



BMJ Open Effect of stress management based on cognitive-behavioural therapy on nurses as a universal prevention in the workplace: a systematic review and meta-analysis protocol

Kazuto Kuribayashi ¹, Ayumi Takano,¹ Akiko Inagaki,² Kotaro Imamura ³, Norito Kawakami³

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For numbered affiliations see end of article.

Correspondence to

Kazuto Kuribayashi;
kkuribayashi-jans@umin.ac.jp

ABSTRACT

Introduction The mental health status of nurses affects not only their well-being but also the organisational outcomes and the quality of patient care. Hence, stress management strategies are critical as a universal prevention measure that address an entire population and are not directed at a specific risk group to maintain nurses' mental health in the workplace. No systematic review or meta-analysis has been conducted to evaluate the effect of cognitive-behavioural therapy (CBT) that specifically focuses on universal prevention. Therefore, the aim of this study is to examine the effectiveness that is reported in published randomised controlled trial (RCT) studies.

Methods and analysis This systematic review and meta-analysis will analyse published studies selected from electronic databases (ie, Cochrane Central Register of Controlled Trials, PubMed, Cumulative Index to Nursing and Allied Health Literature, PsycINFO, PsycARTICLES, Web of Science and the Japan Medical Abstracts Society). The inclusion criteria for studies are that they (1) were conducted to assess the effect of CBT on the mental health of nurses as a universal prevention, (2) used an RCT design and (3) provided sufficient results (sample sizes, means and SD) to estimate the pooled effect sizes with 95% CIs. Studies will be excluded if they only targeted nurses who had been screened as being at high risk in terms of their mental health and indicated that they required the prevention. The methodological quality of the included studies will be assessed using the Cochrane Collaboration's risk of bias tool.

Ethics and dissemination Ethical approval is not required because this study is based on information obtained from previous studies. The results and findings of this study will be submitted for publication in a peer-reviewed international scientific journal. Results from this study will be helpful when implementing CBT strategies for nurses as a universal preventative measure in the workplace and for managing stress-related outcomes.
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INTRODUCTION

Studies of stress in nursing workplaces have reported that nurses have a high prevalence

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This systematic review and meta-analysis will offer the strongest evidence about the effectiveness of cognitive-behavioural therapy (CBT)-based interventions on the mental health of nurses that can be applied as a universal prevention in the workplace.
- ⇒ This study will not include randomised controlled trial studies that targeted only nurses who were screened as being high risk in terms of their mental health.
- ⇒ The findings from the study will be useful for conducting CBT-based stress management interventions for nurses in the workplace as a universal prevention and managing stress-related outcomes.
- ⇒ This study is limited because the findings cannot be generalised to countries or groups that are not included in the selected studies.

of probable occupational stress.^{1 2} The main causes of the work-related stress among nurses are heavy workloads, interpersonal conflicts, the emotional impacts of care, lack of reward or control and shift work.³ Occupational stress is known to be a major risk factor for burnout, anxiety and depression.³ These mental health problems can lead to the worsening of the nurses' somatic symptoms or disorder,⁴ insomnia,⁵ the degradation of their quality of life⁶ and their work engagement,^{7 8} and it can have adverse effects in the workplace (eg, an increase in absenteeism⁹ and the intention to leave employment¹⁰) and lead to a deterioration in the quality of care that the nurses provide.² As in nursing workplaces, there are seldom Employee Assistance Programmes that provide any formal stress management initiatives for employees to improve their mental health by learning coping mechanisms, due to lack of manpower, resources and managers' awareness,¹¹ nurses

can be vulnerable to depression due to the lack of stress management skills.¹² According to two surveys in the USA, the prevalence of depression in nurses varies from 18% to 35%, which is higher than in the general population.^{4 13} Maintaining and improving nurses' mental health as a primary prevention (to prevent diseases before it occurs) is necessary not only for their well-being but also for improving their productivity, reducing workplace costs and guaranteeing the quality of care for the patients.¹⁴ Therefore, stress management for nurses is needed in nursing workplaces.

Cognitive-behavioural therapy (CBT) is one of the major stress management techniques for workers and it has been shown to have positive effects as a primary prevention. According to a meta-review¹⁵ and several meta-analyses,^{16 17} it has been proved that CBT, as a stress management technique, significantly improves occupational stress, anxiety and depression for workers in the workplace. These meta-analyses concluded that CBT was more effective than other interventions.^{16 17} In addition, in studies targeting nurses, a Cochrane review showed that CBT stress management interventions had significant positive effects on stress-related outcomes, including occupational stress and depressive symptoms, among nurses (standardised mean difference (SMD)=-0.34 at the 6-month follow-up).¹² Thus, evidence about CBT-based stress management for nurses has accumulated.

