?ing OR coaching) OR SU (counsel?ing OR coaching)
28 TI ("third wave" N1 (psycho* OR therap*)) OR AB ("third wave" N1 (psycho* OR therap*)) OR SU ("third wave" N1 (psycho* OR therap*))
29 TI "cognit* restructur*" OR AB "cognit* restructur*" OR SU "cognit* restructur*"
30 TI "positive psychology" OR AB "positive psychology" OR SU "positive psychology"
31 TI (reframe* OR re-fram* OR reapprais*) OR AB (reframe* OR re-fram* OR reapprais*) OR SU (reframe* OR re-fram* OR reapprais*)
32 TI (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR AB (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR SU (stress N1 (inoculation OR manag* OR reduc* OR resist*))
33 TI (anxiety N3 manage*) OR AB (anxiety N3 manage*) OR SU (anxiety N3 manage*)
34 TI "acceptance and commitment" OR AB "acceptance and commitment" OR SU "acceptance and commitment"
35 DE "Multimodal Treatment Approach"
36 TI (multimodal OR multi-modal OR "combined modal*") OR AB (multimodal OR multi-modal OR "combined modal*") OR SU (multimodal OR multi-modal OR "combined modal*")
37 DE "Health Promotion"
38 TI (health N3 (educat* OR promot*)) OR AB (health N3 (educat* OR promot*)) OR SU (health N3 (educat* OR promot*))
39 S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38
40 S14 AND S39
41 TI (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR SU (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
42 TI (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR SU (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
43 S40 OR S41 OR S42
44 DE "Clinical Trials"
45 DE "Longitudinal Studies"
46 DE "Program Evaluation"
47 DE "Treatment Effectiveness Evaluation"
48 TI random* OR AB random*
49 TI (allocat* OR assign*) OR AB (allocat* OR assign*)
50 TI (clinic* OR control*) N1 trial*)) OR AB (clinic* OR control*) N1 trial*))
51 TI ((control* OR experiment* OR intervention*) N3 group*) OR AB ((control* OR experiment* OR intervention*) N3 group*)
52 TI ((singl* OR doubl* OR trebl* OR tripl*) N3 (blind* OR mask*)) OR AB ((singl* OR doubl* OR trebl* OR tripl*) N3 (blind* OR mask*))
53 TI (crossover* OR "cross over*") OR AB (crossover* OR "cross over*")
54 TI (placebo* OR (usual N1 treatment*) OR waitlist OR wait-list) OR AB (placebo* OR (usual N1 treatment*) OR waitlist OR wait-list)
55 TI prospectiv* OR AB prospectiv*
56 TI (crossover OR cross-over) OR AB (crossover OR cross-over)
57 TI ((singl* OR doubl* OR tripl* OR trebl*) N1 (blind* OR mask*)) OR AB ((singl* OR doubl* OR tripl* OR trebl*) N1 (blind* OR mask*))
58 TI ((effectiveness OR evaluat*) N3 (stud* OR research*)) OR AB ((effectiveness OR evaluat*) N3 (stud* OR research*))
59 S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58
60 S43 AND S59

61 DE "Health Personnel" OR DE "Health professional"
62 TI (health* N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR AB (health* N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR SU (health* N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))
63 TI ("medical care" N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR AB ("medical care" N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR SU ("medical care" N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR TI (medical N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR AB (medical N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR SU (medical N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))
64 TI (care N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR AB (care N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR SU (care N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))
65 TI (doctor* OR physician* OR "general practitioner" OR ("primary care" N2 practitioner*) OR surgeon*) OR AB (doctor* OR physician* OR "general practitioner" OR ("primary care" N2 practitioner*) or surgeon*) OR SU (doctor* OR physician* OR "general practitioner" OR ("primary care" N2 practitioner*) or surgeon*)
66 TI (nurse* OR (nursing N1 assistant*) OR (nursing N1 staff)) OR AB (nurse* OR (nursing N1 assistant*) OR (nursing N1 staff)) OR SU (nurse* OR (nursing N1 assistant*) OR (nursing N1 staff))
67 DE "nursing"
68 TI nursing OR AB nursing OR SU nursing
69 TI ((hospital OR ambulance) N1 personnel) OR AB ((hospital OR ambulance) N1 personnel) OR SU ((hospital OR ambulance) N1 personnel)
70 TI ((intensive N1 care) OR ICU OR (intensive N1 care N1 unit N1 personnel*)) OR AB ((intensive N1 care) OR ICU OR (intensive N1 care N1 unit N1 personnel*)) OR SU ((intensive N1 care) OR ICU OR (intensive N1 care N1 unit N1 personnel*))
71 TI ((allied N1 health) N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR AB ((allied N1 health) N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR SU ((allied N1 health) N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))
72 TI (psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*") OR AB (psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*") OR SU (psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*")
73 TI (social N1 worker*) OR AB (social N1 worker*) OR SU (social N1 worker*)
74 TI (paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N1 responder*)) OR AB (paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N1 responder*)) OR SU (paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N1 responder*))
75 TI (professional N1 caregiver*) OR AB (professional N1 caregiver*) OR SU (professional N1 caregiver*)
76 TI ((physical N1 therapist*) OR physiotherapist* OR (occupational N1 therapist*) OR (recreational N1 therapist*) OR (music N1 therapist*) OR (art N1 therapist*) OR dietitian* OR nutritionist* OR ((speech and language) N1 therapist*) OR (speech N1 pathologist*) OR audiologist* OR (exercise N1 physiologist*) OR osteopath* OR (sonographer* OR radiographer* OR radiotherapist*) OR ((radiology OR radiation) N1 (therapist* OR technician* OR technologist* OR assistant* OR scientist*)) OR (respiratory N1 therapist*) OR ((anesthesia OR anesthesiologist) N1 (technician* OR assistant*)) OR (dental N1 hygienist*) OR (surgical N1 (technician* OR technologist*)) OR orthotist* OR orthoptist* OR podiatrist* OR perfusionist*) OR AB ((physical N1 therapist*) OR physiotherapist* OR (occupational N1 therapist*) OR (recreational N1 therapist*) OR (music N1 therapist*) OR (art N1 therapist*) OR dietitian* OR nutritionist* OR ((speech and language) N1 therapist*) OR (speech N1 pathologist*) OR audiologist* OR (exercise N1 physiologist*) OR osteopath* OR (sonographer* OR radiographer* OR radiotherapist*) OR ((radiology OR radiation) N1 (therapist* OR technician* OR technologist* OR assistant* OR scientist*)) OR (respiratory N1 therapist*) OR ((anesthesia OR anesthesiologist) N1 (technician* OR assistant*)) OR (dental N1 hygienist*) OR (surgical N1 (technician* OR technologist*)) OR orthotist* OR orthoptist* OR podiatrist* OR perfusionist*) OR SU ((physical N1 therapist*) OR physiotherapist* OR (occupational N1 therapist*) OR (recreational N1 therapist*) OR (music N1 therapist*) OR (art N1 therapist*) OR dietitian* OR nutritionist* OR ((speech and language) N1 therapist*) OR (speech N1 pathologist*) OR audiologist* OR (exercise N1 physiologist*) OR osteopath* OR (sonographer* OR radiographer* OR radiotherapist*) OR ((radiology OR radiation) N1 (therapist* OR technician* OR technologist* OR assistant* OR scientist*)) OR (respiratory N1 therapist*) OR ((anesthesia OR anesthesiologist) N1 (technician* OR assistant*)) OR (dental N1 hygienist*) OR (surgical N1 (technician* OR technologist*)) OR orthotist* OR orthoptist* OR podiatrist* OR perfusionist*)
77 TI counsel?or* OR AB counsel?or* OR SU counsel?or*
78 TI ((clinical OR (clinical N1 laboratory) OR medical OR (medical N1 laboratory)) N1 (technician* OR technologist* OR assistant* OR scientist*)) OR AB ((clinical OR (clinical N1 laboratory) OR medical OR (medical N1 laboratory)) N1 (technician* OR technologist* OR assistant* OR scientist*)) OR SU ((clinical OR (clinical N1 laboratory) OR medical OR (medical N1 laboratory)) N1 (technician* OR technologist* OR assistant* OR scientist*))
79 TI ((human or health) N1 service N1 profession*) OR AB ((human or health) N1 service N1 profession*) OR SU ((human or health) N1 service N1 profession*)
80 TI (public N1 health N1 (service or agency)) OR AB (public N1 health N1 (service or agency)) OR SU (public N1 health N1 (service or agency))
81 TI ("secondary traumati?ation" or (work* N2 (trauma survivor*))) OR AB ("secondary traumati?ation" or (work* N2 (trauma survivor*))) OR SU ("secondary traumati?ation" or (work* N2 (trauma survivor*)))

82 TI ((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N1 therapy) OR (occupational N1 therapy)) N1 student*) OR AB ((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N1 therapy) OR (occupational N1 therapy)) N1 student*) OR SU ((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N1 therapy) OR (occupational N1 therapy)) N1 student*)
83 TI (college N1 student*) OR AB (college N1 student*) OR SU (college N1 student*)
84 TI (nursing N1 (graduates OR education)) OR AB (nursing N1 (graduates OR education)) OR SU (nursing N1 (graduates OR education)) OR TI (medical N2 train*) OR AB (medical N2 train*) OR SU (medical N2 train*) OR TI (student N1 nurse*) OR AB (student N1 nurse*) OR SU (student N1 nurse*)
85 S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77 OR S78 OR S79 OR S80 OR S81 OR S82 OR S83 OR S84
86 S60 AND S85
87 S60 AND S85, Limiters - Published Date: 1990-2019
88 S60 AND S85, Limiters - Published Date: 2016-2019

Web Of Science Core Collection (SCI, SSCI, CPCI-S, CPCI-SSH)

Searched 26 June 2019 [515 records]

#40 #18 AND #38
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=2016-2019
#39 #16 AND #17
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
#38 #37 OR #36 OR #35 OR #34 OR #33 OR #32 OR #31 OR #30 OR #29 OR #28 OR #27 OR #26 OR #25 OR #24 OR #23 OR #22 OR #21 OR #20 OR #19
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#37 TS=("college student*")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#36 TS=((nursing or medical or premedical or paramedic or psychology or "physical therapy" or "occupational therapy") NEAR/2 student*)
#35 ts=("secondary trauma*" or (work* NEAR/2 "trauma survivor*"))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#34 TS=("public health service*" or "public health agenc*")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#33 TS=((clinical or medical*) NEAR/1 (technician* or technologist* or assistant* or scientist*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#32 TS=(counsellor* or counselor*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#31 TS=(anesthetist* or anaesthetist* or audiologist* or "dental hygienist*" or dentist* or dietitian* or "midwi*e*" or nutritionist* or pathologist* or physiologist* or physiotherapist* or therapist or osteopath* or sonographer* or radiographer* or radiotherapist* or ((radiology or radiation) NEAR/1 (technician* or technologist* or assistant* or scientist*)) or ((anesthesia or anesthesiologist) NEAR/1 (technician* or assistant*)) or (surgical NEAR/1 (technician* or technologist*)) or orthotist* or orthoptist* or podiatrist* or perfusionist*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#30 TS=(professional NEAR/1 (caregiver* or care-giver*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#29 TS=((first or emergency or disaster) NEAR/1 (response or responder*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#28 TS=(paramedic* or para-medic* or ambulance)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#27 ts=(psychologist* or psychotherapist* or psychiatrist* or "mental health clinician*" or "mental health profession*" or "mental health worker*" or "social worker*")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#26 TS= ("allied health*" NEAR/2 (personnel* or profession* or worker* or practitioner* or provider* or staff))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#25 TS=((intensive NEAR/2 care) or ICU)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#24 TS=((hospital or ambulance) NEAR/1 (staff or personnel))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#23 ts=(nurse* or nursing)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#22 TS=(doctor* or physician* or general practitioner* or ("primary care" NEAR/2 practitioner*) or surgeon*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#21 TS=(care* NEAR/1 (personnel or profession* or worker* or practitioner* or provider* or staff))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#20 TS=(medical NEAR/3 (personnel or profession* or worker* or practitioner* or provider* or staff))

Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#19 TS=(health* NEAR/3 (personnel or profession* or worker* or practitioner* or provider* or staff))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#18 #17 AND #16
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#17 TS=(random* or trial* or assign* or control* or group* or placebo* or blind* or prospectiv* or longitudinal* or meta-analys* or systematic review*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#16 #14 or #15
#15 TS=((resilience or hardiness) near/3 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#14 #13 AND #6
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#13 #12 OR #11 OR #10 OR #9 OR #8 OR #7
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#12 TS=(health near/3 (educat* or promot*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#11 TS= ((multimodal* or "multi modal*" or "combined modal*") NEAR/3 (treat* or therap* or intervention* or program*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#10 TS=("acceptance and commitment")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#9 TS=((anxiety near/1 manag*) or relaxation or mindful* or counsel*ing or coaching or "third wave" or reframe* or "re frame*" or "cognitive restructur*" or "positive psychology")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#8 TS=(stress near/3 (inoculat* or manag* or reduc* or resist*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#7 TS=((psychotherap* or "psycho therap*") or CBT or mindful* or (behav* near/3 (intervention* or program* or therap*)) OR ((cognit* or "cognitive behavior*" or CBT) near/3 (intervention* or program* or therap*)) OR (psycho* near/3 (intervention* or program* or therap*)))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#6 #5 OR #4 OR #3 OR #2 OR #1
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
# 5 TS= ((withstand* or overcom* or resist* or recover* or thriv* or adapt* or adjust* or "bounc* back") near/1 (stress* or trauma* or advers*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
# 4 TS=(psychol* near/1 (adapt* or adjust*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
# 3 TS=(positiv* near/1 (adapt* or adjust*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
# 2 TS=("post traumatic growth" or "posttraumatic growth" or "stress related growth")
TS=(resilien* or hardiness*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years

International Bibliography of the Social Sciences (IBSS) PROQUEST

Searched 25 June 2019 [135 records]

(((MAINSUBJECT.EXACT("Coping") OR TI(resilien* OR hardiness) OR AB(resilien* OR hardiness)) OR (TI((psychol* OR social) NEAR/1 (adapt* OR adjust*)) OR AB((psychol* OR social) NEAR/1 (adapt* OR adjust*))) OR (TI(positiv* NEAR/1 (adapt* OR adjust*)) OR AB(positiv* NEAR/1 (adapt* OR adjust*))) OR (TI("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR AB("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (TI(cope OR coping) OR AB(cope OR coping)) OR (TI((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") NEAR/5 (stress* OR trauma* OR adversit*)) OR AB((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") NEAR/5 (stress* OR trauma* OR adversit*)))) AND ((MAINSUBJECT.EXACT("Psychotherapy") OR MAINSUBJECT.EXACT("Cognitive therapy") OR MAINSUBJECT.EXACT("Group therapy") OR TI(psychotherap* OR psycho-therap*) OR AB(psychotherap* OR psycho-therap*) OR TI(behav* NEAR/3 (intervention* OR program* OR therap*)) OR AB(behav* NEAR/3 (intervention* OR program* OR therap*)) OR TI(cognit* OR "cognitive behavior*" OR CBT) OR AB(cognit* OR "cognitive behavior*" OR CBT) OR TI(psycho* NEAR/3 (intervention* OR program* OR therap*)) OR AB(psycho* NEAR/3 (intervention* OR program* OR therap*)) OR TI(relaxation OR mindful* OR counsel?ing OR coaching OR "third wave") OR AB(relaxation OR mindful* OR counsel?ing OR coaching OR "third wave") OR TI(cognit* NEAR/1 restructur*) OR AB(cognit* NEAR/1 restructur*) OR TI("positive psychology") OR AB("positive psychology")) AND (MAINSUBJECT.EXACT("Clinical trials") OR (TI(control* OR group OR random* OR placebo* OR longitudinal OR prospective* OR blind* OR trial*) OR AB(control* OR group OR random* OR placebo* OR longitudinal OR prospective* OR blind* OR trial*)))) Limited to publication year 2016-2019

Applied Social Sciences Index & Abstracts ProQuest (ASSIA) PROQUEST

Searched 24 June 2019 [41 records]

1 SU.EXACT("Resilience")
2 SU.EXACT("Hardiness")
3 ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")
4 ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)
5 ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))
6 SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))
7 ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
8 ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
9 (SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
10 ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)
11 ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)
12 ti(randomi?ed) OR ab(randomi?ed)
13 ti(placebo*) OR ab(placebo*)
14 ti(randomly) OR ab(randomly)
15 ti(trial) OR ab(trial)
16 (ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial))
17 ((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))
18 ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)))
19 ti((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))
20 ti(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*)
21 ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff))
22 SU.EXACT("nursing")
23 ti(nursing) OR ab(nursing)
24 ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*))
25 ti(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*") OR ab(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*")
26 ti(social N/1 worker*) OR ab(social N/1 worker*)

