



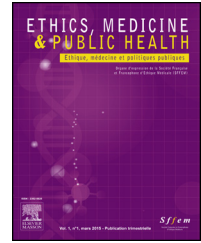
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Available online at  
**ScienceDirect**  
www.sciencedirect.com

Elsevier Masson France  
**EM|consulte**  
www.em-consulte.com/en



ORIGINAL ARTICLE

# Mental well-being and association of the four factors coping structure model: A perspective of people living in lockdown during COVID-19



*Bien-être mental et association des quatre facteurs du modèle de structure d'adaptation : une perspective des personnes vivant en confinement pendant la COVID-19*

**S. Agha (PhD, M.S.Ed) (Associate Professor)**

*College of Medicine, King Saud-bin-Abdulaziz University for Health Sciences, 11481 Riyadh, Saudi Arabia*

Received 23 August 2020; received in revised form 4 October 2020; accepted 6 October 2020  
Available online 14 October 2020

## KEYWORDS

Anxiety;  
Coping Strategies;  
COVID-19;  
Depression;  
Stress

## Summary

**Background.** – The physical and mental health risks of COVID-19 become higher as people are asked to stay home for an indefinite period. The objective was to investigate the link between the four-factor structure model of coping and mental health among those living in lockdown. **Methods.** – The sample was comprised of 100 participants. The data was collected through purposive sampling. Mental health was measured by the Depression, Anxiety and Stress Scale (DASS-21) and coping strategies from the Brief Cope Inventory. A personal information questionnaire was also used to gather information about the characteristics of participants, such as age, gender and education, in addition to questions related to other stressors. Linear regression was used to assess the association between variables. A  $P$ -value  $< 0.05$  was considered statistically significant.

*E-mail address:* [aghasa@yahoo.com](mailto:aghasa@yahoo.com)

**Results.** – Overall, the results showed high levels of stress, anxiety and depression among participants. These findings revealed a significant association between active avoidance and religious/denial coping strategies and mental health problems. However, problem-focused and positive coping strategies were found to be insignificant for all three mental health problems. Other social and personal factors, such as being away from family (90%), having problems sleeping (86%), worrying about the future (85%), experiencing anger (83%), lacking emotional support (79%) and having fear of receiving bad news (72%), were reported often by participants.

**Conclusion.** – Participants showed concern for COVID-19 that was associated with anxiety, stress and depression. These findings have important implications for public health emergency preparedness planning. Moreover, psychological preparedness in the community is essential.

© 2020 Elsevier Masson SAS. All rights reserved.

## MOTS CLÉS

Anxiété ;  
Stratégie  
d'adaptation ;  
COVID-19 ;  
Dépression ;  
Stress

## Résumé

**Contexte.** – Les risques de COVID-19 pour la santé physique et mentale sont d'autant plus élevés qu'il est demandé aux personnes de rester chez elles pour une période indéterminée. L'objectif était d'étudier le lien entre le modèle de structure à quatre facteurs de l'adaptation et la santé mentale chez les personnes vivant en confinement.

**Méthodes.** – L'échantillon était composé de 100 participants. Les données ont été recueillies par échantillonnage raisonné. La santé mentale a été mesurée par l'échelle DASS-21 (*Depression, Anxiety and Stress Scale*) et les stratégies d'adaptation du *Brief Cope Inventory*. Un questionnaire d'informations personnelles a également été utilisé pour recueillir des informations sur les caractéristiques des participants, telles que l'âge, le sexe et l'éducation, en plus des questions relatives aux autres facteurs de stress. La régression linéaire a été utilisée pour évaluer l'association entre les variables. Une valeur de  $p < 0,05$  a été considérée comme statistiquement significative.