Primary prevention strategies for mental health problems can be classified into three categories: (1) universal prevention, which targets the general population and is not directed at a specific risk group, (2) selective prevention, which targets individuals considered to be at potential risk for mental illness as based on the presence of an identified risk factor such as parental mental illness and (3) indicated prevention which targets individuals who are screened for already having early signs or subthreshold symptoms of mental illness.¹⁸⁻²¹ There are theoretical and practical reasons why universal prevention can be more appropriate for the workplace.²² As universal prevention can reach more individuals, including selected and indicated groups without the need for screening which is a costly process to implement,^{18 22 23} and can reach individuals who disclose symptoms for fear of its perceived negative effects on work, the universal prevention of the nurses' mental health problems is a high-priority strategy for mental health management in nursing workplaces. Therefore, systematic reviews and meta-analyses are necessary to obtain a comprehensive understanding and conduct evidence-based interventions regarding the effect of CBT on nurses' mental health as a universal prevention in the workplace.

However, there has been no systematic review and/or meta-analysis that has specialised in the universal prevention effect of CBT on nurses' mental health. The above-mentioned Cochrane review of stress management for nurses included studies of indicated prevention, which targeted only nurses at high risk who were sorted using a screening scale of mental health.¹² Other

systematic reviews, as well, included studies that were not randomised or only for nurses who were screened as high-risk for their mental health.^{1 24-26} Therefore, the effect of CBT-based stress management interventions for universal prevention among nurses has not been clearly identified in a systematic review and/or a meta-analysis. Further, various provisional methods and formats have been developed for CBT in recent years as well as conventional face-to-face implementations of CBT. For example, internet-based CBT (iCBT), in which CBT is provided through an Internet-based platform is attracting attention, and studies that evaluate its effectiveness and social implementations are underway. However, the Cochrane review regarding nurse stress management¹² included studies up to 2013 and did not include new methods of implementation such as iCBT.

Therefore, the aim of this systematic review and meta-analysis is to evaluate the overall effectiveness of CBT-based interventions for stress management among nurses, including the recent studies, as a universal prevention in the workplace. We hypothesise that the CBT-based interventions will be effective for improving nurses' mental health as a universal prevention.

METHODS AND ANALYSIS

Study design

This study protocol for a systematic review and meta-analysis of intervention studies (randomised controlled trials; RCTs) follows the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) guideline.²⁷ Findings will be reported according to the PRISMA statement.²⁸ The study protocol was registered with PROSPERO (CRD42020152837).

Eligibility criteria

The participants, interventions, comparisons and outcomes (PICO) of the studies included in this systematic review and meta-analysis will be defined as follows: (P) healthy nurses (not diagnosed as having a mental illness), (I) any type or mode of CBT-based intervention, (C) no intervention or not a CBT-based intervention and (O) mental health. We will include intervention studies (RCTs) conducted on the entire nurse population, including new graduate nurses (ie, those with less than 1 year of nursing experience). Studies will be excluded if they correspond to selective or indicated prevention among primary prevention. This systematic review and meta-analysis focus on universal prevention as a primary strategy. Therefore, studies of selective or indicated prevention will be excluded from this review. In addition, we will exclude studies in which participants were practical nurses or nursing aides and those that involved other healthcare workers such as doctors in this systematic review and meta-analysis. There will be no exclusion criteria regarding participants' employment status or the healthcare settings in which they were employed. However, we will exclude studies that targeted individuals

considered to be at potentially risk for mental illness according to an identified risk factor such as parental mental illness, or that exclusively targeted nurses who had been screened as being high risk in terms of their mental health. We will include studies with a CBT-based intervention that aimed to reduce burnout, anxiety or depressive symptoms in the entire nursing population.