27 ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*))
28 ti(physiotherapist* OR (occupational N/1 therapist*)) OR ab(physiotherapist* OR (occupational N/1 therapist))
29 ti(counsel?or*) OR ab(counsel?or*)
30 ti((human or health) N/1 service N/1 profession*) OR ab((human or health) N/1 service N/1 profession*)
31 ti(public N/1 health N/1 (service or agency)) OR ab(public N/1 health N/1 (service or agency))
32 ti("secondary traumati?ation" OR (work* N/2 ("trauma survivor*"))) OR ab("secondary traumati?ation" OR (work* N/2 ("trauma survivor*")))
33 ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*)
34 ti(college N/1 student*) OR ab(college N/1 student*)
35 (ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)))) OR (ti((care NEAR/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care NEAR/1
(personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))) OR (ti(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*)) OR (ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff))) OR SU.EXACT("nursing") OR (ti(nursing) OR ab(nursing)) OR (ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*))) OR (ti(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*") OR ab(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*")) OR (ti(social N/1 worker*) OR ab(social N/1 worker*)) OR (ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*))) OR (ti(physiotherapist* OR (occupational N/1 therapist*)) OR ab(physiotherapist* OR (occupational N/1 therapist))) OR (ti(counsel?or*) OR ab(counsel?or*)) OR (ti((human or health) N/1 service N/1 profession*) OR ab((human or health) N/1 service N/1 profession*)) OR (ti(public N/1 health N/1 (service or agency)) OR ab(public N/1 health N/1 (service or agency))) OR (ti("secondary traumati?ation" OR (work* N/2 ("trauma survivor*"))) OR ab("secondary traumati?ation" OR (work* N/2 ("trauma survivor*")))) OR (ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*)) OR (ti(college N/1 student*) OR ab(college N/1 student*))
36 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))))
37 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)))), 2016-10-01 - 2019-06-20
38 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*))

OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((care NEAR/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care NEAR/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))))
39 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((care NEAR/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care NEAR/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))), 2016-10-01 - 2019-06-20
40 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*))
41 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*)), 2016-10-01 - 2019-06-20
42 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)))
43 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff))), 2016-10-01 - 2019-06-20

44 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND SU.EXACT("nursing")
45 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND SU.EXACT("nursing"), 2016-10-01 - 2019-06-20
46 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nursing) OR ab(nursing))
47 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nursing) OR ab(nursing)), 2016-10-01 - 2019-06-20
48 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)))
49 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*))), 2016-10-01 - 2019-06-20

50 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*") OR ab(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*"))

51 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*") OR ab(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*")), 2016-10-01 - 2019-06-20

52 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(social N/1 worker*) OR ab(social N/1 worker*))

53 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(social N/1 worker*) OR ab(social N/1 worker*)), 2016-10-01 - 2019-06-20

54 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)))

55 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR

enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*))), 2016-10-01 - 2019-06-20

56 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(physiotherapist* OR (occupational N/1 therapist*)) OR ab(physiotherapist* OR (occupational N/1 therapist)))

57 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(physiotherapist* OR (occupational N/1 therapist*)) OR ab(physiotherapist* OR (occupational N/1 therapist))), 2016-10-01 - 2019-06-20

58 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(counsel?or*) OR ab(counsel?or*))

59 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(counsel?or*) OR ab(counsel?or*)), 2016-10-01 - 2019-06-20

60 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR anag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((human or health) N/1 service N/1 profession*) OR ab((human or health) N/1 service N/1 profession*))

61 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR anag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((human or health) N/1 service N/1 profession*) OR ab((human or health) N/1 service N/1 profession*)), 2016-10-01 - 2019-06-20
62 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(public N/1 health N/1 (service or agency)) OR ab(public N/1 health N/1 (service or agency)))
63 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(public N/1 health N/1 (service or agency)) OR ab(public N/1 health N/1 (service or agency))), 2016-10-01 - 2019-06-20
64 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti("secondary traumati?ation" OR (work* N/2 ("trauma survivor*"))) OR ab("secondary traumati?ation" OR (work* N/2 ("trauma survivor*")))))
65 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti("secondary traumati?ation" OR (work* N/2 ("trauma survivor*"))) OR ab("secondary traumati?ation" OR (work* N/2 ("trauma survivor*")))), 2016-10-01 - 2019-06-20
66 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*))OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR

manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*))
67 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*))OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*)), 2016-10-01 - 2019-06-20
68 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(college N/1 student*) OR ab(college N/1 student*))
69 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(college N/1 student*) OR ab(college N/1 student*)), 2016-10-01 - 2019-06-20
Subsequent (individual) export of results in lines S37, S39, S41, S43, S45, S47, S49, S51, S53, S55, S57, S59, S61, S63, S65, S67, S69

ProQuest Dissertations & Theses (PQDT) PROQUEST

Searched 24 June 2019 [22 records]

1 SU.EXACT("Resilience")
2 SU.EXACT("Hardiness")
3 ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")
4 ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)
5 ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))
6 SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))
7 ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
8 ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
9 (SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR

ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
10 ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)
11 ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)
12 ti(randomi?ed) OR ab(randomi?ed)
13 ti(placebo*) OR ab(placebo*)
14 ti(randomly) OR ab(randomly)
15 ti(trial) OR ab(trial)
16 (ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial))
17 ((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))
18 ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)))
19 ti(medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR ab(medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))
20 ti((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))
21 ti(doctor* OR physician* OR “general practitioner” OR (“primary care” N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR “general practitioner” OR (“primary care” N/2 practitioner*) OR surgeon*)
22 ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff))
23 SU.EXACT(“nursing”)
24 ti(nursing) OR ab(nursing)
25 ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*))
26 ti(psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”) OR ab(psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”)
27 ti(social N/1 worker*) OR ab(social N/1 worker*)
28 ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*))
29 ti(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*)) OR ab(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*))
30 ti(counsel?or*) OR ab(counsel?or*)
31 ti(“secondary traumati?ation” OR (work* N/2 (“trauma survivor*”))) OR ab(“secondary traumati?ation” OR (work* N/2 (“trauma survivor*”)))
32 ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*)
33 ti(college N/1 student*) OR ab(college N/1 student*)
34 ti(nursing N/1 (graduates OR education)) OR ab(nursing N/1 (graduates OR education))
35 (ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)))) OR (ti(medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR ab(medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR (ti((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))) OR (ti(doctor* OR physician* OR “general practitioner” OR (“primary care” N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR “general practitioner” OR (“primary care” N/2 practitioner*) OR surgeon*)) OR (ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff))) OR SU.EXACT(“nursing”) OR (ti(nursing) OR ab(nursing)) OR (ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*))) OR (ti(psychologist* OR psychotherapist* OR “mental

health clinician*" OR "mental health profession*" OR "mental health worker*") OR ab(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*")) OR (ti(social N/1 worker*) OR ab(social N/1 worker*)) OR (ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*))) OR (ti(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*)) OR ab(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*))) OR (ti(counsel?or*) OR ab(counsel?or*)) OR (ti("secondary traumati?ation" OR (work* N/2 ("trauma survivor*"))) OR ab("secondary traumati?ation" OR (work* N/2 ("trauma survivor*")))) OR (ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*)) OR (ti(college N/1 student*) OR ab(college N/1 student*)) OR (ti(nursing N/1 (graduates OR education)) OR ab(nursing N/1 (graduates OR education)))

36 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))))

37 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)))), 2016-10-01 - 2019-06-20

38 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR ab(medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))

39 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR ab(medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))), 2016-10-01 - 2019-06-20

40 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5

(train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))))
41 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))), 2016-10-01 - 2019-06-20
42 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(doctor* OR physician* OR “general practitioner” OR (“primary care” N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR “general practitioner” OR (“primary care” N/2 practitioner*) OR surgeon*))
43 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(doctor* OR physician* OR “general practitioner” OR (“primary care” N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR “general practitioner” OR (“primary care” N/2 practitioner*) OR surgeon*)), 2016-10-01 - 2019-06-20
44 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)))
45 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR

ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff))), 2016-10-01 - 2019-06-20
46 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND SU.EXACT(“nursing”)
47 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND SU.EXACT(“nursing”), 2016-10-01 - 2019-06-20
48 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nursing) OR ab(nursing))
49 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nursing) OR ab(nursing)), 2016-10-01 - 2019-06-20
50 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)))
51 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR

ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*))), 2016-10-01 - 2019-06-20
52 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”) OR ab(psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”))
53 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”) OR ab(psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”)), 2016-10-01 - 2019-06-20
54 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(social N/1 worker*) OR ab(social N/1 worker*))
55 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(social N/1 worker*) OR ab(social N/1 worker*)), 2016-10-01 - 2019-06-20
56 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)))
57 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5

(stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*))), 2016-10-01 - 2019-06-20

58 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*)) OR ab(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*)))

59 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*)) OR ab(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*))), 2016-10-01 - 2019-06-20

60 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(counsel?or*) OR ab(counsel?or*))

61 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(counsel?or*) OR ab(counsel?or*)), 2016-10-01 - 2019-06-20

62 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR

ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(“secondary traumati?ation” OR (work* N/2 (“trauma survivor*”))) OR ab(“secondary traumati?ation” OR (work* N/2 (“trauma survivor*”))))
63 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(“secondary traumati?ation” OR (work* N/2 (“trauma survivor*”))) OR ab(“secondary traumati?ation” OR (work* N/2 (“trauma survivor*”)))), 2016-10-01 - 2019-06-20
64 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*))
65 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*)), 2016-10-01 - 2019-06-20
66 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(college N/1 student*) OR ab(college N/1 student*))
67 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(college N/1 student*) OR ab(college N/1 student*)), 2016-10-01 - 2019-06-20
68 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc*

back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nursing N/1 (graduates OR education)) OR ab(nursing N/1 (graduates OR education)))
69 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nursing N/1 (graduates OR education)) OR ab(nursing N/1 (graduates OR education))), 2016-10-01 - 2019-06-20
Subsequent (individual) export of results in lines S37, S39, S41, S43, S45, S47, S49, S51, S53, S55, S57, S59, S61, S63, S65, S67, S69

Cochrane Database of Systematic Reviews (CDSR)

Searched 26 June 2019 (5 records)

IDSearchHits
#1(resilien* or hardiness*):ti,ab
#2(post next traumatic next growth or posttraumatic NEXT growth or stress next related next growth):ti,ab
#3(positiv* near/1 (adapt* or adjust*)):ti,ab
#4(psychol* near/1 (adapt* or adjust*)):ti,ab
#5{or #1-#4}
#6(behav* or psycho* or cbt or cognit* or mindful* or reframe* or re next fram*):ti,ab
#7(stress near/3 (inoculat* or manag* or reduc* or resist*)):ti,ab
#8(anxiety near/3 manag*):ti,ab
#9"acceptance and commitment":ti,ab
#10(multimodal* or multi next modal* or combined next modal*):ti,ab
#11(health near/3 (educat* or promot*)):ti,ab
#12{or #6-#11}
#13#5 and #12 with Cochrane Library publication date Between Oct 2016 and Jun 2019, in Cochrane Reviews, Cochrane Protocolss

Epistemonikos (epistemonikos.org)

Searched 24 June 2019 [6 records]

1 (title:(resilien* OR hardiness*) OR abstract:(resilien* OR hardiness*))
2 (title:("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR abstract:("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth"))
3 (title:("positive adaptation" OR "positive adjustment") OR abstract:("positive adaptation" OR "positive adjustment"))
4 (title:("psychological adaptation" OR "psychological adjustment") OR abstract:("psychological adaptation" OR "psychological adjustment"))
5 OR/#1-#4
6 (title:("health personnel*" OR "health profession*" OR "health professional*" OR "health worker*" OR "health practitioner*" OR "health provider*" OR "health staff") OR abstract:("health personnel*" OR "health profession*" OR "health professional*" OR "health worker*" OR "health practitioner*" OR "health provider*" OR "health staff"))
7 (title:("healthcare personnel*" OR "healthcare profession*" OR "healthcare professional*" OR "healthcare worker*" OR "healthcare practitioner*" OR "healthcare provider*" OR "healthcare staff") OR abstract:("healthcare personnel*" OR "healthcare profession*" OR "healthcare professional*" OR "healthcare worker*" OR "healthcare practitioner*" OR "healthcare provider*" OR "healthcare staff"))
8 (title:("health care personnel*" OR "health care profession*" OR "health care professional*" OR "health care worker*" OR "health care practitioner*" OR "health care provider*" OR "health care staff") OR abstract:("health care personnel*" OR "health care profession*" OR "health care professional*" OR "health care worker*" OR "health care practitioner*" OR "health care provider*" OR "health care staff"))
9 OR/#6-#8
10 AND/#5-#9; Publication year (Custom year range): 1990 – 2019; Publication type: Systematic Review; Systematic review question: All; Cochrane review: All; Type of meta-analysis: All

ERIC EBSCOhost

26 June 2019 (505 records)

All years searched in 2019 as there were errors in the 2016 search

S1DE "Resilience (Psychology)"
Database - ERIC
S2DE "Social Adjustment" OR DE "Emotional Adjustment"
Database - ERIC
S3TI ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth")
Database - ERIC
S4TI (positiv* N1 (adapt* OR adjust*)) OR AB (positiv* N1 (adapt* OR adjust*))
Database - ERIC
S5TI (psychol* N1 (adapt* OR adjust*)) OR AB (psychol* N1 (adapt* OR adjust*))
Database - ERIC
S6TI (resilien* OR hardiness*) OR AB (resilien* OR hardiness*) OR SU (resilien*)
Database - ERIC
S7TI (cope OR coping) OR AB (cope OR coping) OR SU (cope OR coping)
Database - ERIC
S8TI ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR AB ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*))
Database - ERIC
S9S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8
Database - ERIC
S10DE "Psychotherapy" OR DE "Milieu Therapy" OR DE "Relaxation Training"
Database - ERIC
S11TI (psycho-therap* OR psychotherap*) OR AB (psychotherap* OR psychotherap*) OR SU (psycho-therap* OR psychotherap*)
Database - ERIC
S12TI (behav* N3 (intervention* OR program* OR therap*)) OR AB (behav* N3 (intervention* OR program* OR therap*))
Database - ERIC
S13TI ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR AB ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*))
Database - ERIC
S14TI (psycho* N3 (intervention* OR program* OR therap*)) OR AB (psycho* N3 (intervention* OR program* OR therap*))
Database - ERIC
S15TI relaxation OR AB relaxation OR SU relaxation
Database - ERIC
S16TI mindful* OR AB mindful*
Database - ERIC
S17TI (counsel?ing OR coaching) OR AB (counsel?ing OR coaching) OR SU (counsel?ing OR coaching)
Database - ERIC
S18TI ("third wave" N1 (psycho* OR therap*)) OR AB ("third wave" N1 (psycho* OR therap*))
Database - ERIC
S19TI ("cognit* restructur*") OR AB ("cognit* restructur*") OR SU ("cognit* restructur*")
Database - ERIC
S20TI "positive psychology" OR AB "positive psychology"
Database - ERIC
S21TI (reframe* OR reframe* OR reapprais*) OR AB (reframe* OR reframe* OR reapprais*)Interface - EBSCOhost Research Databases
Database - ERIC
S22TI (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR AB (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR SU (stress N1 (inoculation OR manag* OR reduc* OR resist*))
Database - ERIC
S23TI (anxiety N3 manage*) OR AB (anxiety N3 manage*)
Database - ERIC
S24TI "acceptance and commitment" OR AB "acceptance and commitment"
Database - ERIC
S25TI (multimodal OR multimodal OR "combined modal*") OR AB (multimodal OR multimodal OR "combined modal*")
Database - ERIC
S26TI (health N3 (educat* OR promot*)) OR AB (health N3 (educat* OR promot*)) OR SU (health N3 (educat* OR promot*))
Database - ERIC