**Résultats.** – Dans l'ensemble, les résultats ont montré des niveaux élevés de stress, d'anxiété et de dépression chez les participants. Ces résultats ont révélé une association significative entre l'évitement actif et les stratégies d'adaptation à la religion/au déni et les problèmes de santé mentale. Cependant, les stratégies d'adaptation positives et axées sur les problèmes se sont avérées insignifiantes pour les trois problèmes de santé mentale. D'autres facteurs sociaux et personnels, tels que l'éloignement de la famille (90 %), les problèmes de sommeil (86 %), l'inquiétude face à l'avenir (85 %), la colère (83 %), le manque de soutien émotionnel (79 %) et la peur de recevoir de mauvaises nouvelles (72 %), ont souvent été mentionnés par les participants.

**Conclusion.** – Les participants se sont montrés préoccupés par COVID-19 qui était associé à l'anxiété, au stress et à la dépression. Ces résultats ont des implications importantes pour la planification de la préparation aux situations d'urgence en santé publique. En outre, la préparation psychologique de la communauté est essentielle.

© 2020 Elsevier Masson SAS. Tous droits réservés.

## Introduction

Since the beginning of 2020, millions of cases of COVID-19 have been detected around the globe. Due to their evolving nature, outbreaks of emerging infectious diseases have a considerable association with fear, anxiety and stress among communities, especially when they lead to death. The World Health Organization (WHO) has described COVID-19 as a virus that impairs and destroys the immune system of a person and transmits from one human to another in a short time. WHO has proposed strategies, such as quarantining, isolation, avoiding close contact, caring for oneself and others,

keeping updated about the symptoms and risk and transferring reliable information to others, to avoid the spread of disease [1].

The purpose of quarantining and isolation in any outbreak is to prevent individuals and communities from transmitting infectious diseases [2,3]. The Centres for Disease Control and Prevention (CDC) have defined quarantine as "an approach which separates and restrict the movements of individuals are exposed to a corona disease" and isolation as "to keep away the infected people from those who are not exposed to infectious disease" [2].

Previous studies have reported adverse effects on the mental health of people who were quarantined in the SARS and MERS outbreaks. A study assessed the mental health condition of parents of children who were quarantined or isolated and reported the prevalence of Post-Traumatic Stress Disorder (PTSD) among isolated or quarantined children (30%) and parents (25%) [4]. Another study stated the high prevalence rate of anxiety syndrome and aggression among subjects who were in quarantine or self-isolation [5]. Furthermore, a cohort study identified symptoms of psychological distress and PTSD among health professionals [6].

During the recent outbreak of COVID-19, a complete lockdown was imposed to prevent the widespread infectious disease among individuals and the community. Since such restrictions were adopted for the protection of physical health, implications on the mental well-being of individuals were beyond expectations. Recent studies have found multiple psychological issues among people with dysfunctional anxiety during the coronavirus infection [7–10]. This research emphasised the importance of screening for dysfunctional anxiety by health professionals and evaluating the underlying reasons for other mental and physical problems during this pandemic [11]. It was suggested that online mental health programs should be designed and implemented to help people overcome their anxieties [11,12].

Among all contributing factors, COVID-19 constitutes one of the main causes of developing psychological problems; responses to social restrictions vary from person to person based on the background and environment they are living in. To date, the literature is mainly focused on the psychosocial factors that contribute to depression, anxiety and stress in people who live with the disease and have a limited focus on the coping strategies that may have a positive or negative effect on individuals living with the fear of being infected and on the resources, such as media, support services or living style, that may reduce these fears and stressors.

Psychological problems and coping methods, whether adequate or inadequate, have a vast effect on one another. Coping is defined as making constant efforts to manage specific internal and/or external stresses [13]. Hastings et al. [14] categorised and defined the four types of coping strategies: "Active avoidance coping which represents an individual attempt to ignore the stressors or avoid its impacts by using drugs, involving in activities that distract and prevent to deal with the situation, and self-blaming. Problem-focused coping focuses on dealing with the stressor effectively. People commonly use planning to cope with the stressor, take measures, and seek social and emotional support to deal with the stressors. Positive coping is defined as the positive reframing of behaviors and adopting activities that improve self-esteem and decrease stress and psychological problems associated with stressful situations. Religious/denial coping is characterised as relying on religious beliefs and/or denial to believe that the stressor exists."