CBT is defined as an intervention that provides new ways to rationally think and/or behave in stressful situations, such as through cognitive restructuring, behavioural activation, problem solving, mindfulness-based cognitive therapy and acceptance and commitment therapy.^{29–30} The comparisons will be defined as no intervention; waiting-list control; treatment as usual, such as education or training (but not CBT) that is provided by the nursing association; or alternative (not CBT) interventions. Aspects of mental health (ie, primary outcome) will include burnout, anxiety or depression, which are the adverse effects of occupational stress.³ These will be assessed using such self-reported measures as the Maslach Burnout Inventory,³¹ the General Health Questionnaire³² and the Beck Depression Inventory,³³ as well as structured interviews, including the Hamilton Rating Scale for Depression.³⁴ As secondary outcomes, we will consider occupational outcomes, which can be the adverse effects of mental health problems. These will include absenteeism, intention to leave current employment, degradation of care quality, work performance or work engagement. Studies that did not conduct a statistical analysis to examine the intervention effects will be excluded.

Studies will be included in this systematic review and meta-analysis that (1) were conducted to evaluate the effect of CBT-based interventions on the mental health of nurses as a universal prevention, (2) used an RCT design, (3) did not exclusively target nurses who had been screened as being at high risk in terms of their mental health, (4) provide sufficient data (sample sizes, means and SD) for calculating the effect sizes with 95% CIs, (5) were published as original articles written in English or Japanese and (6) were published up to 2022.

Information sources, search strategy and data management

Systematic searches of published studies will be performed using the following electronic databases: Cochrane Central Register of Controlled Trials, PubMed (Medline), Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycINFO, PsycARTICLES, Web of Science and the Japan Medical Abstracts Society. The search terms will include words related to the research PICO. The search strategy (ie, the key terms) is listed in online supplemental file 1. Through systematic searches, we will also obtain information regarding studies that may have been completed but are not yet published. This search is essential to reduce publication bias in this systematic review. All identified studies will be managed using Microsoft Excel (Microsoft Corp., Redmond, Washington, USA) files. Prior to the study selection process,

duplicate citations in the Excel files will be excluded by KK who is a first author. Decisions about all of the studies will be recorded.

Study selection process

The study selection process will include two phases. The first is a sifting phase. According to the inclusion criteria, three review authors (KK, AT and AI) will independently conduct the screening of the studies. The titles and abstracts will be screened according to the eligibility criteria created earlier in the sifting phase. The second is the full text review phase. The full text of all eligible studies will be obtained and reviewed using a standardised form (see online supplemental file 2) to assess their eligibility for inclusion in this review. Any discrepancies in the assessment will be recorded, and if they cannot be resolved, they will be settled by discussion among all of the authors until a consensus is reached. The reference lists from the studies will be carefully examined for any additional eligible studies. We will directly contact the corresponding authors of the eligible studies if (1) the results of the publication are unclear or may be related to multiple interpretations, (2) the reported results did not show data relevant to our study analysis or (3) the study has been registered for clinical trials but are not yet published. If we contact those corresponding authors but do not receive a reply, we will not include their articles in the analysis. We will describe the process in the paper, including contact with the corresponding authors. A flow chart will be provided to show the entire review process.

Data extraction

The data will be independently extracted from the included studies by three review authors (KK, AT and AI) using a standardised data extraction form (see online supplemental file 3). Any disagreement or inconsistencies will be recorded and solved by discussion among all of the authors until a consensus is reached. The extracted data will include the following: the year of publication, country where the study was conducted, number of participants included in the analysis, sampling framework, participants' demographic characteristics (ie, mean age, sex proportions, years of nursing experience and employment status), number of participants who were excluded or lost to follow-up, the contents of the intervention programme, control condition (ie, no intervention, waiting-list control or other), outcome variables (ie, stress-related outcomes such as burnout, anxiety and depressive symptoms, or occupational outcomes such as absenteeism, intention to leave current employment, quality of care, work performance or work engagement), length of follow-up and sufficient data (ie, the number of participants in each group (N), mean differences between groups and SD for outcomes) for calculating the effect size with 95% CIs for determining the effect of CBT on the mental health of nurses for universal prevention. This extraction format is experimental and can be modified as needed. The relevant research teams of the studies

will be contacted about the availability of unpublished or missing data.

Risk of bias assessment

Three review authors (KK, AT and AI) will independently assess the methodological quality of the included studies using the Cochrane Collaboration's risk of bias tool.³⁵ The tool evaluates possible sources of bias in intervention studies based on seven main categories: (1) random sequence generation, (2) allocation concealment, (3) blinding of the participants and personnel, (4) blinding of the outcome assessment, (5) incomplete outcome data, (6) selective outcome reporting and (7) other biases. Inconsistencies in the quality assessment of the methodology will be recorded and discussed by all of the authors until a consensus is reached. For the assessment of the meta-bias, the publication bias will be assessed using funnel plots for asymmetry and Egger's test.