S27S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26
Database - ERIC
S28S9 AND S27
Database - ERIC
S29((DE "Health Occupations" OR DE "Allied Health Occupations" OR DE "Medical Education" OR DE "Health Personnel" OR DE "Allied Health Personnel" OR DE "Mental Health Workers" OR DE "Nurses" OR DE "Physicians" OR DE "Psychologists" OR DE "Graduate Medical Education" OR DE "Nursing Education" OR DE "Allied Health Occupations Education" OR DE "Clinical Experience" OR DE "Medical Schools" OR DE "Medical Students" OR DE "Premedical Students"
Database - ERIC
S30DE "Counselors" OR DE "School Social Workers" OR DE "Social Work"
Database - ERIC
S31TI(health* N3 (personnel or profession* or worker* or practitioner* or provider* or staff)) OR AB(health* N3 (personnel or profession* or worker* or practitioner* or provider* or staff))
Database - ERIC
S32TI(medical N3 (personnel or profession* or worker* or practitioner* or provider* or staff)) OR AB(medical N3 (personnel or profession* or worker* or practitioner* or provider* or staff))
Database - ERIC
S33TI(care N1 (personnel or profession* or worker* or practitioner* or provider* or staff)) OR AB(care N1 (personnel or profession* or worker* or practitioner* or provider* or staff))Database - ERIC
S34TI(doctor* or physician* or general practitioner* or (primary care N2 practitioner*) or surgeon*) OR AB(doctor* or physician* or general practitioner* or (primary care N2 practitioner*) or surgeon*)
Database - ERIC
S35TI(nurse* or nursing) OR AB(nurse* or nursing)
Database - ERIC
S36TI(hospital or ambulance) OR AB(hospital or ambulance)
Database - ERIC
S37TI((intensive N2 care) or ICU) OR AB((intensive N2 care) or ICU)
Database - ERIC
S38TI(allied health* N2 (personnel* or profession* or worker* or practitioner* or provider* or staff)) OR AB(allied health* N2 (personnel* or profession* or worker* or practitioner* or provider* or staff))
Database - ERIC
S39TI(psychologist* or psychotherapist* or psychiatrist* or mental health clinician* or mental health profession* or mental health worker*) OR AB(psychologist* or psychotherapist* or psychiatrist* or mental health clinician* or mental health profession* or mental health worker*)
Database - ERIC
S40TI(social worker*) OR AB(social worker*)
Database - ERIC
S41TI(paramedic* or para-medic* or ambulance) OR AB(paramedic* or para-medic* or ambulance)
Database - ERIC
S42TI(first or emergency or disaster) N1 (response or responder*)) OR AB(first or emergency or disaster) N1 (response or responder*))
Database - ERIC
S43TI(professional N1 (caregiver* or care-giver*)) OR AB(professional N1 (caregiver* or care-giver*))
Database - ERIC
S44TI (physical therapist* or physiotherapist* or occupational therapist* or recreational therapist* or music therapist* or art therapist* or dietitian* or nutritionist* or ((speech and language) N1 therapist*) or speech pathologist* or audiologist* or exercise physiologist* or osteopath* or sonographer* or radiographer* or radiotherapist* or ((radiology or radiation) N1 (therapist* or technician* or technologist* or assistant* or scientist*)) or respiratory therapist* or ((anesthesia or anesthesiologist) N1 (technician* or assistant*)) or dental hygienist* or (surgical N1 (technician* or technologist*)) or orthotist* or orthoptist* or podiatrist* or perfusionist*) OR AB (physical therapist* or physiotherapist* or occupational therapist* or recreational therapist* or music therapist* or art therapist* or dietitian* or nutritionist* or ((speech and language) N1 therapist*) or speech pathologist* or audiologist* or exercise physiologist* or osteopath* or sonographer* or radiographer* or radiotherapist* or ((radiology or radiation) N1 (therapist* or technician* or technologist* or assistant* or scientist*)) or respiratory therapist* or ((anesthesia or anesthesiologist) N1 (technician* or assistant*)) or dental hygienist* or (surgical N1 (technician* or technologist*)) or orthotist* or orthoptist* or podiatrist* or perfusionist*)
Database - ERIC
S45TI(counsel*or*) OR AB(counsel*or*)
S46TI((clinical OR medical*) N1 (technician* or technologist* or assistant* or scientist*)) OR AB((clinical OR medical*) N1 (technician* or technologist* or assistant* or scientist*))
Database - ERIC
S47TI(public health service* or public health agenc*) OR AB(public health service* or public health agenc*)
Database - ERIC
S48TI(secondary trauma* or (work* N2 trauma survivor*)) OR AB(secondary trauma* or (work* N2 trauma survivor*))
Database - ERIC

S49TI (nursing or medical or midwifery OR premedical or paramedic or psychology or physical therapy or occupational therapy) N2 student*) OR AB (nursing or medical or midwifery OR premedical or paramedic or psychology or physical therapy or occupational therapy) N2 student*)
Database - ERIC
S50TI(college student*) OR AB(college student*)
Database - ERIC
S51TI((nurs* N1 graduate*) or (nurs* N1 education) or (medic* N1 train*)) OR AB((nurs* N1 graduate*) or (nurs* N1 education) or (medic* N1 train*))
Database - ERIC
S52S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51
Database - ERIC
S53S28 AND S52
Database - ERIC
S54DE "Meta Analysis" OR DE "Evaluation Research" OR DE "Control Groups" OR DE "Experimental Groups" OR DE "Longitudinal Studies" OR DE "Followup Studies" OR DE "Program Effectiveness" OR DE "Program Evaluation"
Database - ERIC
S55(random* or trial* or group or experiment* or PROSPECTIVE* OR longitudinal or BLIND* or CONTROL* or treatment as usual or TAU)
Database - ERIC
S56S54 OR S55
Database - ERIC
S57S53 AND S56
Database - ERIC

Current Controlled Trials (ISRCTN registry; http://www.isrctn.com)

Searched 24 June 2019 [33 records]

Text search:
(((((resilience OR hardiness OR "posttraumatic growth" OR stress OR trauma) AND (psychotherap OR relaxation OR mindfulness OR coaching OR "positive psychology" OR reappraisal OR "stress inoculation" OR "stress management" OR multimodal OR "health promotion")) OR ((resilience OR hardiness) AND (training OR program OR intervention OR promot OR prevent OR enhanc OR learn OR teach OR educat OR increas or develop OR manag OR therap OR protocol OR treat)))) AND ("health personnel" OR "health professional" OR "health worker" OR "health practitioner" OR "health provider" OR "health staff" OR students OR "human service professional"))
Date assigned from 01/10/2016 to 24/06/2019

ClinicalTrials.gov (clinicaltrials.gov)

Searched 24 June 2019 [147 records]

Condition or disease = resilience OR hardiness OR posttraumatic growth OR stress OR trauma
Other terms = health personnel OR health professional OR health worker OR health practitioner OR health provider OR health staff OR students OR human service professional
Study type: Interventional studies (clinical trials)
Intervention/treatment: resilience training OR hardiness training OR psychotherapy OR relaxation OR mindfulness OR coaching OR positive psychology OR reappraisal OR stress inoculation OR stress management OR multimodal OR health promotion Title or acronym: resilience OR hardiness OR posttraumatic growth OR stress OR trauma
Study start: 01/10/2016 to 24/06/2019

WHO ICTRP (apps.who.int/trialsearch)

Searched 24 June 2019 [145 records]

title = health personnel OR health professional OR health worker OR health practitioner OR health provider OR health staff OR students OR human service professional
intervention = resilience OR hardiness OR posttraumatic growth OR stress OR trauma OR psychotherapy OR relaxation OR mindfulness OR coaching OR positive psychology OR reappraisal OR stress inoculation OR stress management OR multimodal OR health promotion
Recruitment status: ALL
Date of registration: 01/10/2016 – 24/06/2019

Appendix 10. Data collection/extraction sheet (items according to Li 2019)

Source	• Study ID (created by review author)

(Continued)

	• Report ID (created by review author) • Review author ID (created by review author) • Citation and contact detail
Eligibility	• Confirm eligibility for review • Reason for exclusion

Methods	• Study design
	• Total study duration
	• Sequence generation[a]
	• Allocation sequence concealment[a]
	• Blinding[a]
	• Other concerns about bias:[a]
	  ○ analyses to assure baseline comparability of groups for sociodemographic characteristics and outcomes of interest; and
	  ○ selection of comparison group

Participants	• Total number • Setting • Diagnostic criteria • Age • Sex • Country • Comorbidity • Sociodemographics • Date of study

Interventions	• Total number of intervention groups
	• For each intervention and comparison group of interest:
	  ○ specific intervention; and
	  ○ intervention details (sufficient for replication, if feasible)

Outcomes	• Outcomes and time points (1) collected; (2) reported[a]
	• For each outcome of interest:
	  ○ outcome definition (with diagnostic criteria, if relevant)
	  ○ unit of measurement (if relevant)
	• For scales: upper and lower limits and whether high or low score is good

Results	• Number of participants allocated to each intervention group
	• For each outcome of interest:
	  ○ sample size
	  ○ missing participants[a]
	  ○ summary data for each intervention group (e.g. means and SDs for continuous data at baseline and any time point after treatment; change);
	  ○ estimate of effect with standard error, 95% CI and P value
	  ○ subgroup analyses
	• Potential adverse effects

Miscellaneous aspects	• Funding source • Declaration of interests for the primary investigators • Key conclusions of the study authors • Miscellaneous comments from the study authors • References to other relevant studies

(Continued)

- Correspondence required
- Miscellaneous outcomes by the review authors

CI: Confidence interval; **ID:** Identifier; **SD:** Standard deviation.

Footnotes

[a]Full description required for standard items in 'Risk of bias' tool.

Appendix 11. Criteria for 'Risk of bias' assessment in included RCTs (according to Higgins 2011b)

Item	Judgement	Description
1. Random sequence generation (selection bias). We will describe the method used to generate the allocation sequence in sufficient detail for each included trial to allow an assessment of whether it should produce comparable groups	Low risk	The investigators describe a random component in the sequence generation process such as: • random number table; • computer random number generator; • coin tossing; • shuffling cards or envelopes; • throwing dice; • drawing of lots; or • minimisation (Minimisation may be implemented without a random element (treatment sums are equal), and this is considered to be equivalent to being random)

	High risk	The researchers describe a (systematic or non-systematic) non-random component in the sequence generation process such as:
		• systematic, non-random approach
		  ◦ generating the sequence by, for example:
		  ◦ odd or even date of birth;
		  ◦ date (or day) of admission;
		  ◦ hospital or clinic record number; or
		  ◦ alternation.
		• non-systematic, non-random approach
		  ◦ allocating the participant by, for example:
		  ◦ judgement of the clinician;
		  ◦ preference of the participant;
		  ◦ results of a laboratory test or a series of tests; or
		  ◦ availability of the intervention.

	Unclear risk	Insufficient information to permit a judgement of 'Low risk' or 'High risk'.
2. Allocation concealment (selection bias). For each RCT we will describe the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen in advance of, or during, enrolment.	Low risk	Participants and investigators enrolling participants could not foresee assignment because one of the following, or an equivalent method, was used to conceal allocation: • central allocation (including telephone, web-based and pharmacy-controlled randomisation); • sequentially numbered drug containers of identical appearance; or

(Continued)

		• sequentially numbered, opaque, sealed envelopes.
	High risk	Participants or investigators enrolling participants could possibly foresee assignment and thus introduce selection bias because one of the following methods was used: • open random allocation schedule (e.g. a list of random numbers); • assignment envelopes without appropriate safeguards (e.g. if envelopes were unsealed or non-opaque or not sequentially numbered); • alternation or rotation; • date of birth; • case record number; or • any other explicitly unconcealed procedure.
	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. This is usually the case if the method of concealment is not described or not described in sufficient detail to allow a definite judgement (e.g. if the use of assignment envelopes is described, but it remains unclear whether envelopes were sequentially numbered, opaque and sealed).
3. Blinding of participants and personnel (performance bias): objective outcomes. For each included trial, we will describe all methods used to blind trial participants and personnel from knowledge of which intervention a participant received. We will provide any information relating to whether the intended blinding was effective. We will assess blinding separately for different classes of outcomes. Outcomes will be divided into objective (e.g. cortisol) and subjective (e.g. self-reported resilience and other psychological outcomes). We will consider the same outcomes at different time points.	Low risk	Any one of the following: • no blinding or incomplete blinding, but the review authors judge that the outcome is not likely to be influenced by lack of blinding; or • blinding of participants and key study personnel ensured, and unlikely that the blinding could have been broken.
4. Blinding of participants and personnel (performance bias): subjective outcomes. For each included trial we will describe all methods used to blind trial participants and personnel from knowledge of which intervention a participant received. We will provide any information relating to whether the intended blinding was effective. We will assess blinding separately for different classes of outcomes. Outcomes will be divided into objective (e.g. cortisol) and subjective (e.g. self-reported resilience and other psychological outcomes). We will	Low risk	Blinding of participants and intervention providers, and unlikely that the blinding could have been broken.
	High risk	Any one of the following: • no blinding or incomplete blinding, and the outcome is likely to be influenced by lack of blinding; or • blinding of key study participants and personnel attempted, but likely that the blinding could have been broken; and the outcome is likely to be influenced by the lack of blinding.
	Unclear risk	Insufficient information to permit a judgement of 'Low risk' or 'High risk'.

(Continued)

consider the same outcomes at different time points.		
5. Blinding of outcome assessors (detection bias): objective outcomes. For each included trial we will describe all methods used to blind outcome assessors from knowledge of which intervention a participant received. We will provide any information relating to whether the intended blinding was effective. We will assess blinding separately for different classes of outcomes. Outcomes will be divided into objective (e.g. cortisol) and subjective (e.g. self-reported resilience and other psychological outcomes). We will consider the same outcomes at different time points.	Low risk	Any one of the following: • no blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding; or • blinding of outcome assessment ensured, and unlikely that the blinding could have been broken.
6. Blinding of outcome assessors (detection bias): subjective outcomes. For each included trial we will describe all methods used to blind outcome assessors from knowledge of which intervention a participant received. We will provide any information relating to whether the intended blinding was effective. We will assess blinding separately for different classes of outcomes. Outcomes will be divided into objective (e.g. cortisol) and subjective (e.g. self-reported resilience and other psychological outcomes). We will consider the same outcomes at different time points.	Low risk	Any one of the following: • no blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding; or • blinding of outcome assessment ensured, and unlikely that the blinding could have been broken.
	High risk	Any one of the following: • no blinding of outcome assessment, and the outcome measurement is likely to be influenced by lack of blinding; or • blinding of outcome assessment, but likely that the blinding could have been broken, and the outcome measurement is likely to be influenced by lack of blinding.
	Unclear risk	Insufficient information to permit a judgement of 'Low risk' or 'High risk'.
7. Incomplete outcome data (attrition bias). For each RCT we will describe the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. We will state whether attrition and exclusions were reported, the numbers included at each stage (compared with the total number of participants randomised), reasons for attrition or exclusions (where reported), and whether missing data were balanced across groups or were related to outcomes. Where sufficient data are reported, or can be provided by the trial authors, we will re-include missing data in the analyses.	Low risk	Any one of the following: • no missing outcome data; • reasons for missing outcome data unlikely to be related to true outcome (for survival data, censoring unlikely to be introducing bias); • missing outcome data balanced in numbers across intervention groups, with similar reasons for missing data across groups; • for dichotomous outcome data, the proportion of missing outcomes compared with observed event risk not enough to have a clinically relevant impact on the intervention effect estimate; • for continuous outcome data, plausible effect size (difference in means or standardised difference in means) among missing outcomes not enough to have a clinically relevant impact on observed effect size; • missing data have been imputed using appropriate methods; or

(Continued)

		• intention-to-treat; all randomised participants are analysed in the group to which they were allocated by randomisation, irrespective of noncompliance and co-interventions.
	High risk	Any one of the following: • reason for missing outcome data likely to be related to true outcome, with either imbalance in numbers or reasons for missing data across intervention groups; • for dichotomous outcome data, the proportion of missing outcomes compared with observed event risk is enough to induce clinically relevant bias in intervention effect estimate; • for continuous outcome data, plausible effect size (difference in means or standardised difference in means) among missing outcomes enough to induce clinically relevant bias in observed effect size; • potentially inappropriate application of simple imputation; or • 'as-treated' analysis done with substantial departure of the intervention received from that assigned at randomisation.
	Unclear risk	Insufficient reporting of attrition or exclusions to permit a judgement of 'Low risk' or 'High risk' (e.g. number randomised not stated, no reasons for missing data provided, number of dropouts not reported for each group).
8. Selective outcome reporting (reporting bias). For each included trial we will describe how the possibility of selective outcome reporting was examined and what was found.	Low risk	Any of the following: • the study protocol is available and all of the study's pre-specified (primary and secondary) outcomes that are of interest in the review have been reported in the pre-specified way; or • the study protocol is not available, but it is clear that the published reports include all expected outcomes, including those that were pre-specified (convincing text of this nature may be uncommon).
	High risk	Any one of the following: • not all of the study's pre-specified primary outcomes have been reported; • one or more primary outcomes is reported using measurements, analysis methods or subsets of the data (e.g. subscales) that were not pre-specified; • one or more reported primary outcomes were not pre-specified (unless clear justification for their reporting is provided such as an unexpected adverse effect); • one or more outcomes of interest in the review are reported incompletely so that they cannot be entered in a meta-analysis; or • the study report fails to include results for a key outcome that would be expected to have been reported for such a study.
	Unclear risk	Insufficient information to permit a judgement of 'Low risk' or 'High risk'.