Research on the association of coping styles and symptoms of stress demonstrated a high predictive association between them [15]. It reported that avoidance and denial were most commonly used as coping mechanisms by individuals with mental health problems. Nonetheless, there is a high association of active coping with lower levels of anxiety

[16], and problem-focused coping strategies are regarded as the best for stress management [17].

When people are too stressed, they become distressed and disorganised, and normal coping may not work. However, it is most difficult to cope and live with associated social, emotional and other consequences. In such situations, identifying coping strengths and recovery skills are very important in making a person safer and more resilient. Hence, the common ways of coping that people may employ while living in a pandemic require more exploration. The need for more resources and a more comprehensive understanding of people's mental health and coping mechanisms signifies the importance of this study. The present study explored the four-factor structure of coping that was adapted by people during the lockdown and, more specifically, the impact coping had on the levels of depression, anxiety and stress related to COVID-19. The results of this study will help healthcare institutions and community health providers understand how to deal with people living in traumatic situations and will provide information to mental health service providers on effective coping mechanisms to deal with depression, anxiety and stress. Also, it will open possibilities for future research.

## Methods

In this online cross-sectional study, 100 participants (83 men and 17 women) from one of the largest public sector health professionals' university in Saudi Arabia were included. The sample consisted of individuals who were socially restricted for six weeks or more due to the pandemic, were not self-quarantined or isolated due to symptoms of COVID-19 and who had the knowledge about COVID-19. To control sampling bias, all subjects were informed about the objective of the study and issues related to COVID-19.

## Instruments

### Demographic Information Form

The demographic form in the present study was designed to comprise of information related to participants' characteristics, living status and specific psychosocial issues related to the current situation.

### Brief COPE Inventory

The four-factor coping structure by Hastings et al. [14] from Brief COPE Inventory [18] was used in the current study to explore a wide range of coping strategies among people living with social restrictions. The inventory consists of 28 items classified into four sub-scales; "active avoidance coping consisted of the items related to self-blame, behavioural disengagement, substance use, venting of emotions, and a statement from the distraction scale", "problem-focused coping deals with active coping, planning, seeking social support, and an element from seeking emotional social support scale", "positive coping consisted of the use of humour and positive reframing and one item each from

the acceptance and emotional social support scales”, and “religious/denial coping consists of a factor related to religious coping and denial as a coping mechanism.” The items were each summed up on 4-point Likert scale to calculate a total score for all four classifications.

### Depression, Anxiety and Stress Scale (DASS-21)

A short version of the Depression, Anxiety and Stress Scale (DASS-21), developed by Lovibond and Lovibond [19], was used to assess the well-being of participants. Each subscale of DASS-21 consists of seven items on a 4-point Likert scale, ranging from 0 to 3. The same scoring system of the original DASS was used.

### Procedure

The ethical approval was taken from the institutional review board. An official email was sent to the participants’ valid email addresses, which described the purpose of the study, their consent to participate, and also included questionnaires. Informed consent was taken from all of the participants and they were reassured about the confidentiality of their data. After a week, two reminders were sent to the subjects. The data was collected in May 2020. Only those who fulfilled the criteria of six or more weeks of social restrictions were included. Participants who were asked by the physician to quarantine due to coronavirus symptoms and questionnaires with missing information were excluded.

### Data analysis

After collecting data, the scoring of questionnaires was done based on the criteria. A *t*-test was computed to see the differences between gender, psychological problems and coping strategies. Also, linear regression analyses were performed to calculate the predictive relationship between depression, anxiety and coping strategies. A *P*-value < 0.05 was considered statistically significant.

