RESEARCH ARTICLE

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Perceived stress, stress coping strategies, and post-traumatic-growth among healthcare professionals during COVID-19 pandemic

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Funding information
Ardabil University of Medical Sciences, Grant/Award Number: 1004285

Abstract

Aim: The purpose of this research was to identify the perceived stress coping strategies, and Post-Traumatic-Growth (PTG) among Iranian healthcare professionals.

Design: A cross-sectional study was applied.

Methods: This study was conducted among 402 healthcare professionals in north-western Iran. Participants completed demographic, perceived stress, stress coping strategies, and PTG questionnaires. Multiple linear regression was employed to identify the predictors of perceived stress and PTG.

Results: The overall score of perceived stress was calculated 30.55 (6.18). The problem-oriented strategy was the most common stress coping by healthcare professionals (52.66 (8.72)). Also, the total score of PTG was calculated at 45.72 (30.42). Perceived stress, stress coping strategies (except problem-oriented), and PTG scores were significantly different between hospital and health centres participants (p-value <0.05). Previous experience in critical situations, crisis-related course, degree, age, department, and stress coping strategies were related to the stress level. Moreover, workplace, department, work experiences, and employment status were the predictors of PTG.

KEYWORDS
COVID-19 pandemic, health centre, hospital, perceived stress, post-traumatic-growth, stress coping strategies

1 | INTRODUCTION

On March 11, 2020, World Health Organization (WHO) characterized the situation as a pandemic of coronavirus disease 2019 (COVID-19) (Mosolova et al., 2020). The main feature of this disease is the easy transmissibility through human-to-human contact. Facing this critical emergency, governments implemented unprecedented measures to curb viral transmission (Babore et al., 2020). The rapid spread of the COVID-19 virus has caused several challenges for health professionals, including high workload, burnout, risk of infection transmission, ethical conflicts in decision-making for patients, and inadequate protective equipment, which have caused a heightened level of stress and other mental health symptoms (Li, Yu, et al., 2020; Sanliturk, 2021; Tian et al., 2020). As in any pandemic, front-line nurses and medical staff experienced a great deal of anxiety and depression especially in the early stages of the disease

(Shen et al., 2020; Zhang, Yang, et al., 2020; Zhou et al., 2020; Zhu et al., 2020).

In addition to workplace stresses, limitations impacting daily life, such as restrictions on public outings, have reduced chances for medical professionals to release stress, further aggravating negative mental status (Venkatesh & Edirappuli, 2020). Personality characteristics effects how individuals perceived the traumatic event. On the other hand suitable and positive coping processes can help the individual to move on from their psychological struggle (Tahara et al., 2021). So, it is important to recognize coping strategies that help healthcare professionals adjust to the highly stressful circumstances associated with COVID-19 (Tahara et al., 2021). Many studies showed that Post-Traumatic Growth (PTG) resulting from coping with trauma and an adaptive response to the adverse trauma (Peng et al., 2021). This growth reflected in the individual's understanding of the value of life after experiencing a traumatic event (Zhang et al., 2021). Therefore, appropriate stress coping strategies can moderate stress and provide the possibility of individual growth.

2 | BACKGROUND

Coping is considered a stabilizing factor that helps people to adapt mentally to stressful situations. The coping process is a complex response that occurs when a person tries to eliminate perceived stress or threat from the environment (Walton, 2002). There are different methods in coping with stress, such as cognitive coping, avoidance, and emotion-focused behaviours (Montero-Marin et al., 2014). Stress coping strategies improved psychological symptoms, life satisfaction, and general health during the 2002 severe acute respiratory syndrome (SARS) epidemic (Main et al., 2011). During the COVID-19 pandemic, studies have been conducted regarding stress coping strategies. A study on healthcare workers showed poor mental health among 66.6% of Japanese participants. Most of workers selected an escape-avoidance coping strategy (Tahara et al., 2021). Religious coping and desire to serve humanity and country were common coping strategies among frontline emergency health workers in Pakistan (Munawar & Choudhry, 2021). Using of coping strategies is associated with low-stress levels (Martínez et al., 2020; Yin et al., 2018). How people psychologically adapt to stressful situations are associated with the choice of coping strategies type (Finstad et al., 2021; Sébille et al., 2016).