RCT: Randomised controlled trial.

Appendix 12. Detailed results of both searches

Using the original search strategy (Appendix 8), our database searches retrieved 32,184 records (including 1601 from trials registers). We found an additional 100 records by searching other resources. Following de-duplication, we screened the remaining 20,410 records by title and abstract. We deemed 18,116 records to be irrelevant and sought the full text of the remaining 2294 records for further assessment. On the level of title/abstract screening, we achieved a good agreement (kappa = 0.70) between review authors. We retrieved 2294 full text reports. Based on the original eligibility criteria of this review (see Differences between protocol and review), 251 studies met the inclusion criteria. We identified 18 ongoing studies and 46 studies awaiting classification (in total: 315 studies from 376 reports). We excluded 1918 reports as irrelevant (Excluded studies). The full text screening for the first search resulted in excellent inter-rater reliability (kappa = 0.95).

After revising the eligibility criteria to focus on healthcare professionals based on a broad definition of this target group (see Differences between protocol and review), we reassessed the studies found by the initial screening. From these, we identified 49 studies that were performed in any of these groups. We also identified one ongoing study and 10 studies awaiting classification. Finally, after revising the eligibility criteria to focus on **healthcare professionals**, we reassessed these 60 studies. From these, we identified 28 studies that fulfilled our inclusion criteria (Criteria for considering studies for this review). We also identified one study awaiting classification (see Studies awaiting classification). The results of the original search are presented in Figure 4.

Figure 4. Study flow diagram for original searches (January 1990 to October 2016).

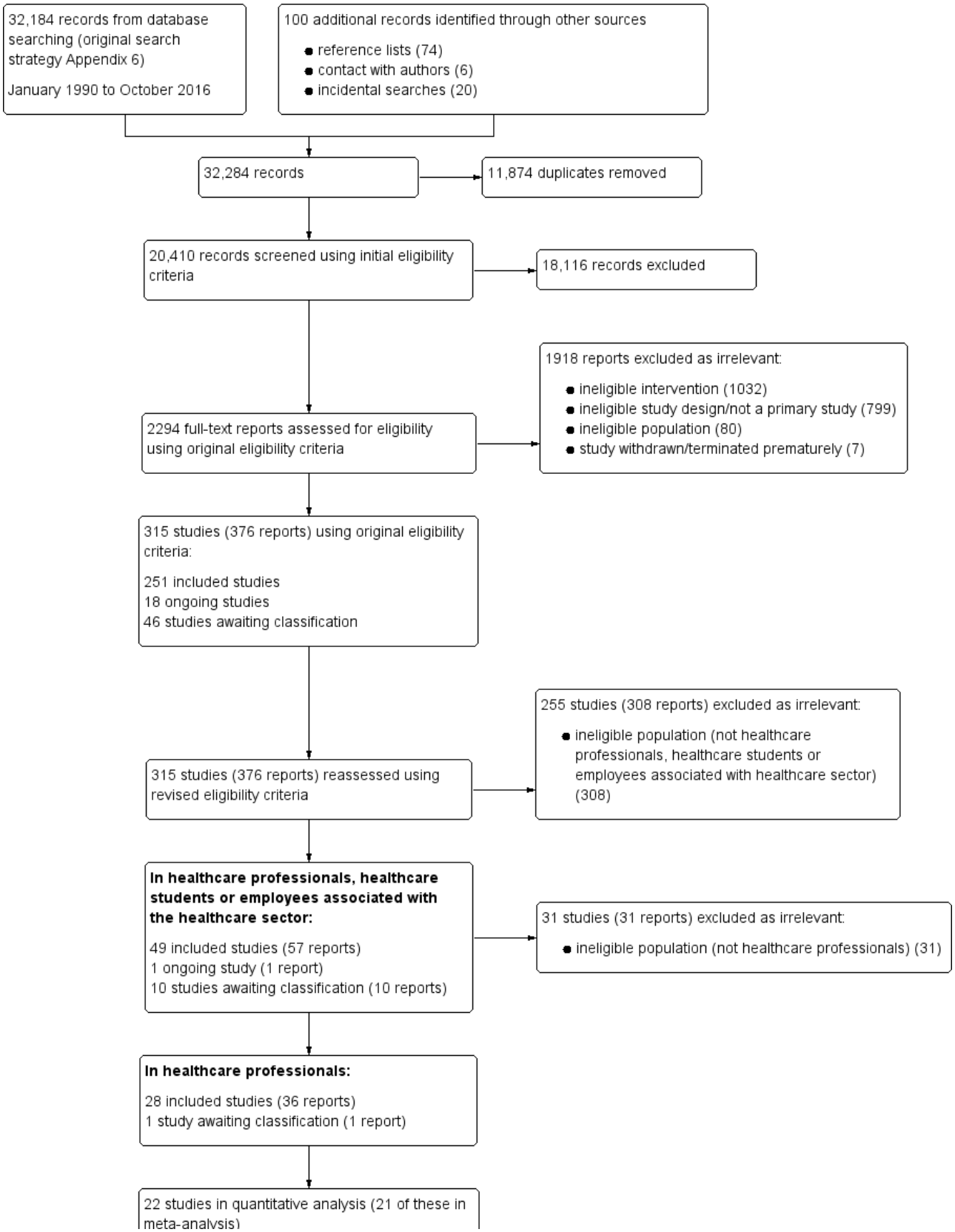
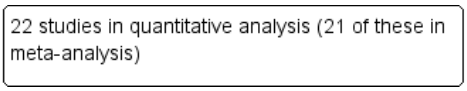
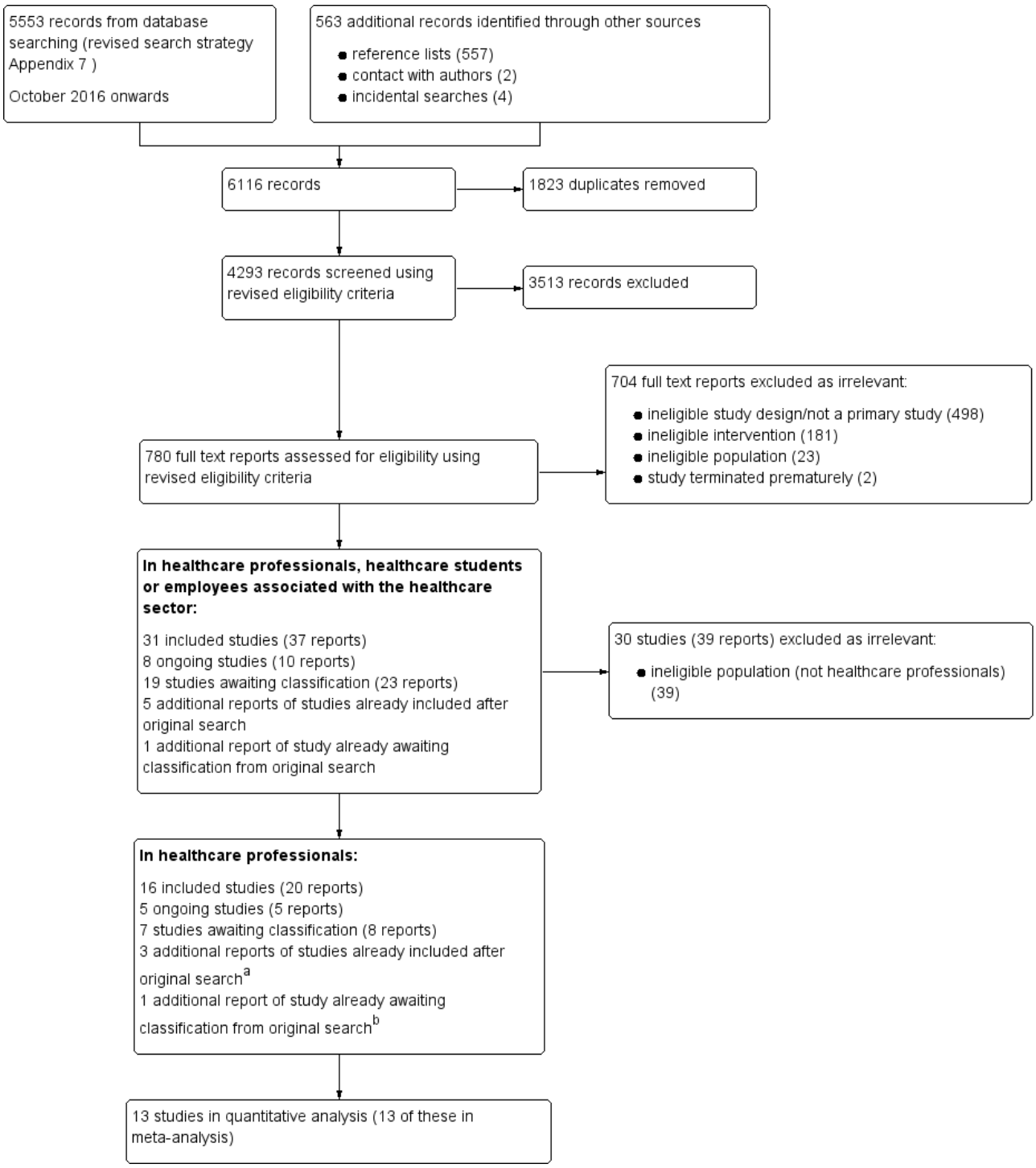


Figure 4. (Continued)



From 2016 onwards, we refined our search strategy to focus broadly on the healthcare sector (including healthcare professionals; Appendix 9. The searches yielded 6116 records (5553 + 563). Based on these broad criteria, we identified six additional reports of studies identified by earlier searches. We newly identified 31 studies that were performed in any of these groups, eight ongoing studies and 19 studies awaiting classification. We reassessed these 58 studies according to the narrower population, which is the focus of this review (healthcare professionals only). From these, we identified 16 studies that fulfilled our inclusion criteria. We also identified five ongoing studies and seven studies awaiting classification. The full text screening for the top-up searches also resulted in excellent inter-rater reliability (kappa = 1). The results of the top-up searches are presented in Figure 5.

Figure 5. Study flow diagram for revised searches (October 2016 onwards). [a]Duchemin 2015; Mistretta 2018; Schroeder 2016. [b]Van Berkel 2014.



Appendix 13. References concerning the description of included studies

Key characteristics of included studies	Number of included studies with respective references

(Continued)

Location	• USA: 19 studies (Alexander 2015; Calder Calisi 2017; Chesak 2015; Clemow 2018; Duchemin 2015; Klatt 2015; Lebares 2018; Loiselle 2018; Luthar 2017; Mealer 2014; Mistretta 2018; NCT02603133; Schroeder 2016; Sood 2011; Sood 2014; Stetz 2007; Tierney 1997; West 2014; West 2015) • Germany: six studies (Bernburg 2016; Bernburg 2019; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017) • China: four studies (Cheung 2014; Fei 2019; Lin 2019; NCT03645798) • Australia: three studies (Ireland 2017; Poulsen 2015; Varker 2012) • Iran: three studies (Hosseinnejad 2018; Khoshnazary 2016; Mirzaeirad 2019) • UK: three studies (ISRCTN69644721; Medisauskaite 2019; Wild 2016) • Canada: one study (Smith 2019) • the Netherlands: one study (Strijk 2011) • Israel: one study (Berger 2011) • Italy: one study (Villani 2013) • Poland: one study (Cieslak 2016) • Sri Lanka: one study (Gelkopf 2008)
Settings (venue or implementation sites of interventions)	• Clinics or specific hospital departments (e.g. Department of Radiology): 24 studies (Alexander 2015; Berger 2011; Bernburg 2016; Calder Calisi 2017; Chesak 2015; Clemow 2018; Duchemin 2015; Fei 2019; Klatt 2015; Loiselle 2018; Luthar 2017; Mache 2015a; Mache 2015b; Mache 2016; Mealer 2014; Mirzaeirad 2019; Mistretta 2018; Poulsen 2015; Schroeder 2016; Sood 2011; Sood 2014; Strijk 2011; Tierney 1997; West 2014) • Intervention site not further specified: 11 studies (Bernburg 2019; Hosseinnejad 2018; Ireland 2017; Lebares 2018; Lin 2019; Mache 2017; Medisauskaite 2019; Smith 2019; Varker 2012; West 2015; Wild 2016) • Online or mobile interventions with no concrete venue: four studies (Cieslak 2016; NCT02603133; NCT03645798; Villani 2013) • Laboratory: one study (Stetz 2007) • Mixed settings (e.g. online training plus face-to-face sessions with implementation site not further specified): two studies (ISRCTN69644721; Khoshnazary 2016) • Other intervention sites: Chinese Auxiliary Medical Service (Cheung 2014) and a non-governmental organisation (Gelkopf 2008)
Participants - number randomised	• 100 or more participants: 11 studies (Cheung 2014; Cieslak 2016; Fei 2019; ISRCTN69644721; Lin 2019; Medisauskaite 2019; NCT02603133; NCT03645798; Strijk 2011; West 2015; Wild 2016) • 30 participants or less: five studies (Lebares 2018; Mealer 2014; Smith 2019; Sood 2014; Villani 2013)

Participants - age	• Three studies reporting only age range: included participants between 27 and 60 years (Calder Calisi 2017: 27-60 years; Hosseinnejad 2018: 24-45 years; Khoshnazary 2016: 24-55 years)
	• Three studies reporting alternative information on age:
	  ◦ Stetz 2007: 60% of the sample to be under 30 years of age
	  ◦ Mirzaeirad 2019: 42 participants under 31 years of age and 28 participants aged 31 years and older
	  ◦ Poulsen 2015: participants between 25 and over 45 years of age
	• Age of the sample not further specified or is unclear: eight studies (ISRCTN69644721; Klatt 2015; Mealer 2014; NCT02603133; NCT03645798; Tierney 1997; West 2014; West 2015)
	  ◦ Mealer 2014: mean duration of practicing in intensive care unit of 5.35 years (SD 5.94)
	  ◦ Tierney 1997: inclusion of staff nurses who had been employed between six months and 2.5 years at a hospital

Participants - gender	• Women outnumbered men: in 23 studies (Alexander 2015; Bernburg 2016; Bernburg 2019; Chesak 2015; Cheung 2014; Clemow 2018; Duchemin 2015; Hosseinnejad 2018; Ireland 2017; Khoshnazary 2016; Lin 2019; Loiselle 2018; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mealer 2014; Mirzaeirad 2019; Mistretta 2018; Poulsen 2015; Schroeder 2016; Smith 2019; Strijk 2011). Female participants were also in the majority in one study evaluating a resilience-training programme in volunteers in the general population (Varker 2012)

(Continued)

- Male participants outnumbered women: five studies (Lebares 2018; Medisauskaite 2019; Sood 2014; Stetz 2007; West 2014)
- Only women: four studies (Berger 2011; Calder Calisi 2017; Luthar 2017; Villani 2013)
- Comparable gender distribution across two arms: one study (Sood 2011)
- Gender unclear: six studies (Fei 2019; Klatt 2015; NCT02603133; NCT03645798; Tierney 1997; West 2015). For example, Fei 2019 investigated nurses but did not indicate whether or not male nurses were also considered. The same applied to Tierney 1997.
- Studies with mixed samples (four studies):
  - women outnumbered men: three studies (Cieslak 2016; Gelkopf 2008; Wild 2016)
  - gender unclear: one study (ISRCTN69644721)

Participants - target group

- Nurses: 15 studies (Alexander 2015; Berger 2011; Bernburg 2019; Calder Calisi 2017; Chesak 2015; Fei 2019; Hosseinnejad 2018; Khoshnazary 2016; Lin 2019; Mealer 2014; Mirzaeirad 2019; NCT03645798; Smith 2019; Tierney 1997; Villani 2013)
- Physicians: 14 studies (Bernburg 2016; Ireland 2017; Lebares 2018; Loiselle 2018; Luthar 2017; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Medisauskaite 2019; Schroeder 2016; Sood 2011; West 2014; West 2015)
- Hospital personnel (e.g. physicians and other hospital personnel): eight studies (Clemow 2018; Duchemin 2015; Klatt 2015; Mistretta 2018; NCT02603133; Poulsen 2015; Sood 2014; Strijk 2011)
- General medical personnel (e.g. military medical personnel): two studies (Cheung 2014; Stetz 2007)
- Studies with mixed samples (four studies):
  - i.e. healthcare professionals combined with other individuals such as ambulance personnel and other emergency services including the police (Cieslak 2016; Gelkopf 2008; ISRCTN69644721; Wild 2016)
  - Relevant subgroups within these studies: health service professionals (Cieslak 2016); mental health workers (Gelkopf 2008) and ambulance service personnel (Wild 2016; ISRCTN69644721).
- General population: one study (Varker 2012; proof of concept study); considered for this review as resilience intervention was developed for emergency services personnel