## Results

### Demographic information

A total of 150 participants were contacted, though only 100 completed the questionnaires. The overall response rate was 66.6%. The mean age was (33.13 ± 9.38) for the overall sample: (32.82 ± 9.75) for men, and (34.65 ± 7.37) for women. In total, 83% of participants were male, and the remaining 17% were female. In terms of marital status, most of the participants were married (87%) and the majority (89%) were living alone without their family members. The information related to smoking habits showed that more than half of the participants (55%) reported that they do not smoke. A summary of the participants’ demographic characteristics can be seen in Table 1.

**Table 1** Characteristics of study subjects (*n* = 100). *Caractéristiques des sujets de l’étude (n = 100).*

Variables	Percentages ( <i>n</i> = 100)
Gender	
Male	83
Female	17
Living status	
With family	11
Without family	89
Profession	
Teaching	75
Non-teaching	25
Nationality	
Middle East	20
Asians	75
African	05

### Forms of perceived situational stress

Table 2 shows different forms of situational stress, as perceived by participants, during social isolation. Being away from family was discovered as a major contributing factor (90%) that impeded the participants’ ability to cope with situational pressure. In total, 72% were afraid of hearing any bad news, and 83% felt anger due to uncertainty. In general, 85% were worried about their future, and 79% felt a lack of emotional support from the hospital and their significant others. Over 86% of participants reported that they had sleep issues, almost half (47%) reported a change in their eating habits, and 33% struggled with handling their problems.

### Depression, anxiety, stress, coping strategies, and gender

The mean and standard scores of the two groups revealed the prevalence of depression, anxiety, and stress among the participants (22.92 + 10.36, 20.08 + 9.59, and 26.60 + 9.57, respectively), as seen in Table 3. When evaluating any differences in the mean scores between males and females, no significant distinctions were found on the grounds of depression, anxiety, and stress (Table 4).

Additionally, in order to assess the differences between the genders on coping methods, an independent *t*-test was applied. There was a significant difference in scores among the genders in their ways of handling the dilemma. Women reported the use of “religion/denial” (male 12.02 ± 2.63, female 13.18 ± 1.94; *P* = 0.03) as a coping strategy to overcome their psychological issues, whereas men indicated the use of “active avoidance” (male 28.49 ± 4.27, female 23.41 ± 4.21; *P* < 0.00) to manage their stress. The means ± SD and *P*-values of the coping mechanisms across the genders are shown in Table 4.

### Association of coping strategies with DASS

To obtain more detailed results, regression analysis was carried out. Results from the logistic regression analysis demonstrated a reasonable number of variances

**Table 2** Forms of situational stress as perceived by participants.  
*Formes de stress de situation telles que perçues par les participants.*

Perceived stress	Yes(%)	No(%)	Not sure(%)
Away from family	90	09	01
Sleeping difficulty	86	14	0
Future worrying	85	14	01
Anger feeling	83	10	07
No emotional support	79	12	09
Hearing bad news	72	14	14
Fear of stigma	54	30	16
Media role in fear acceleration	53	37	10
Appetite change	47	35	18
Lack of treatment	46	45	09
Difficulty handling problem	33	51	16
Upset on unexpected	18	58	24
Family problems	07	80	13

**Table 3** Overall summary of the four factors structure of coping, depression, anxiety, and stress in participants living in social restrictions.

*Résumé général de la structure des quatre : adaptation, dépression, anxiété et stress chez les participants vivant dans des situations de restrictions sociales.*

Variables	Mean	SD
Coping styles		
Active avoidance	27.63	4.65
Problem-focused	20.85	3.17
Positive coping	19.37	3.27
Religious/denial	12.22	2.58
DASS		
Depression	22.92	10.36
Anxiety	20.08	9.59
Stress	26.60	9.57
Age	33.13	9.377

between the two coping strategies, mostly used for all three domains of DASS including "active avoidance and depression" ( $R=0.271$ ,  $P=0.005$ ), "active avoidance and anxiety" ( $R=0.342$ ,  $P=0.000$ ), and "active avoidance and stress" ( $R=0.243$ ,  $P=0.015$ ). Moreover, a significant association was reported between "religious/denial and depression" ( $R=0.386$ ,  $P=0.000$ ), "religious/denial and anxiety" ( $R=0.141$ ,  $P=0.000$ ), and "religious/denial and stress (Table 5)."