Coping strategies have been considered as one of the determinants in the PTG process (Tomita et al., 2017). Individuals can reach a higher level of psychological performance after exposure to stressful conditions known as PTG, according to Tedeschi and Calhoun (Karagiorgou et al., 2018; Tedeschi & Calhoun, 1996). It is defined as "positive psychological change experienced as a result of the struggle with highly challenging life circumstances" (Zhang et al., 2021). PTG occurs as a result of having the confidence to deal with stressful events (Tedeschi & Calhoun, 2004). This self-confidence is strengthened as a result of changing life philosophy and religious beliefs, increasing social resources, and personal resources such as management techniques (Tedeschi & Calhoun, 2004).

Nurses, paramedics, and social workers experience traumatic events indirectly and then experience growth (Rhee et al., 2013). PTG has been reported to be moderate to high among nurses, physicians, social workers, and midwives (Beck et al., 2016; Lev-Wiesel et al., 2009; Taubman-Ben-Ari & Weintroub, 2008). This growth has been higher among nurses than in other groups (Beck et al., 2016; Lev-Wiesel et al., 2009; Taubman-Ben-Ari & Weintroub, 2008). Two studies of health workers during the COVID-19 pandemic showed moderate to high PTG (Feingold et al., 2022; Mo et al., 2021). It is also mentioned to apply an active coping style helps to improve the level of PTG (Mo et al., 2021). The problem-based coping such as planning, are positive factor of PTG (Tuncay & Musabak, 2015; Stutts et al., 2015). Besides, coping may be flexible across situations, and there are specific effective strategies in certain conditions (Kato, 2012). Thus, it is essential to explore the association between coping strategies and PTG during COVID-19 pandemic.

Studies show that the strategies to cope with stress effect on stress rate, and PTG. Therefore, studying these three phenomena together can be useful. However, the available data on stress, coping strategies, PTG, and risk factors associated with them among healthcare professionals during the COVID-19 are still relatively limited in Iran. This study aimed to determine perceived stress, coping strategies, and PTG among healthcare professionals during the COVID-19 pandemic. We hypothesized that the type of coping strategies (Problem-oriented, Emotion-oriented, and Escape) associated with perceived stress and PTG. Also, individual and occupational variables effect on perceived stress and PTG. In other words, we hypothesized that the healthcare professionals who choose rational strategies to cope with stress experience lower levels of stress. Our other assumption was that choosing the right strategy can reach people to a high level of psychological functioning or PTG. Our third hypothesis was that individual variables and working conditions affect the level of stress and PTG of a person and need to be investigated. The results obtained in our study can help develop mental health support programmes for healthcare professionals during and after the pandemic in order to mitigate actual and delayed negative psychiatric consequences.

3 | THE STUDY

3.1 | Design

This cross-sectional survey was conducted from January to March 2021.

3.2 | Aim

The present study has three aims. The first aim was to determine the scores of perceived stress, the coping strategies, and PTG among healthcare professionals during COVID-19 pandemic. The second aim was to determine individual and occupational variables effect on perceived stress and PTG. The third aim was to determine the type of coping strategies effect on perceived stress and PTG.

3.3 | Sampling and data collection

A survey was conducted in a public hospital and ten health centres in Ardabil province, northwestern Iran, which were selected as referral centres for patients with COVID-19. The study population included 402 healthcare professionals working the morning, evening, and night shifts, with participants selected based on census sampling. In total, 450 questionnaires were circulated by researchers from the 25th of January to 15th of March, 2021. Participants were asked to complete and return the questionnaires within 20 days.

3.4 | Survey tools

The first questionnaire was about demographic information comprising of age, sex, education level, marital status, type of employment, hospital and department name, city, work experiences (in years), shift type, having children, passing a crisis-related course, continuous presence during the COVID-19 outbreak, direct exposure to the patients with COVID-19, and previous experience of dealing with critical situations.

The second questionnaire was developed by Cohen et al. (1983), named the perceived stress scale (Cohen et al., 1983), which consists of 14 items. Scores are given on a five-point Likert scale. The lowest and highest achievable scores are 0 and 56, respectively, and a higher score indicates more stress. Cohen et al. confirmed the reliability of this questionnaire by Cronbach's alpha coefficient of 0.75 (Cohen et al., 1983). In addition, Maroufizadeh et al. in Iran, confirmed that the 14-item perceived stress scale has satisfactory psychometric properties for measuring stress. Cronbach's alpha coefficient in this study was 0.90 (Maroufizadeh et al., 2014).