Participants - mental health assessment at baseline

- Mental health assessment at baseline: 29 studies (Alexander 2015; Berger 2011; Calder Calisi 2017; Chesak 2015; Cheung 2014; Cieslak 2016; Clemow 2018; Duchemin 2015; Ireland 2017; ISRCTN69644721; Lebares 2018; Loiselle 2018; Luthar 2017; Mache 2017; Mealer 2014; Medisauskaite 2019; Mistretta 2018; NCT02603133; NCT03645798; Schroeder 2016; Smith 2019; Sood 2011; Sood 2014; Stetz 2007; Varker 2012; Villani 2013; West 2014; West 2015; Wild 2016)
- All studies measuring mental health used self-report (screening) measures covering one or a small number of mental dysfunctions (e.g. Beck Depression Inventory (BDI), e.g. Luthar 2017; Post-Traumatic Stress Disorder Checklist (PCL), e.g. Stetz 2007; Depression Anxiety and Stress Scales-21 (DASS-21), e.g. Mistretta 2018; Maslach Burnout Inventory (MBI), e.g. West 2014; General Anxiety Disorder-7 (GAD-7), e.g. Chesak 2015; General Health Questionnaire-28 (GHQ-28), Cheung 2014).
- None of the studies conducted comprehensive baseline diagnostics by the use of a structured interview (e.g. Mini-International Neuropsychiatric Interview; MINI).
- No data about the mental health status of the sample: 15 studies (Bernburg 2016; Bernburg 2019; Fei 2019; Gelkopf 2008; Hosseinnejad 2018; Khoshnazary 2016; Klatt 2015; Lin 2019; Mache 2015a; Mache 2015b; Mache 2016; Mirzaeirad 2019; Poulsen 2015; Strijk 2011; Tierney 1997)
- Unclear mental health status despite baseline assessment: three unpublished trials (ISRCTN69644721; NCT02603133; NCT03645798) and one study published as conference abstract (Smith 2019)
- Eligibility criteria concerning mental health:
  - Five studies: only mentally healthy participants (e.g. Chesak 2015; Cheung 2014; Sood 2011; Sood 2014) or participants showing symptoms below a cut-off on a screening instrument (e.g. Stetz 2007)
  - Lin 2019 (no mental health assessment specified) did not consider participants taking mood-modulating drugs
  - For Mirzaeirad 2019, the lack of mental stress (not further specified) was an inclusion criterion

(Continued)

Intervention - setting	• Group setting: 30 studies (Alexander 2015; Berger 2011; Bernburg 2016; Bernburg 2019; Chesak 2015; Cheung 2014; Clemow 2018; Duchemin 2015; Fei 2019; Gelkopf 2008; Hosseinnejad 2018; Ireland 2017; Klatt 2015; Lebares 2018; Lin 2019; Luthar 2017; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mirzaeirad 2019; Mistretta 2018; Poulsen 2015; Schroeder 2016; Smith 2019; Tierney 1997; Varker 2012; West 2014; West 2015; Wild 2016) • Variety of training settings: eight studies (Calder Calisi 2017; ISRCTN69644721; Khoshnazary 2016; Loiselle 2018; Mealer 2014; NCT03645798; Sood 2014; Strijk 2011) • Individual-setting interventions: four studies (Cieslak 2016; Sood 2011; Stetz 2007; Villani 2013) • Unclear setting: two studies (Medisauskaite 2019; NCT02603133)
Intervention - delivery format	• Face-to-face: 29 studies (Alexander 2015; Berger 2011; Bernburg 2016; Bernburg 2019; Calder Calisi 2017; Cheung 2014; Clemow 2018; Fei 2019; Gelkopf 2008; Hosseinnejad 2018; Ireland 2017; Klatt 2015; Lebares 2018; Loiselle 2018; Luthar 2017; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mirzaeirad 2019; Poulsen 2015; Schroeder 2016; Sood 2011; Strijk 2011; Tierney 1997; Varker 2012; West 2014; West 2015; Wild 2016) • Multimodal delivery: 10 studies (e.g. web-based intervention and daily diary; Chesak 2015; Cieslak 2016; Duchemin 2015; ISRCTN69644721; Khoshnazary 2016; Lin 2019; Mealer 2014; Mistretta 2018; Smith 2019; Sood 2014) • Online or mobile-based: three studies (NCT02603133; NCT03645798; Villani 2013) • Laboratory setting and unlikely with face-to-face contact: one study (Stetz 2007) • Unclear delivery format: one study (Medisauskaite 2019)
Intervention - training intensity	• High intensity (i.e. > 12 hours or > 12 sessions): 18 studies (Berger 2011; Bernburg 2016; Bernburg 2019; Calder Calisi 2017; Gelkopf 2008; Lebares 2018; Lin 2019; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mealer 2014; NCT03645798; Schroeder 2016; Smith 2019; Strijk 2011; West 2014; Wild 2016) • Moderate intensity (i.e. > 5 to ≤ 12 hours or > 3 to ≤ 12 sessions): 15 studies (Cheung 2014; Cieslak 2016; Clemow 2018; Duchemin 2015; Fei 2019; Hosseinnejad 2018; Ireland 2017; ISRCTN69644721; Klatt 2015; Loiselle 2018; Luthar 2017; Mistretta 2018; Poulsen 2015; Tierney 1997; West 2015) • Low intensity (i.e. ≤ 5 hours or ≤ 3 sessions in total): seven studies (Chesak 2015; NCT02603133; Sood 2011; Sood 2014; Stetz 2007; Varker 2012; Villani 2013) • Unclear training intensity: four studies (Alexander 2015; Khoshnazary 2016; Medisauskaite 2019; Mirzaeirad 2019)
Intervention - theoretical foundation	See Appendix 14
Comparator	• No intervention control: 14 studies (Bernburg 2016; Fei 2019; Luthar 2017; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mealer 2014; Medisauskaite 2019; Mistretta 2018; Smith 2019; Stetz 2007; Tierney 1997; West 2014) • Wait-list control: 13 studies (Berger 2011; Bernburg 2019; Calder Calisi 2017; Cheung 2014; Duchemin 2015; ISRCTN69644721; Klatt 2015; Lin 2019; Loiselle 2018; Schroeder 2016; Sood 2011; Sood 2014; West 2015) • Active control: six studies (Chesak 2015; Gelkopf 2008; Ireland 2017; Poulsen 2015; Strijk 2011; Wild 2016) • Attention control: four studies (Cieslak 2016; Lebares 2018; Varker 2012; Villani 2013) • TAU: four studies (Alexander 2015; Clemow 2018; Hosseinnejad 2018; NCT03645798) • Control group not further specified: two studies (Khoshnazary 2016; Mirzaeirad 2019) • For NCT02603133: number of control groups and whether the study only included a wait-list control or also an active control (see lecture on safety culture) unclear
Funding sources	• Different hospitals or hospital grants (e.g. Mayo Clinic): five studies (Calder Calisi 2017; Poulsen 2015; Smith 2019; Sood 2011; West 2014) • Universities (e.g. certain faculties) and university research funds: five studies (Alexander 2015; Hosseinnejad 2018; Klatt 2015; Medisauskaite 2019; NCT03645798) • National Institutes of Health (NIH): two studies (Clemow 2018; Mealer 2014)

(Continued)

- Ministries: two studies (Berger 2011; Cieslak 2016)
- Different foundations: two studies (Gelkopf 2008; Strijk 2011)
- State/regional and city initiatives for healthcare: two studies (Lin 2019; Schroeder 2016)
- US army: one study (Stetz 2007)
- Research grants (e.g. for student research): one study (Cheung 2014)
- Research programmes (e.g. specifically for resilience): one study (Duchemin 2015)
- Combination of funding sources (e.g. university and national institute, hospital grant and gift, university and charity, hospital funds and EU grant Horizon 2020, NIH and foundations, hospital and university): seven studies (ISRCTN69644721; Lebares 2018; Luthar 2017; Mistretta 2018; NCT02603133; Sood 2014; Wild 2016)
- Funding sources not specified: 15 studies (Bernburg 2019; Chesak 2015; Fei 2019; Ireland 2017; Khoshnazary 2016; Loiselle 2018; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mirzaeirad 2019; Tierney 1997; Varker 2012; Villani 2013) or could not be retrieved from the available information (e.g. conference abstract) (West 2015)
- No funding support: one study (Bernburg 2016)

TAU: Treatment as usual

Footnotes

Appendix 14. Intervention content depending on theoretical foundation

Theoretical foundation (number of studies)	Studies	Characteristics of studies within theoretical foundation	Intervention content
Combined resilience interventions (19)	Berger 2011; Bernburg 2016; Bernburg 2019; Calder Calisi 2017; Fei 2019; Gelkopf 2008; Ireland 2017; Lin 2019; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Mealer 2014; Mistretta 2018; Smith 2019; Tierney 1997; Varker 2012; West 2014; Wild 2016	• 15 combined resilience-training programmes carried out face-to-face (Berger 2011; Bernburg 2016; Bernburg 2019; Calder Calisi 2017; Fei 2019; Gelkopf 2008; Ireland 2017; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017; Tierney 1997; Varker 2012; West 2014; Wild 2016) • Four with combined formats, with intervention facilitated via face-to-face sessions and CDs or USB/MP3 audio files (Mealer 2014; Mistretta 2018), a chat-group on mobile phones (Lin 2019), or via online modules (Smith 2019), respectively	• Studies based on mindfulness and CBT or cognitive therapy (Mealer 2014; Wild 2016): ◦ Both studies included training in (formal and informal) mindfulness practices (e.g. body scan, sitting meditation and other MBSR techniques; partly facilitated by guided CDs). ◦ The cognitive or CBT component in these studies typically involved teaching the ABC (Activating Event, Belief, Consequence) model (i.e. cognitive restructuring) to change the process of thinking and challenging negative thoughts to promote cognitive reappraisal (e.g. Mealer 2014). ◦ In addition, the multimodal resilience-training programme in Mealer 2014 educated the participants about types of psychological distress in intensive care units and self-care topics and included written exposure therapy; CBT-based counselling sessions were event-triggered (e.g. patient's death). ◦ The Mind's resilience intervention in Wild 2016 was based on Mind's model of resilience and five ways to well-being (e.g. be active, connect). Besides teaching CBT- and mindfulness-based coping skills, participants were encouraged to positive activities and to build social capital by joining social networks. Intervention length ranged from six 2.5-hour sessions (Wild 2016) to 12 weeks (Mealer 2014).

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- Studies based on MBSR and MBCT (Ireland 2017; Lin 2019); partly also including ACT (Ireland 2017); or combination of mindfulness and ACT (Mistretta 2018)
  - Session topics across the three studies included, for example, the introduction to mindfulness, attentional training and (everyday) awareness of the body (e.g. mindful breathing) and in sports (e.g. mindfulness yoga), staying present (e.g. at work, in daily life), the importance/reality of thoughts, emotional and thought management by mindfulness (e.g. ABC's of MBSR), and issues related to self-care (e.g. self-compassion, self-kindness, self-criticism).
  - The ACT component in Ireland 2017 and Mistretta 2018 referred to letting go of sensations and emotions, for example.
  - In contrast to traditional MBSR and ACT, the Mindfulness-Based Resilience Training (MBRT) of Mistretta 2018 included shorter meditation practices and a deeper review of the neurobiology of stress and resilience.
- Studies based on ERASE Stress (Berger 2011; Gelkopf 2008)
  - evaluated the ERASE Stress-based group training, with sessions focusing on identifying personal resources, teaching new coping skills or building a social shield, for example.
  - Gelkopf 2008, however, investigated the 'Training the trainer' course based on ERASE Stress, with participants given the opportunity to experience the 12-session ERASE stress programme themselves as well as to explore ways to effectively delivering the programme to children.
- 6 studies based on principles of CBT and solution-focused group work (Bernburg 2016; Bernburg 2019; Mache 2015a; Mache 2015b; Mache 2016; Mache 2017); with some studies (Bernburg 2016; Bernburg 2019; Mache 2016) also including mindfulness (and acceptance training; Bernburg 2019)
  - Although named differently (e.g. Psychosocial competency training, 'Multicomponent Mental Competency and Stress Management Training', psychosocial resilience training), the six interventions included similar components, such as psychosocial skills for physicians (e.g. mindfulness, self-awareness), problem-solving, relaxation techniques, conflict handling, emotion regulation techniques, cognitive strategies and acceptance, communication, dealing with difficult decisions, social support, planning for the future, and organisational hospital culture (e.g. reporting mistakes).
- 6 combined training programmes that could not be clustered further (Calder Calisi 2017; Fei 2019; Smith 2019; Tierney 1997; Varker 2012; West 2014)
  - Smith 2019 examined the multi-modal wellness intervention ARISE (Achieving Resilience in Acute Care Nurses) with a focus on resilience-focused and self-care techniques like yoga and stretching and stress relief using the senses and mindfulness (e.g. online mindfulness sessions via Zoom).

(Continued)

- Tierney 1997 investigated a hardiness class as combination of stress inoculation, rational emotive techniques, assertiveness training and relaxation.
- The training programme by Varker 2012 incorporated aspects of SIT (Cameron 1982) with serial approximation (Foa 1986). Besides educating participants about trauma, the intervention included thought stopping techniques and cognitive reappraisal.
- In the study by Calder Calisi 2017 the theory of human caring also provided the theoretical framework. The eight-week Relaxation Response (RR) tested here was described as complementary therapy supporting holistic self-care. Developed by Benson 2000, it consists of diaphragmatic breathing pattern and a repetitive mental focus to break everyday thoughts.
- The small-group curriculum examined by West 2014 included a combination of mindfulness and stress management techniques (e.g. stress education, meaning in work, personal resources).
- The latter were combined with rational emotional therapy in Fei 2019 (chat group). Besides registering their emotions on a daily basis, core components of the emotional resilience training included recognising and evaluating one's emotions, challenging irrational beliefs, and emotion regulation, for example.

Unspecific resilience interventions (11)	Alexander 2015; Cheung 2014; Hosseinnejad 2018; ISRCTN69644721; Khoshnazary 2016; Luthar 2017; Medisauskaite 2019; Mirzaeirad 2019; NCT02603133, Poulsen 2015; West 2015	• 11 interventions mostly delivered in a face-to-face group setting (Alexander 2015; Cheung 2014; Hosseinnejad 2018; Luthar 2017; Mirzaeirad 2019; Poulsen 2015; West 2015), with the remaining training programmes conducted in combined settings (ISRCTN69644721; Khoshnazary 2016), online with unclear setting (NCT02603133), or with unclear setting and delivery (Medisauskaite 2019) • Treatment duration (unclear for Medisauskaite 2019) ranged from weekly (e.g. 1- or 2-hour sessions of four to eight weeks (Alexander 2015; Hosseinnejad 2018; ISRCTN69644721; Mirzaeirad 2019), 1-day interventions	• In one case, a Psychological First Aid (PFA) intervention was used (Cheung 2014). According to Luthar 2017, the Authentic Connections Group (ACG) was based on the structured Relational Psychotherapy Mothers' Group (RPMG) programme (Luthar 2000b; Luthar 2007). Poulsen 2015 examined a recovery training programme adapted from Hahn 2011, that was tailored for cancer care workers. The IG relevant for this review (IG4) in Medisauskaite 2019 covered different theoretical approaches (e.g. Maslach burnout theory, Maslach 1981; Job Demands-Resources model, Bakker 2007; Kübler Ross stages of grief (Kübler-Ross 1997). • The training programmes focused, for example, on defining resilience and resilience skills, emotion regulation, communication skills training, confidence and self-esteem building, problem-solving and goal setting, strengthening disaster response preparedness (e.g. connection with social supports, coping), self-awareness (e.g. becoming aware of daily activities with positive impact on health and well-being) and self-care tools, emotional intelligence enhancing skills (e.g. happiness, optimism), promoting self-efficacy (e.g. identify positive features of themselves), and social support (e.g. proactive mutual support in the workplace). • One intervention (Alexander 2015) used a supervised yoga instruction (e.g. basic of postural assignment, monitoring the mind with meditations). • Besides many of the above-mentioned aspects (e.g. teaching about psychology of stress and burnout, emotion regulation, work-family balance), Medisauskaite 2019 also included elements about how to deal with a patient's death (IG4).