## Discussion

Health professionals recognise the growing rate of anxiety and fear among patients, but very little is written about the mental well-being of those who are living with social restrictions during COVID-19. Since many people are experiencing a higher level of anxiety and fear during the outbreak, it is imperative to acknowledge and study the mental health issues of those with anxiety and fear [20]. Thus, this study aimed to identify the coping strategies of people living in complete lockdown and their predictive association with

depression, anxiety and stress. The results of the present study revealed the presence of depression, anxiety, stress and other social factors among the participants. Studies conducted in China with health providers found higher levels of depression, anxiety, post-traumatic stress and sleep problems [8,9], especially among COVID-19 infected patients [21].

Multiple factors, such as living alone without family, hearing bad news, having anger and future-related worries, lacking emotional support or handling problems, were considered harmful for the well-being and mental health of individuals. Similarly, studies have stated the high prevalence rates of generalised anxiety [22], depression [23], perceived lack of social support, suicidal ideation among males and females [24] and situational anxiety [7]. A recent study on adults with COVID-19-related fear and anxiety showed the presence of hopelessness, suicidal thoughts and the use of alcohol or drugs as a coping strategy [7]. It is recommended that health institutes establish secure online psychological services for all [9] so that people can share and understand success and failure and provide stress reduction strategies [25].

Interestingly, media was reported as a major contributing factor in accelerating fear and anxiety associated with COVID-19 in this study. These results emphasise the need for a well-informed team of physical and mental health professionals to regularly monitor and update information related to the outbreak in the media. People can also be informed through reliable sources of information such as the ministry of health website or TV.

Regarding the relation of multiple coping methods to emotional problems from social restrictions, the key findings showed an association of active avoidance coping strategies with depression, anxiety and stress, which was also reported in a previous study [26]. The results showed that active avoidance coping is an ineffective way to deal with the current situation and may increase the likelihood of symptoms.

Every society has a few well-defined social values that everyone must follow. Sometimes, certain myths may affect the well-being of individuals. Both COVID-19 and mental illness are surrounded by the associated stigmas in many

**Table 4** Gender wise summary of the variables of four factors structure of coping, depression, anxiety and stress, and age in participants living in social restrictions.  
*Résumé par sexe des variables de la structure des quatre facteurs : adaptation, dépression, anxiété et stress, et âge chez des participants vivant dans des situations de restrictions sociales.*

Variables	Men		Women		<i>t</i>	<i>P</i> -value
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Age	32.82	9.75	34.65	7.37	33.13	9.38
Personal well-being						
Depression	22.94	10.13	22.92	10.47	0.007	0.49
Anxiety	20.47	9.18	20.0	9.72	0.18	0.42
Stress	27.53	10.04	26.41	9.52	0.44	0.33
Coping strategies						
Active avoidance	28.49	4.27	23.41	4.21	4.52	0.00
Problem-focused	20.76	3.23	21.29	2.91	−0.671	0.25
Positive coping	19.48	3.37	18.82	2.74	0.880	0.19
Religious/denial	12.02	2.63	13.18	2.16	−1.94	0.03

**Table 5** Predictive association of coping with stress, anxiety, and depression in participants living social restrictions.  
*Association prédictive de la gestion du stress, de l'anxiété et de la dépression chez les participants vivant des restrictions sociales.*