Data synthesis and statistical methods

The included studies will be statistically synthesised by a meta-analysis to estimate the pooled effect (SMD) of CBT on the mental health of nurses as a universal prevention in the workplace. We will combine studies that we determine to be similar in terms of follow-up time. We will consider the effects over the following follow-up periods: (1) up to 1 month, (2) from 1 to 6 months or (3) over 6 months. Forest plots of the between-group and post-intervention effect sizes for mental health and the 95% CIs will be produced. The number of participants and the scores, such as the means and SDs for the intervention and the control group for the psychological outcomes, will be entered into Review Manager (RevMan).³⁶ The magnitude of the effect size will be interpreted as being small (0.2), medium (0.5) or large (0.8).³⁷

The meta-analysis will be performed when at least three eligible studies can be collected. If it is not appropriate to perform a meta-analysis (ie, no more than two studies are eligible and included), the results will be presented in a narrative form. The publication bias will be examined using a funnel plot and Egger's test. Statistical heterogeneity will be assessed using the χ^2 test with Cochran's Q statistic and the I^2 .³⁸ The I^2 values of 25%, 50% and 75% indicate low, medium and high heterogeneity, respectively.³⁹ An I^2 value of 50% or more will be deemed to indicate considerable heterogeneity. If there is little or no statistical heterogeneity (ie, an I^2 value of less than 50%) in a comparison, we will pool the results using a fixed-effects model. If the I^2 statistic is more than 50%, we will use a random-effects model.⁴⁰

Since the effect of the CBT may differ according to the specific population, subgroup analyses will be conducted to compare the results. The major possible grouping characteristics will include newly graduated nurses because they have been reported to have higher stress-related outcomes, including depressive symptoms, compared with veteran nurses.^{14 41-43} We will treat participants with more/less than 1 year of nursing experience as another stratification factor and conduct a subgroup analysis. In

addition, the mode of CBT delivery (eg, face-to-face vs computer-based CBT including iCBT) or outcome variables (ie, burnout, anxiety and depressive symptoms) will be considered as possible grouping characteristics. Any subgroup differences will be reported, and our findings will be explained by considering these differences. To assess the effect of the risk of bias on the pooled results, a sensitivity analysis will be conducted of the included studies that are only classified as low risk according to the Cochrane Collaboration's risk-of-bias tool.³⁵ All of the extracted data and analysed results will be deposited by the corresponding author and they will be available for external reviewers and readers on request.

Patient and public involvement statement

This study will not involve any patients or participants because this study protocol is for a systematic review and meta-analysis.

Ethics and dissemination

As this systematic review and meta-analysis will be based on previously published studies, it does not require ethical approval. The results and findings of this study will be published in peer-reviewed international journals and be presented at related research conferences, academic symposiums and seminars.

Strengths and limitations

The greatest strength of this study is that, to the best of our knowledge, it will be the first systematic review and meta-analysis to offer evidence regarding the effect of CBT-based interventions on the mental health of nurses as a universal prevention in the workplace. Because the mental health status of nurses deleteriously affects not only the individuals but also the organisations and the quality of patient care,^{2 14} if the effect of the CBT provided in the workplace as universal prevention is confirmed by this meta-analysis, it will be beneficial for nurses', occupation's and patients' health. In addition, it will provide economic and productivity boosts in the workplace. The findings from this study will be helpful for conducting CBT-based stress management interventions for nurses as a universal prevention in the workplace and for managing stress-related outcomes.

However, this study has the limitation that the generalisation of our study findings to countries or groups that are not included in the selected studies will be limited. In addition, there is a limitation that the article search will be conducted only in two languages, which can exclude potentially important data published in other languages.

Author affiliations

¹Department of Mental Health and Psychiatric Nursing, Tokyo Medical and Dental University Graduate School of Health Care Sciences, 1-5-45 Yushima, Bunkyo-ku, Tokyo, Japan

²Division of Nursing, Faculty of Healthcare, Tokyo Healthcare University, 4-1-17 Higashigotanda, Shinagawa-ku, Tokyo, Japan

³Department of Mental Health, Graduate School of Medicine, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, Japan

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ORCID iDs

Kazuto Kuribayashi <http://orcid.org/0000-0001-7513-2807>

Kotaro Imamura <http://orcid.org/0000-0003-2584-0666>

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