(Continued)

		(Cheung 2014; Khoshnazary 2016; Poulsen 2015), partly with an additional weekly training (Khoshnazary 2016), and one 10-day training (NCT02603133) to twelve biweekly sessions over six months (Luthar 2017: West 2015). • Some of the interventions were combined with homework assignments (e.g. Alexander 2015); Khoshnazary 2016 combined a workshop with a written training using educational pamphlets.	• The recovery training programme of Poulsen 2015 addressed four recovery experiences (e.g. psychological detachment, mastery) with an additional module on social support by peer monitoring. • Similarly, the resilience intervention combining digital-modules and face-to-face sessions in ISRCTN69644721 concentrated on four topics linked to maintaining resilience according to the authors (e.g. attention training, dealing with difficult emotions). • In the WISER (web-based implementation for the science of enhancing resilience) trial, NCT02603133 investigated an intervention including resilience tools, such as exercises on optimism ('three good things') and gratitude. • In one study (COMPASS groups (COlleagues Meeting to Promote And Sustain Satisfaction; West 2015), self-formed groups discussed about an assigned topic relevant to the physician experience (e.g. resiliency, meaning in work).
Mindfulness-based resilience interventions (5)	Duchemin 2015; Klatt 2015; Lebares 2018; Loiselle 2018; Schroeder 2016	• The five training programmes were largely performed face-to-face (Klatt 2015; Lebares 2018; Loiselle 2018; Schroeder 2016) or included face-to-face elements (Duchemin 2015). One study (Duchemin 2015) combined a face-to-face delivery with a CD (e.g. guided meditation practice). • All studies except one (Schroeder 2016) reported having a homework component (e.g. daily guided meditations). • Three studies included a mindfulness retreat (Klatt 2015; Schroeder 2016) or a 'mindfulness hike' (Lebares 2018). • The intervention length of mindfulness-based programmes varied from eight weekly sessions combined with daily homework (Duchemin 2015); weekly sessions plus a mindfulness re-	• Most training programmes were based on MBSR (Lebares 2018) or used a modified version of MBSR (e.g. MBSR combined with elements of compassion skills training; Duchemin 2015; Klatt 2015; Schroeder 2016). Since it is categorised in the automatic self-transcending category of meditation practices, the Transcendental Meditation (TM) technique tested by Loiselle 2018 was also viewed as mindfulness-based. • The mindfulness-oriented resilience interventions aimed on teaching participants the principles of mindfulness (e.g. mindful awareness) and included the experiential practice of mindfulness meditations in group settings, in part combined with yoga and relaxation through music (e.g. Duchemin 2015; Klatt 2015).

(Continued)

		treat/hike of several hours (Klatt 2015; Lebares 2018), 11 class instructions with daily practice over several months (Loiselle 2018) to a weekend training program with follow-up sessions (Schroeder 2016).	
Attention and interpretation therapy (3)	Chesak 2015; Sood 2011; Sood 2014	• In all studies, the intervention consisted of a single 90-minute session in individual (Sood 2011) or group settings (Chesak 2015; Sood 2014), combined with optional follow-up sessions (Chesak 2015; Sood 2011; Sood 2014) and phone calls (Sood 2014)	• All studies used stress management and resiliency training (SMART); SMART, as abbreviated adaptation of AIT developed at Mayo Clinic, teaches learners to focus their attention on novel aspects of the world and to delay judgements (Sood 2011; Sood 2014) • Based on five higher-order principles (e.g. acceptance), participants are taught to cultivate and guide their interpretations by these principles. • Two studies also conducted brief structured relaxation techniques (Sood 2011; Sood 2014).
Stress inoculation (2)	Stetz 2007; Villani 2013	• SIT component either implemented by virtual reality (VR) scenarios and games (VR-SIT; Stetz 2007) or mobile-based (M-SIT: audio-video clips of oncology patients; Villani 2013) • Both studies with low training intensity	• Besides SIT component, both studies taught coping strategies for stressful situations (e.g. relaxation techniques like controlled breathing; Stetz 2007), partly before being exposed to the SIT part of training (Villani 2013).
Cognitive-behavioural therapy (2)	Cieslak 2016; Clemow 2018	• Two moderate-intensity interventions • While one intervention included weekly face-to-face sessions delivered at the workplace (Clemow 2018), the other was web-based and asked participants to read the content and do exercises within a specific time period (Cieslak 2016). • In Clemow 2018, each session was adjuncted by a video with a facilitator leading participants	• Interventions named as self-efficacy enhancement module (Cieslak 2016) and LifeSkills workshop (also named stress and anger management intervention or workshop on cognitive-behavioural coping skills; Clemow 2018) • Cieslak 2016 focused on strengthening the resilience factor self-efficacy by using CBT techniques (e.g. gain self-efficacy from own past mastery experiences) • Clemow 2018 taught a broad range of cognitive-behavioural skills to deal with anger- and stress-inducing situations (e.g. self-monitoring of thoughts/behaviours, problem-solving, communication skills, building positive relationships)

(Continued)

		through the taught skills.	
Positive psychology (1)	NCT03645798	• High-intensity wechat-based intervention • Combined setting with daily records either being open to others or only to researcher	• 'Three good things' positive psychotherapy asked participants to record three good things for each day in the wechat friends cycle in order to maintain the emphasis on the positive experience and to answer the question 'Why did this good thing happen?'
Coaching approaches (1)	Strijk 2011	• Face-to-face guided group sessions along with aerobic exercising and individual coaching sessions • High-intensity intervention with approximately 77 sessions in total	• Written information about a healthy lifestyle along with the six-month vital@work intervention, including yoga and workout sessions, and three coach visits aimed at changing the healthcare workers' lifestyle behaviour (e.g. goal setting, problem-solving)

ACT: Acceptance and commitment therapy; **CBT:** cognitive-behaviour therapy; **CD:** compact disc; **ERASE stress:** Enhancing resiliency among students experiencing stress; **IG:** intervention group; **MBCT:** Mindfulness-based cognitive therapy; **MBSR:** Mindfulness-based stress reduction; **MP3:** MPEG (moving picture experts group) audio layer-3; **SIT:** stress inoculation training; **USB:** universal serial bus

Footnotes

Appendix 15. Detailed exclusion reasons for excluded studies

We excluded 13 studies that seemed to merit inclusion but on closer inspection did not (see Characteristics of excluded studies).

Most of these studies (nine studies) were excluded as they did not explicitly state the aim of fostering resilience, hardiness or post-traumatic growth through the intervention and/or we received the information from the study authors that resilience was not the primary focus of the study (Chang 2008; Dyrbye 2016; Imamura 2019; NCT03753360; NCT03914898; Rowe 1999; Speckens 2019; Strauss 2018; Watanabe 2019). Chang 2008 only mentioned the concept of resilience in the discussion section, but did not explicitly state the aim of promoting resilience. Speckens 2019, who tested a mindfulness intervention for medical residents of different fields, identified resilience as one issue in qualitative interviews but did also not aim to foster the participants' resilience. For two study protocols (Imamura 2019; Strauss 2018), we received the information from the study authors that resilience was not the primary focus and not measured in these studies. We excluded two studies that mentioned resilience in the trial registration, study protocol or a publication reporting baseline results of an RCT, but not in the final report (Dyrbye 2016; Watanabe 2019). We did not consider the study by Rowe 1999, and the corresponding follow-up reports, since hardiness, although mentioned several times in the reports, was only examined as correlate of burnout (main outcome of the study) and not the primary aim of the intervention. According to the primary investigators of the completed, but unpublished study NCT03914898, the content of the intervention programme did include resilience elements. Nevertheless, as the corresponding report (currently under review but provided to us by the study authors) only mentioned the term resilience when referring to other studies, we decided against including the study in this review. For NCT03753360, we obtained the information from the investigators that fostering resilience was not the primary focus of the intervention, but rather a secondary outcome. Therefore, we excluded this study also due to the ineligible intervention.

Two studies were excluded due to ineligible study design. Lahn 2014 was excluded because the "heartfelt emotion" (p 9) condition, which trained the resilience factor positive emotions and would have been relevant for this review, only served as second control condition and not as the intervention arm in this study. We excluded Maunder 2010 as the study involved a random assignment to three different doses of resilience intervention, but no control group.

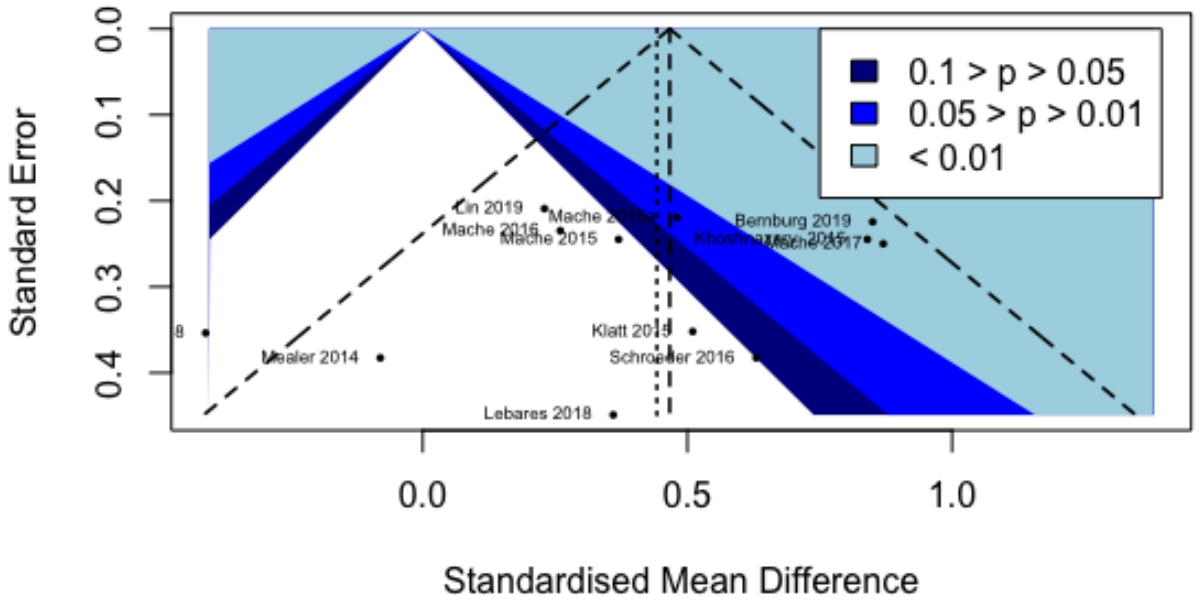
Since they did not examine healthcare professionals, two studies were excluded due to ineligible population. NCT02417051 was conducted in a sample of active disaster responders that participated in relief efforts after Hurricane Sandy but included no healthcare professionals. We excluded Bian 2011 for a similar reason, as it evaluated the effectiveness of a coping training intervention for the Chinese Special Service Military Personnel as civil emergency responders. Although the training was provided partially by soldiers from a medical military team, healthcare professionals were not among the participants.

Appendix 16. Funnel plots

In order to assess reporting bias and to examine potential funnel plot asymmetry (see Assessment of reporting biases), we drew contour-enhanced funnel plots for the comparison between resilience intervention and control for the four primary outcomes at post-test with 10 or more included studies in the meta-analysis (see Effects of interventions).

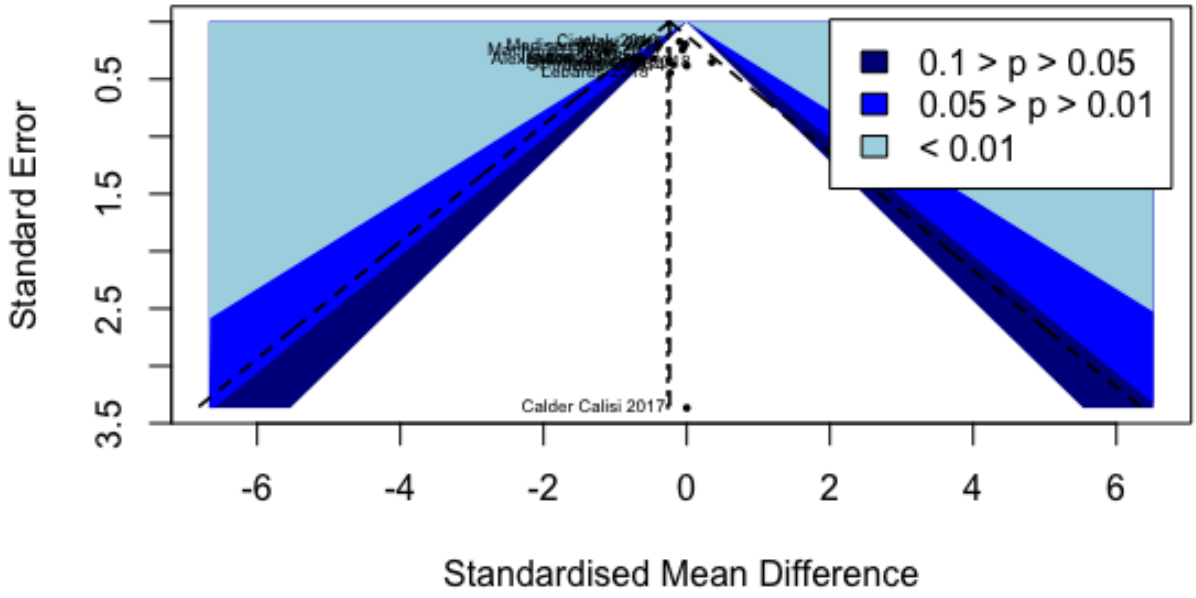
We drew a contour-enhanced funnel plot for resilience at post-intervention (Figure 6), which shows slight visual evidence of asymmetry (see Appendix 18).

Figure 6. Figure A1. Contour-enhanced funnel plot of comparison: comparison 1 Resilience intervention vs control, healthcare professionals, Resilience: post-intervention.



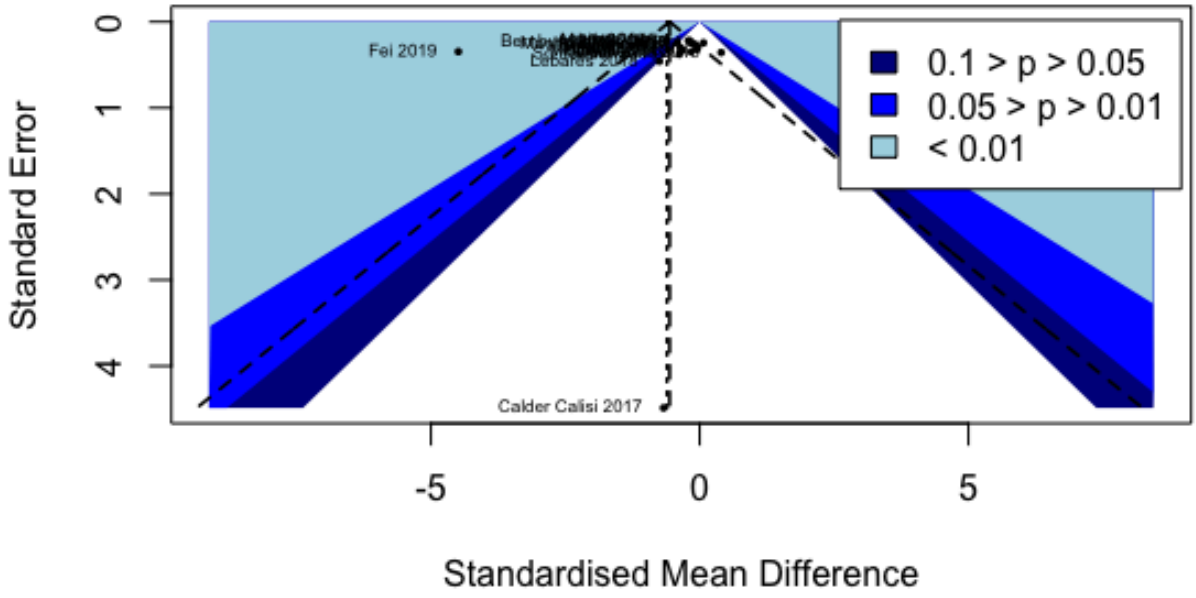
The contour-enhanced funnel plot for depression at post-test (Figure 7) is rather symmetrical in shape and shows no visual evidence of asymmetry (see Appendix 18).

Figure 7. Figure A2. Contour-enhanced funnel plot of comparison: comparison 1 Resilience intervention vs control, healthcare professionals, Depression: post-intervention.