Coping strategies	Dependent variables	<i>R</i>	<i>R</i> <sup>2</sup>	<i>B</i>	<i>F</i>	<i>Sig</i>
Active avoidance	Depression	0.271	0.073	0.271	8.319	0.005
	Anxiety	0.342	0.117	0.342	13.363	0.000
	Stress	0.243	0.059	0.243	6.143	0.015
Problem-focused	Depression	0.152	0.023	−0.152	2.315	0.131
	Anxiety	0.016	0.000	−0.016	0.026	0.873
	Stress	0.014	0.000	−0.014	0.018	0.893
Positive	Depression	0.065	0.004	0.280	0.418	0.520
	Anxiety	0.092	0.008	0.346	0.828	0.365
	Stress	0.025	0.001	0.243	0.063	0.803
Religious/denial	Depression	0.386	0.149	0.386	17.201	0.000
	Anxiety	0.141	0.132	0.376	16.102	0.000
	Stress	0.379	0.144	0.379	16.471	0.000

societies. These stigmas prevent individuals from sharing their troubles due to a fear of rejection and instead practice avoidance behaviour as a coping strategy. The use of avoidance, such as denial and wishful thinking coping strategies, safeguard them from the stressful situation caused by the stigma [27]. They tend to stay away from issues that, in the long run, increase their psychological problems and reduce positive thinking. Employing avoidance as a coping mechanism with such social circumstances is considered a detrimental means of coping, as evidenced in literature [28].

Furthermore, the results showed that problem-focused coping strategies and positive coping strategies are insignificant predictors of depression, anxiety and stress. These results are similar to a study [27] that also reported a lack of association. Although problem-focused coping strategies and positive coping strategies are significant in enhancing mental well-being in critical situations, people usually look for easy solutions to avoid and/or handle stressors and problematic thoughts [29]. The literature on positive coping has suggested it has an effect of reducing the impact of traumatic events and the level of stress [30]. These results

signify the important role problem-focused coping strategies and positive coping strategies play in the positive well-being of individuals in stressful situations.

Additionally, religious/denial coping strategies are significantly associated with depression, anxiety and stress in the present study. By using a religious coping mechanism, an individual looks for comfort; this strategy is intended to help them to delineate their own lives, motivate themselves and manage their emotional problems [31]. These results contrast those of a study that suggested the possible effect of religious coping in reducing stress and depression [32]. This contradiction highlights the need for more research in the future. Concerning denial coping, another study found that denial strategies are effective in adapting immediately to a stressor but tend to be ineffective with time. Consequently, due to its maladaptive nature, the frequent use of denial may give rise to depression, anxiety and distress [13].

Gender differences were also found in coping and depression, anxiety and stress levels. There was a higher association of religious or denial coping with high levels of depression, anxiety and stress in females more so than

males. On the other hand, avoidance coping was reported higher in males than in females.

This study has certain limitations. First, it only collected data from those who were in lockdown and did not include symptomatic patients who self-quarantined. Second, the associations between gender and perceived depression, anxiety and stress were not calculated. Due to the online nature of the study and limited data, the results of this study may not capture factors associated with different cultures; demographic variables, such as living status or professions, were not assessed. Future studies should be conducted to evaluate the associations between coping strategies, mental health problems and demographic variables. Longitudinal studies with a larger sample may offer a more detailed understanding of the issue's and outbreak aftermath's effects on the psychosocial well-being of individuals.

## Conclusion and recommendations

In conclusion, the results postulate the significant effect ways of coping have on depression, anxiety and stress among study subjects. The coping strategies most used for overcoming psychological symptoms and had predictive associations were the religious/denial and active-avoidance coping strategies. In contrast, no association between the problem-focused and positive coping strategies and psychological issues was established. Religious coping was a more frequently used coping strategy among females, whereas active avoidance was more frequent among males.

However, these results have implications for mental health interventions. Health professionals must understand and discuss the coping strategies that are effective in protecting patients and individuals from any psychological problems during the pandemic. Second, as the avoidant and denial strategies are maladaptive approaches to coping, the focus should be more on positive and problem-focused strategies to increase well-being. These findings enable healthcare professionals and institutions to develop awareness and training programs to teach effective skills for dealing with traumatic situations and to focus on implementing problem-focused and positive coping strategies that protect the mental health of people during and after outbreaks [33,34].

## Disclosure of interest

The author declares that he has no competing interest.

## References

- [1] World Health Organization. Coronavirus disease 2019 (COVID-19) Situation Report—94. World Health Organization; 2020. p. 1–12 [Retrieved from: <https://apps.who.int/iris/handle/10665/331865>].
- [2] Centers for Disease Control and Prevention (CDC). Quarantine and Isolation. USA: U.S. department of health & human services; 2017 [Available from: <https://www.cdc.gov/quarantine/index.html>].
- [3] Tognotti E. Lessons from the history of quarantine, from plague to influenza A. *Emerg Infect Dis* 2013;19(2):254–9, <http://dx.doi.org/10.3201/eid1902.120312>.
- [4] Sprang G, Silman M. Posttraumatic stress disorder in parents and youth after health-related disasters. *Disaster Med Public Health Prep* 2013;7:105–10.
- [5] Jeong H, Yim HW, Song YJ, Ki M, Min JA, Cho J, et al. Mental health status of people isolated due to Middle East Respiratory Syndrome. *Epidemiol Health* 2016;38:e2016048.
- [6] Reynolds DL, Garay JR, Deamond SL, Moran MK, Gold W, Styra R. Understanding, compliance and psychological impact of the SARS quarantine experience. *Epidemiol Infect* 2008;136:997–1007.
- [7] Lee SA. Coronavirus anxiety scale: a brief mental health screener for COVID-19 related anxiety. *Death Stud* 2020;44:393–401, <http://dx.doi.org/10.1080/07481187.2020.1748481>.
- [8] Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open* 2020;3:e203976.
- [9] Xiang Y, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet* 2020;7:228–9, [http://dx.doi.org/10.1016/S2215-0366\(20\)30046-8](http://dx.doi.org/10.1016/S2215-0366(20)30046-8).
- [10] Goyal K, Chauhan P, Chhikara K, Gupta P, Singh MP. Fear of COVID 2019: first suicidal case in India. *Asian J Psychiatr* 2020;49:101989, <http://dx.doi.org/10.1016/j.ajp.2020.101989>.
- [11] Taylor S. *The psychology of pandemics: preparing for the next global outbreak of infectious disease*. UK: Newcastle upon Tyne: Cambridge Scholars Publishing; 2019. p. 23–38.
- [12] Liu S, Yang L, Zhang C, et al. Online mental health services in China during the COVID-19 outbreak. *Lancet Psychiatry* 2020;7:e17–8, [http://dx.doi.org/10.1016/S2215-0366\(20\)30077-8](http://dx.doi.org/10.1016/S2215-0366(20)30077-8).
- [13] Lazarus RS, Folkman S. *Stress, appraisal, and coping*. New York: Springer; 1984. p. 19–41.
- [14] Hastings RP, Kovshoff H, Brown T, Ward NJ, Espinosa FD, Remington B. Coping strategies in mothers and fathers of preschool and school-age children with autism. *Autism* 2005;9:377–91, <http://dx.doi.org/10.1177/1362361305056078>.
- [15] Heppner MJ, Humphry CF, Hillenbrand-Gunn TL, DeBord KA. The differential effects of rape prevention programming on attitudes, behavior and knowledge. *J Counsel Psychol* 1995;42:508–18.
- [16] McPherson S, Hale R, Richardson P, Obholzer A. Stress and coping in accident and emergency senior house officers. *Emerg Med J* 2003;20:230–1, <http://dx.doi.org/10.1136/emj.20.3.230>.
- [17] McLeod MP, Warren RL, Hsiao WW, Araki N, Myrhe M, Fernandes C, et al. The complete genome of *Rhodococcus* sp. RHA1 provides insights into a catabolic powerhouse. *Proc Natl Acad Sci U S A* 2006;103:15582–7, <http://dx.doi.org/10.1073/pnas.0607048103>.
- [18] Carver CS, Scheier MF, Weintraub JK. Assessing coping strategies: a theoretically based approach. *J Pers Soc Psychol* 1989;56:267–83, <http://dx.doi.org/10.1037//0022-3514.56.2.267>.
- [19] Lovibond SH, Lovibond PF. *Manual for the Depression Anxiety Stress Scales*. 2nd ed Sydney: Psychology Foundation; 1995. p. 1–42.
- [20] Asmundson GJG, Taylor S. Coronaphobia: fear and the 2019-nCoV outbreak. *J Anxiety Disord* 2020;70:102196, <http://dx.doi.org/10.1016/j.janxdis.2020.102196>.
- [21] Xu B, Gutierrez B, Mekaru S, Sewalk K, Goodwin L, Loskill A, et al. Epidemiological data from the COVID-19 outbreak,