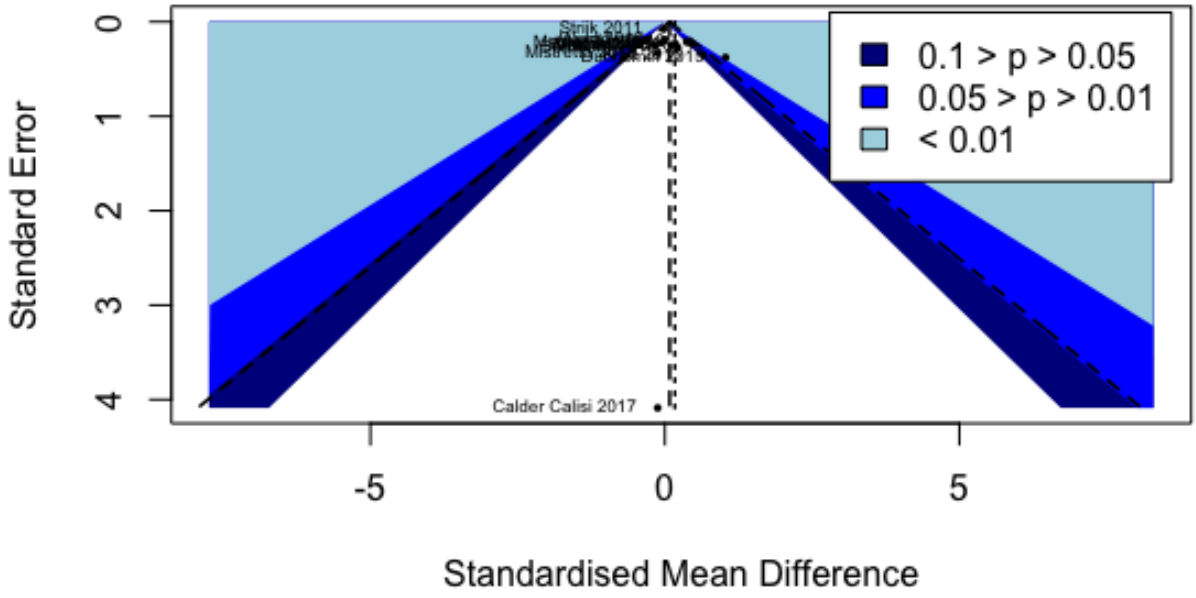
For stress or stress perception at post-intervention, we also drew a contour-enhanced funnel plot (Figure 8), which provides slight visual evidence of asymmetry (see Appendix 18).

Figure 8. Figure A3. Contour-enhanced funnel plot of comparison: comparison 1 Resilience intervention vs control, healthcare professionals, Stress or stress perception: post-intervention.



Finally, the contour-enhanced funnel plot for well-being or quality of life at post-intervention (Figure 9) is rather symmetrical in shape and shows no visual evidence of asymmetry (see Appendix 18).

Figure 9. Figure A4. Contour-enhanced funnel plot of comparison: comparison 1 Resilience intervention vs control, healthcare professionals, Well-being or quality of life: post-intervention.



Appendix 17. Further details on the overall completeness and applicability of evidence

Participants

- *Gender:* Most study participants were female (e.g. proportion of female participants in 32 studies solely conducted in healthcare staff and reporting total numbers for participants' sex: 68.6%).
- *Age:* The included studies mainly considered young professionals (e.g. junior physicians in Bernburg 2016) and middle-aged employees up to approximately 50 years of age (Strijk 2011) (e.g. mean age across 25 studies solely conducted in healthcare workers and reporting age: 37.74 (SD 6.70) years).
- *Healthcare sectors:* Various medical departments were represented (e.g. Psychiatry, Cardiology, Emergency, Surgery, Intensive Care Unit), with no clear majority of a certain healthcare sector.
- *Mental health at baseline:*
  - 15 of the 44 studies provided no data about the mental health status of the sample or only reported to include healthy participants.
  - All studies measuring mental functioning, used self-report (screening) measures covering one or a small number of mental dysfunctions.
  - Comprehensive baseline diagnostics of mental health by the use of a structured interview were not conducted.
  - Five studies only included mentally healthy participants or individuals showing symptoms below a cut-off in a screening measure. Two studies only considered participants without mental stress (not further specified) or without taking mood-modulating drugs.
  - Overall, drawing from those studies assessing mental health, the severity of impairment ranged between (mostly) no mental symptoms (e.g. Strijk 2011; Wild 2016) to moderate and high levels of mental dysfunctions at least in a certain proportion of the sample, for example, compared to normative samples (e.g. Cheung 2014; Mealer 2014; West 2014).
- *Study location:*
  - Most studies were from North America (20 studies), Europe (12 studies), and Asia (including the Near East; 9 studies). Only three studies were from Australia.
  - Thirty-six studies took place in high-income countries: Australia, Canada, Germany, Israel, Italy, Poland, The Netherlands, UK, and USA.
  - Eight studies were conducted in upper-middle-income countries: China, Iran, and Sri Lanka.

Interventions

- The evidence found is restricted to certain types of intervention settings, delivery formats, training intensities and theoretical foundations.
- Thirty of the 44 studies assessed the effectiveness of resilience interventions in group setting, whereas only eight were conducted in combined settings and four in individual settings (unclear setting for two studies).
- The same pattern was seen for the delivery format of interventions with the majority of studies (29/44) investigating face-to-face delivery, followed by multimodal delivery (10/44; e.g. web-based intervention and daily diary). We identified only three studies delivered in an online- or mobile-based format.
- Most of the interventions were of relatively high or moderate intensity (high: 18/44: > 12 hours or sessions; moderate: 15/44) compared to low-intensity trainings (7/44) and studies with unclear training intensity (4/44). Treatment durations ranged considerably from a 40-minute single session to 87 hours or 77 sessions in total.
- Except for ACT and sole problem-solving approaches, all theoretical foundations pre-specified (Helmreich 2017) have been tested in RCTs found in this review. The number of RCTs varies with most studies investigating combined theoretical foundations (e.g. CBT and mindfulness).

Outcomes

- Different measures for resilience in the review (see Table 2), ranging from resilience scales measuring resilience as trait (e.g. RS-14), as summary of resilience factors (e.g. CD-RISC) or as outcome (e.g. BRS).

Footnotes

ACT: acceptance and commitment therapy; BRS: Brief Resilience Scale; CBT: cognitive behavioural therapy; CD-RISC: Connor-Davidson Resilience Scale; RCTs: randomised controlled trials; RS-14: Resilience Scale, 14 items; SD: standard deviation

Appendix 18. Assessment of publication bias for the primary outcomes (except anxiety)

Outcome, time point (number of included studies)	Assessment of publication bias
Resilience, post-test (12 studies)	• We drew a funnel plot (see Effects of interventions and Appendix 16), which shows slight visual evidence of asymmetry; however, studies appear to be missing in areas of high statistical significance (P < 0.01) and therefore publication bias can be assumed as unlikely according to *Cochrane Handbook* (Page 2019) • No statistical evidence of asymmetry (see also Effects of interventions; Egger's test: t = −1.04, df = 10, P = 0.32) • Results of grey literature (Loiselle 2018; no evidence of effect of negative direction) do not differ from other published studies (e.g. Klatt 2015, Lebares 2018; Mealer 2014), which also found no evidence of effect; in addition, Loiselle 2018 is a very small study (33 participants) • Difficult to assess small-study effects due to lack of larger studies; however, overestimation of effects in smaller studies unlikely as the meta-analysis also included studies that had small sample sizes with non-significant results (e.g. Klatt 2015; Schroeder 2016) • No relevant conflicts of interest for included studies during the study period

Resilience, short-term follow-up (11 studies)	• We drew a funnel plot (see Effects of interventions), which provides visual evidence of asymmetry.
	• Statistical evidence of asymmetry (see also Effects of interventions; Egger's test: t = 4.01, df = 9, P = 0.003)
	• Unlikely that asymmetry is due to publication bias for several reasons:
	  ○ 'negative' studies (i.e. statistically non-significant studies) also published;
	  ○ studies appear to be missing in areas of high statistical significance (P < 0.01); and
	  ○ results of one unpublished study (Cheung 2014), although showing a (non-significant) tendency for decrease of resilience, does not differ from other published studies (e.g. Sood 2014)
	• Visual asymmetry in funnel plot could not be explained by other forms of selection bias (language bias, location or database bias, multiple publication bias, provision of data bias, citation bias, outcome reporting bias for resilience); non-significant results in an unpublished study could indicate potential time lag bias (Cheung 2014)

(Continued)

	• Meta-analysis is based on large number of small studies (10/11 studies)[a]; for one small study (Chesak 2015), potential conflict of interest indicated in the report; for two small studies (Sood 2011; Sood 2014), conflict of interest likely due to contribution of the same authors as in Chesak 2015; however, insufficient evidence of publication bias, as these studies represent minority of studies and Sood 2014 also reports non-significant results • Difficult to assess small-study effects due to lack of larger studies; however, overestimation of effects in smaller studies seems unlikely as the meta-analysis included studies that had small sample sizes, with significant (e.g. Bernburg 2019; Chesak 2015), as well as non-significant results (e.g. Mache 2016; Sood 2014); effect size did not differ according to study size due to true heterogeneity (Page 2019), as there were no consistent clinical (e.g. population, setting or delivery format of resilience training) or methodological differences between studies of different size and since evidence was based largely on small studies • Alternative explanations of funnel plot asymmetry could refer to artefacts due to use of SMDs or chance (Page 2019)
Depression, post-test (14 studies)	• We drew a funnel plot (see Effects of interventions and Appendix 16), which is rather symmetric in shape and shows no visual evidence of asymmetry. • No statistical evidence of asymmetry (see also Effects of interventions; Egger's test: t = −0.10, df = 12, P = 0.93) • Loiselle 2018 (grey literature) provides a different direction of effect (non-significant tendency to depression increase) than the majority of published studies (decrease of depression) and West 2015 (also grey literature); however, it is a small study (33 participants) and does not differ from published studies in terms of evidence of effect • Difficult to assess small-study effects due to lack of larger studies; however, overestimation of effects in smaller studies seems unlikely as the meta-analysis included studies that had small sample sizes, with significant (e.g. Alexander 2015; Ireland 2017; Mache 2017), as well as non-significant results (e.g. Mealer 2014; Schroeder 2016; West 2014) • No relevant conflicts of interest for included studies during the study period
Stress or stress perception, post-test (17 studies)	• We drew a funnel plot (see Effects of interventions and Appendix 16), which provides slight visual evidence of asymmetry; however, studies appear to be missing in areas of high statistical significance (P < 0.01) and therefore publication bias can be assumed as unlikely according to *Cochrane Handbook* (Page 2019) • No statistical evidence of asymmetry (see also Effects of interventions; Egger's test: t = −0.34, df = 15, P = 0.74) • Results of grey literature (Loiselle 2018; no evidence of effect of negative direction) do not differ from other published studies (e.g. Bernburg 2016; Calder Calisi 2017) • Difficult to assess small-study effects due to lack of larger studies; however, overestimation of effects in smaller studies seems unlikely as the meta-analysis included studies that had small sample sizes, with significant (e.g. Bernburg 2019; Lin 2019; Mache 2017), as well as non-significant results (e.g. Duchemin 2015; Ireland 2017; Schroeder 2016) • No relevant conflicts of interest for included studies during the study period
Stress or stress perception, short-term follow-up (14 studies)	• We drew a funnel plot (see Effects of interventions, which shows slight visual evidence of asymmetry; however, studies appear to be missing in areas of high statistical significance (P < 0.01) and therefore publication bias can be assumed as unlikely according to *Cochrane Handbook* (Page 2019) • No statistical evidence of asymmetry (see also Effects of interventions; Egger's test: t = −1.32, df = 12, P = 0.21) • No grey literature that could have differed from published studies • Available evidence comes entirely from small studies with conflict of interest being likely for three studies (Chesak 2015; Sood 2011; Sood 2014); although this pattern of results can suggest publication bias (Guyatt 2011e), it has to be considered that only a minority of 14 studies included were concerned by conflicts of interest, and one study also reported non-significant findings (Sood 2014) • Difficult to assess small-study effects due to lack of larger studies; however, overestimation of effects in smaller studies seems unlikely as the meta-analysis included studies that had small sam-

(Continued)

	ple sizes, with highly significant (e.g. Mache 2017; Schroeder 2016), as well as non-significant results (e.g. Mache 2015a; Mistretta 2018) • Alternative explanations of funnel plot asymmetry could refer to artefacts due to use of SMDs or chance (Page 2019)

Well-being or quality of life, post-test (13 studies)	• We drew a funnel plot (see Effects of interventions and Appendix 16), which is rather symmetric in shape and shows no visual evidence of asymmetry.
	• No statistical evidence of asymmetry (see also Effects of interventions; Egger's test: t = 1.91, df = 11, P = 0.08)
	• Results of grey literature (West 2015; no evidence of effect) do not differ from majority of published studies in this meta-analysis (e.g. Bernburg 2016; Klatt 2015)
	• Small study effects:
	  ◦ only one small study reported significant results in favour of resilience training (Duchemin 2015), whereas other studies with small sample sizes found no significant effects; however Strijk 2011, as the only large study in this analysis with 730 participants, reported non-significant result in the opposite direction (i.e. reduction of well-being or quality of life); this difference could indicate a potential small-study effect; and
	  ◦ due to lack of larger studies, spurious inflation in smaller studies (e.g. due to poor methodological quality, more accurate implementation of resilience training, more restrictive and receptive study sample) could not be determined with certainty
	• No relevant conflicts of interest for included studies during the study period

Well-being or quality of life, short-term follow-up (12 studies)	• We drew a funnel plot (see Effects of interventions) which shows visual evidence of asymmetry.
	• Statistical evidence of asymmetry (see also Effects of interventions; Egger's test: t = 2.43, df = 10, P = 0.04)
	• Unlikely that asymmetry is due to publication bias for several reasons:
	  ◦ 'negative' studies (i.e. statistically non-significant studies) also published;
	  ◦ studies appear to be missing in areas of high statistical significance (P < 0.01); and
	  ◦ results of one unpublished study (Cheung 2014), although showing a (non-significant) tendency for decrease of well-being or quality of life, do not differ from other published studies (e.g. Bernburg 2016)
	• Visual asymmetry in funnel plot could not be explained by other forms of selection bias (language bias, location or database bias, multiple publication bias, provision of data bias, citation bias); non-significant results in unpublished study could indicate potential time lag bias (Cheung 2014); one non-English study in the analysis published in local paper with English abstract (Hosseinnejad 2018); no outcome reporting bias for well-being or quality of life except for three studies where the authors did not report a pre-specified time point or reported outcomes that had not been pre-specified in trial registration (Hosseinnejad 2018; Mistretta 2018; West 2014); non-significant results in unpublished study could indicate potential time lag bias (Cheung 2014)
	• Meta-analysis is based on large number of small studies (11/12 studies)[a]; potential conflicts of interest for two studies (Sood 2011; Sood 2014); however, no sufficient evidence of publication bias as these studies represent minority of studies and both report non-significant results
	• Small study effects:
	  ◦ only Hosseinnejad 2018 found significant increase of well-being, which differed from non-significant result of the only one larger study included (Cheung 2014);
	  ◦ insufficient evidence of small-study effect since other studies with small sample sizes (e.g. Mache 2016; Sood 2014) also reported no significant effect; and
	  ◦ effect size did not differ according to study size due to true heterogeneity (Page 2019), as there were no consistent clinical (e.g. population, setting or delivery format of resilience training) or methodological differences between studies of different size, and since evidence was largely based on small studies
	• Alternative explanations of funnel plot asymmetry could refer to artefacts due to use of SMDs or chance (Page 2019)

df: Degrees of freedom; **P:** P value of Egger's test; **SMD:** standardised mean difference; **t:** T value of Egger's test.

Footnotes

[a]According to the GRADE approach (Guyatt 2011e), publication bias should be suspected when available evidence comes from a number of small studies, most of which have been commercially funded or when conflicts of interest are assumed.

Appendix 19. Prevention of potential biases by the search methods of this review

We performed extensive searches of relevant databases, checked reference lists, and considered grey literature. The search process was designed in conjunction with, and supervised by, the Cochrane Developmental, Psychosocial and Learning Problems (CDPLP) Information Specialist, in order to minimise bias in the acquisition of potentially relevant references. We contacted the authors of (included) studies to ask for, for example, full texts or additional data where reported data were insufficient or missing. In all phases of the review process, we repeatedly (at least twice) tried to contact the study authors by email, when needed.

Regarding data analysis, correspondence with the authors was required for 32 included studies. For 19 studies, the replies we received allowed us to include these studies in quantitative analysis (e.g. West 2014).