- real-time case information. *Sci Data* 2020;7:106, <http://dx.doi.org/10.1038/s41597-020-0448-0> 2020.
- [22] Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med* 2006;166:1092–7, <http://dx.doi.org/10.1001/archinte.166.10.1092>.
- [23] Kroenke K, Spitzer RL, Williams JBW. The PHQ-9. validity of a brief depression severity measure. *J Gen Intern Med* 2001;16:606–13.
- [24] Gonzalez A, Zvolensky MJ, Solomon SE, Miller CT. Exploration of the relevance of anxiety sensitivity among adults living with HIV/AIDS for understanding anxiety vulnerability. *J Health Psychol* 2010;15:138–46, <http://dx.doi.org/10.1177/1359105309344898>.
- [25] Laschinger HKS, Fida R. New nurses' burnout and workplace well-being: the influence of authentic leadership and psychological capital. *Burn Res* 2014;1:19–28.
- [26] Major B, Quinton WJ, McCoy SK. Antecedents and consequences of attributions to discrimination: theoretical and empirical advances. *Adv Exp Soc Psychol* 2002;34:251–330.
- [27] Pinel EC. Stigma consciousness: the psychological legacy of social stereotypes. *J Pers Soc Psychol* 1999;76:114–28, <http://dx.doi.org/10.1037//0022-3514.76.1.114>.
- [28] Ball J, Tannenbaum L, Armistead L, Maguen S, Family Health Project Research Group. Coping and HIV infection in African-American women. *Women Health* 2002;35:17–36, [http://dx.doi.org/10.1300/J013v35n01\\_02](http://dx.doi.org/10.1300/J013v35n01_02).
- [29] Fraser VJ, Burd L, Liebson E, Lipschik GY, Peterson CM. *Diseases and disorders*, 3. New York: Marshall Cavendish Corporation; 2008. p. 646–942.
- [30] Folkman S, Moskowitz JT. Positive effect and other side of coping. *Am Psychol* 2000;55:647–54.
- [31] Harvey IS, Silverman M. The role of spirituality in the self-management of chronic illness among older African and Whites. *J Cross Cult Gerontol* 2007;22:205–20.
- [32] Tarakeshwar N, Pargament KI. Religious coping in families of children with autism. *Focus Autism Other Dev Disabl* 2001;16:247–60, <http://dx.doi.org/10.1177/108835760101600408>.
- [33] Masic I, Miokovic M, Muhamedagic B. Evidence based medicine – new approaches and challenges. *Acta Inform Med* 2008;16:219–25, <http://dx.doi.org/10.5455/aim.2008.16.219-25>.
- [34] Brownson RC, Fielding JE, Green LW. Building capacity for evidence-based public health: reconciling the pulls of practice and the push of research. *Annu Rev Public Health* 2018;39:27–53, <http://dx.doi.org/10.1146/annurev-publhealth-040617-014746>.