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CONTRIBUTIONS OF AUTHORS

Angela Kunzler: protocol writing, study selection, data extraction and assimilation, 'Risk of bias' assessment, GRADE assessment, statistical analysis and review writing. Angela Kunzler has overall responsibility for the review and is the guarantor for the review.
Isabella Helmreich: protocol writing, study selection, data extraction, 'Risk of bias' assessment, GRADE assessment, review writing.
Andrea Chmitorz: protocol writing, review writing, arbiter.
Jochem König: protocol writing, expert statistical support, statistical analysis and review writing.
Harald Binder: protocol writing, expert statistical support, statistical analysis and review writing.
Michèle Wessa: protocol writing and review writing.
Klaus Lieb: overall supervision of the review, protocol writing, review writing, arbiter.

All review authors agreed on this version before publication.

DECLARATIONS OF INTEREST

Angela Kunzler – none known.
Isabella Helmreich is a board-certified cognitive-behaviour therapist.
Andrea Chmitorz is a board-certified cognitive-behaviour therapist.
Jochem König – none known.
Harald Binder – none known.
Michèle Wessa is a board-certified cognitive-behaviour therapist.
Klaus Lieb is a board-certified cognitive-behaviour therapist with a special interest in schema therapy. Klaus Lieb is an Editor with Cochrane Developmental, Psychosocial and Learning Problems. Klaus Lieb received funding for this review from the Ministry of Science (MWWK) of the State Rhineland-Palatinate, Germany.

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- Institute of Medical Biostatistics, Epidemiology and Informatics (IMBEI), University Medical Center of the Johannes Gutenberg University Mainz, Germany

  Home institution of JK; support provided in the form of salary and resources.
- Institute of Medical Biometry and Statistics, Faculty of Medicine and Medical Center - University of Freiburg, Freiburg, Germany

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  Support provided in the form of resources.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

All modifications to the methods specified in the protocol (Helmreich 2017) are described in the following section.

1. Title
   a. We changed the title of the review due to the post hoc restriction to healthcare professionals (see Types of participants).
2. Background
   a. Due to the post hoc restriction to healthcare professionals, we adapted the Background sections (Description of the condition; Description of the intervention; How the intervention might work; Why it is important to do this review) for this target group, e.g. by adding current references about previous systematic reviews in this population.
   b. Description of the intervention
      i. We modified the first sentence of this section to illustrate that we refer to resilience intervention research in general.
      ii. To be consistent, we limited the number of references for each psychotherapeutic method to one reference.
   c. How the intervention might work
      i. We changed the order of appearance of the different psychotherapeutic approaches, to present theoretical approaches that are associated with cognitive-behavioural therapy (CBT), such as stress inoculation and problem-solving therapy, immediately after CBT, before discussing other theoretical approaches.
      ii. Instead of performing a subgroup analysis on the target group of training, we had planned to conduct a subgroup analysis of the training intensity, and added arguments for whether participants could benefit differently from differing training intensities.
      iii. To derive the planned subgroup analysis for the theoretical foundation, we modified the section by describing the recent results of Joyce 2018, who analysed the impact of theoretical foundations of resilience intervention for the first time. At the time of writing the protocol, this systematic review had not been published.
   d. Why it is important to do this review
      i. Compared to the protocol, we presented the need for doing this review by integrating the results of recently-published systematic reviews in clinical and non-clinical adult populations (e.g. Joyce 2018).
3. Objectives
   a. We modified the objectives of the review to refer only to healthcare professionals, reflecting the post hoc restriction to this population.
4. Types of participants
   a. **Post hoc change - step 1:** Initially, we planned to include clinical and non-clinical populations (e.g. patients, employees, students, military) in this review (see Helmreich 2017). Based on a broad search strategy in October 2016, we identified 251 studies and 18 ongoing studies evaluating resilience-training programmes in a variety of target groups. To be able to manage the large number of studies with many divergent target groups, we decided to **de-scope the review** based on the populations investigated. This also allowed us to perform top-up searches (i.e. for the period October 2016 to the present) that were specific for the respective target groups. We made the decision to de-scope the review for **two main reasons**. First, using the database of 269 studies found by searches in October 2016, the review that we had originally planned might have been trumped by the publication of studies since this time point. Studies published since 2016, for example, using innovative delivery formats or different therapeutic methods than earlier studies might possibly have affected the results of subgroup analysis of the review (e.g. concerning delivery format). In addition, we expected a substantial number of new studies fulfilling the eligibility criteria of the review for the period end 2016 to 2019. Especially since 2015, there has been a significant growth in publications in this field. For example, by searching additional sources (e.g. reference lists, trial registers) or study protocols published until October 2016, we identified 26 RCTs published between 2017 and 2018. We also found 16 completed studies that had not yet been published (e.g. manuscripts in preparation or under review). Second, the RCTs identified were spread across a large number of comparisons (e.g. different target groups, theoretical foundations of interventions or control groups), which might have over-scoped the review and resulted in substantial heterogeneity if we had included all 269 studies. Based on the number of studies identified for the healthcare sector (including healthcare professionals like physicians, healthcare students like medical students and employees associated with the healthcare sector such as human service professionals) in October 2016, we therefore decided to focus on RCTs in these populations. In June 2019, we performed top-up searches focusing broadly on the healthcare sector, in order to guarantee a review of high credibility, which synthesises the latest evidence on the efficacy of psychological resilience interventions in this group at the time of publication.
   b. **Post hoc change - step 2:** Based on the top-up searches in June 2019, we identified 31 studies and eight ongoing studies that had been performed in healthcare professionals, healthcare students, and employees associated with the healthcare sector. Combining these with the original search, we found a total of 80 RCTs and nine ongoing studies in this population. During the process of writing up this review, and the editorial process, we made further decisions about the eligibility criteria of this review for the 'Types of participants'. We **further separated** the pool of 80 RCTs into two groups: **1) healthcare professionals** (i.e. with completed training) and **2) healthcare students**. On the evidence base from the two searches, this review refers to healthcare professionals.

In addition, we also considered studies with mixed samples, where healthcare professionals were included as a subgroup (total: 44 RCTs and five ongoing studies). A second review (Kunzer unpublished) refers to psychological interventions to foster resilience in healthcare students (total: 30 RCTs and three ongoing studies). We took this decision for the following empirical reasons. First, when summarising the 80 RCTs in a first review draft, we identified a substantial amount of heterogeneity for these studies that could only be partially explained by the planned subgroup analyses (see Table 1). Similarly, during internal peer review, the question arose about whether the research question of such a review (i.e. including healthcare professionals, students, and different employees associated with the healthcare sector) was too broad and the studies too heterogeneous to combine in the same review. We therefore decided to split the review into two publications, one for healthcare professionals and one for healthcare students, in order to create two focused reviews that are based on sufficiently homogeneous studies, are up-to-date, and provide a concise summary of the evidence for the reviews' readers. A second rationale behind the decision to further split the data is the stressor exposure in the two groups of healthcare professionals and healthcare students: Students and qualified staff have different stressor exposures and responsibilities, which might moderate the effect of resilience training. While healthcare professionals are exposed to stressors such as shift work, medical decision-making or hierarchies, students are confronted with different kind of stressors (e.g. exams, challenging subjects). Thus, a split between these two groups seemed reasonable. Based on both searches, we had identified six studies in employees widely associated with the healthcare sector, whose samples were too heterogeneous (e.g. human service professionals, nurse managers) to combine them with healthcare professionals (e.g. physicians, nurses), that are mostly employed in clinical practice and patient care. In addition, it is questionable whether these employees can be viewed as front-line healthcare staff and should be included in a review of this target group. We therefore decided to omit this group of studies.

c. Based on these two post hoc changes, which we had discussed with the CDPLP editorial team, we adapted the Types of participants section accordingly, to specify that this review covered healthcare professionals (i.e. healthcare staff delivering direct medical care such as physicians, nurses, hospital personnel) and allied healthcare staff working in allied health professions distinct from medical care (e.g. psychologists, social workers, counsellors, physical therapists, occupational therapists, speech therapists, medical assistants, medical technicians). Since we also identified several eligible studies in mixed samples, we stated that we would include these mixed samples in the review and also included them in meta-analyses, provided we could obtain the data from the study authors for healthcare professionals as a discrete group.

5. Types of interventions
   a. We stated in the protocol that we planned to include broader, health-promoting interventions (e.g. well-being therapy), but in the full review we included only studies that explicitly defined the aim of fostering resilience, hardiness or post-traumatic growth by using one or more of these terms in the publications. We made this modification on the basis of a post-protocol amendment in consultation with the CDPLP editorial team and the Cochrane Editorial and Methods Department. During the initial process of literature extraction, we realised that it was not feasible to consider all health-promoting interventions that aim to foster resilience in a broader sense (e.g. mental health, well-being, psychological adaptation in a population with stressor exposure) without including the terms resilience, hardiness or post-traumatic growth, for the following reasons. First, it appeared very difficult to decide between which of the very large number of interventions should be included in the review and which should not, since the relationship of the interventions to the concept of resilience was not made explicit in those interventions. This would have left the review authors having to make many assumptions with no objective criteria, resulting in reduced traceability of selection criteria and potentially low inter-rater reliability at the end of screening. Second, since the objective of the review was to synthesise the current evidence on the efficacy of resilience training, including broader interventions could have biased the review's conclusions, as fostering resilience was not explicitly formulated as an aim in any of those interventions.
6. Types of outcome measures
   a. Based on a suggestion during internal peer review, we added adverse events as a primary outcome of this review, and marked it with an asterisk for inclusion in the 'Summary of findings' table.
7. Electronic searches
   a. We planned to perform searches in October 2016 for a review of psychological resilience interventions in clinical and non-clinical populations. However, due to post hoc modification of the inclusion criteria, the search processes for the review were based on a two-step approach, with searches performed in October 2016 and top-up searches in June 2019.
   b. We expanded the description of the search process by adding details about using the Cochrane Highly Sensitive Search Strategy for MEDLINE and Embase, as specified in the *Cochrane Handbook* (Lefebvre 2019), in order to present the search strategy in sufficient detail.
   c. We searched the Web of Science Core Collection databases simultaneously rather than individually (Science Citation Index; Social Science Citation Index; Conference Proceedings Citation Index - Social Science & Humanities; Conference Proceedings Citation Index - Science), since our institutional access to this database only offered this possibility.
8. Selection of studies
   a. We judged the feasibility of selection criteria after 500 instead of 50 studies screened due to the large number of records yield by the searches for this review.
9. Assessment of risk of bias in included studies
   a. We reported that we considered the achieved baseline comparability between study conditions as part of selection bias (random-sequence generation) in addition to the standard 'Risk of bias' domains in the *Cochrane Handbook* (Higgins 2011b). We had extracted this additional information from the included studies and judged it to be interesting for the readers of this review.

10. Measures of treatment effect
    a. Continuous data: In the protocol we said we would calculate standardised mean difference (SMD) effect sizes because resilience-training studies are likely to use different measures for resilience and related constructs. We therefore added a sentence about the variation in measurement scales between included studies and referred to Table 2 and Table 3 on the outcome scales used. We added the information on how we interpreted the magnitude of effect sizes (SMDs) for continuous outcomes in the review.
11. Unit of analysis issues
    a. Repeated observations on participants: we explained when we judged post-test in intervention studies as post-intervention assessment and considered them in the respective meta-analyses. Assessments at more than one week after the end of training were declared as post-test by some study authors, although interim events between the end of the intervention and the assessment might have affected the effects measured. We wished to differentiate between such assessments and 'real' post-tests with greater proximity to the end of training (i.e. within one week after the intervention ended).
12. Dealing with missing data
    a. We supplemented the procedure of dealing with missing data in the review by explaining how we would handle missing data in studies of mixed samples. We added this information as we also considered studies with mixed samples in the review (see point 4 above).
    b. We added a sentence explaining how we managed missing/incomplete summary outcome data, as well as missing outcome data due to attrition.
13. Assessment of heterogeneity
    a. We added a sentence explaining that we discuss the similarities and differences between the included studies (e.g. in terms of study characteristics) in the Results and Discussion section of the review.
    b. We further described the conventions used to interpret I^2 values on the basis of suggestions in the *Cochrane Handbook* (Deeks 2019), and added information about conducting subgroup analyses to investigate substantial heterogeneity ($I^2 \geq 50\%$), in order to be transparent.
    c. We added a sentence explaining that we calculated the 95% prediction intervals from random-effects meta-analyses to present the extent of between-study variation according to the *Cochrane Handbook* (Deeks 2019).
14. Assessment of reporting biases
    a. We had stated in the protocol that we would assess potential publication bias by drawing and inspecting funnel plots. In the review, we expanded the description of this process by adding the information about analysing reporting bias on the basis of at least 10 studies in the meta-analysis for one outcome.
    b. We inspected contour-enhanced funnel plots for the primary outcomes, as they offer more graphical possibilities to detect a potential publication bias than standard funnel plots.
15. Data synthesis
    a. For several studies in the review that provided no means and SDs, but provided alternative data to calculate SMDs and the respective standard error, we described the procedure for combining these with other studies using the generic invariance method in RevMan. This information had been missing from the protocol (Helmreich 2017).
    b. We expanded the description of how we managed scales for depression and burnout, as well as scales for general well-being or quality of life and work-related measures in the same study, because several included studies fitted this case.
    c. We did not conduct a network meta-analysis, as planned, due to the insufficient evidence base in the review.
16. Summary of findings
    a. We added information about the inclusion of the primary outcomes at post-test in the ‘Summary of findings’ table. We took the decision to restrict the outcomes to those assessed at post-test following internal peer review. Adverse events are also included here (see Types of outcome measures and point 6 in this section).
    b. We replaced the term 'quality of the evidence' with 'certainty of the evidence' throughout the review, in order to be consistent with current guidelines and preferences in the literature (Hultcrantz 2017).
    c. We provided further details about the downgrading of studies for each of the five GRADE criteria (study limitations, indirectness, inconsistency, imprecision, publication bias).
    d. We also explained how we interpreted effect sizes and rated the certainty of the evidence, as this information had been missing from the protocol (Helmreich 2017).
17. Subgroup analysis and investigation of heterogeneity
    a. We omitted the preplanned sensitivity analysis on 'target group in resilience interventions', due to the review's revised focus on healthcare professionals only.
    b. We added a post hoc analysis for training intensity; low-intensity training included interventions with a total duration of five hours or less or three sessions or fewer (if no duration in hours or minutes was indicated); moderate intensity referred to training that included

more than five hours to 12 hours or less, or more than three to 12 sessions or fewer; and high intensity to programmes of more than 12 hours or more than 12 sessions. We added this subgroup analysis post hoc due to the restriction to healthcare students (see point 2c).

c. We added a subgroup for mobile-based delivery format to the preplanned analysis on delivery format, given the evidence found in this review.

d. We changed ‘multimodal intervention’ to ‘combined intervention’ to the preplanned analysis on theoretical foundation, to refer to resilience interventions that were based on two or more explicit theoretical foundations such as CBT and ACT or CBT and mindfulness. We also added coaching, positive psychology and unspecific resilience training. Non-specific training programmes included resilience interventions fostering one or several resilience factors but without specifying any explicit theoretical foundation, or where the underlying framework could not be assigned to a certain theoretical foundation. We changed from 'multimodal' to 'combined intervention' in order to be consistent with other subgroup analyses (compare combined setting, combined delivery). We added the extra subgroups based on the evidence found in this review.

e. Lastly, we added active and attention control to the preplanned analysis on comparator groups, in order to distinguish between these groups. Attention-control groups referred to an alternative treatment that mimicked the amount of time and attention received (e.g. by the trainer) in the intervention group. We used the term ‘active control’ for alternative treatment (no standard care; for example, treatment developed specifically for the treatment study) but that did not control for the amount of time and attention in the intervention group, and was not attention control in a narrow sense. We made these changes due to the evidence found in this review.

f. We added information about which subgroup analyses were prespecified and which were added post hoc.

18. Sensitivity analysis

a. We provided more detail on the planned sensitivity analyses based on risk of bias (i.e. restriction to studies at low and unclear risk of attrition as well as at low and unclear risk of reporting bias, respectively), as this information had been missing from the protocol (Helmreich 2017). We chose attrition and reporting bias as key domains for the sensitivity analyses, since most of the variability between included studies was evident in these domains.

INDEX TERMS

Medical Subject Headings (MeSH)

Allied Health Personnel [psychology]; Cognitive Behavioral Therapy; Health Personnel [*psychology]; Mindfulness [education]; Occupational Diseases [psychology] [*therapy]; Randomized Controlled Trials as Topic; *Resilience, Psychological; Stress, Psychological [psychology] [*therapy]

MeSH check words

Adult; Female; Humans; Male; Middle Aged