The third questionnaire used in this study was the Coping with Stressful Situations questionnaire by Endler and Parker, consisting of 48 items (Endler & Parker, 1990a). The questionnaire covers three main areas of coping behaviours (each area with 16 items) including Problem-oriented confrontation, Emotion-oriented confrontation, and Confrontation avoidance or escape from the problem. The items of this questionnaire are scored based on a 5-point Likert scale. The score of each of the three confrontational behaviours, that is, problem-oriented, Emotion-oriented, and Confrontation avoidance or escape from the problem. The total internal consistency coefficient is reported 0.92 in the main sample of the Endler and Parker (1990b). The Cronbach's alpha coefficient of the Persian translation of this questionnaire was calculated at 0.83 (Ghoreishi Rad, 2010).

Another tool used in this study was the Post-Traumatic Growth Inventory (PTGI) by Tedeschi and Calhoun (1996) consisting of 21 items in the five domains of growth: (1) relating to others better (seven items); (2) recognizing new possibilities (five items); (3) a greater sense of personal strength (four items); (4) spiritual change (two items); and (5) greater appreciation of life (three items). The items are scored based on a 5-point Likert scale. The subject scores range from 0 to 105. There is excellent internal and test–retest reliability among Western and Asian samples (Jin et al., 2014; Tedeschi & Calhoun, 1996). In the study of Najafi Gharehasani et al., the total alpha coefficient was 0.93 among Iranian nurses (Najafi Gharehasani et al., 2020).

3.5 | Analysis

To analyse the data, Statistical Package for Social Science (SPSS) software, version 25 (IBM Corp.) was used. The respondents' demographic characteristics were presented using descriptive statistics: frequency/percentages, mean, median, and standard deviation (SD). Also, the scores of questionnaires have been calculated according to each dimension and then analysed in the software using descriptive data analysis by means, percentage, and standard deviation. Normality was checked via the Shapiro–Wilk W test. Multiple linear regression was employed to identify the predictors of perceived stress and PTG.

3.6 | Ethical considerations

Ethical permission was obtained from the Ethics Committee of Ardabil University of Medical Science (ethical code: IR.ARUMS. REC.1399.430). Informed consent: All participants were informed about the aim of the study. Written informed consent was obtained from the participants who could withdraw from the study at any stage.

4 | RESULTS

4.1 | Participants

From 450 distributed questionnaires, about 402 responses were received during three months. The overall response rate was 89.33%.

The majority of subjects were female (74.1%) and married (75.6%). The participants with children were 60.95%. The majority of the samples held a Bachelor's degree (75.12%) and had fixed shifts (52.5%). The mean age of the participants was 35.1 (SD = 7.7) years, and the average experience was 10.5 (SD = 7.9) years. most subjects had full-time jobs in the hospital (47.76%) in the hospital (50.75%). Characteristics of the samples are summarized in Table 1.

4.2 | Perceived stress, stress coping strategies, and PTG scores

The overall score of the perceived stress was 30.55 ± 6.18. According to the results, the most common stress coping strategy by healthcare professionals was the problem-oriented (52.66 ± 8.72). Also, the total score of PTG was calculated (45.72 ± 30.42). Relating to others had the highest score. The scores of the studied variables are summarized in Table 2. A statistically significant difference was found

TABLE 1 General characteristics of participants (N = 402).

Variables	N (%)
Gender	
Female	298 (74.1)
Male	104 (25.8)
Marital status	
Single	98 (24.4)
Married	304 (75.6)
Employment status	
Official	192 (47.76)
Semi-official	35 (8.71)
Contractual	89 (22.14)
Corporative	37 (9.2)
Temporary (2 or 4 years)	49 (12.19)
Education level	
Diploma	52 (12.94)
Bachelor's	302 (75.12)
Master's	26 (6.47)
Professional Doctorate	22 (5.47)
Workplace	
Hospital	204 (50.75)
Health Centre	198 (49.25)
Department	
Inpatient	99 (24.63)
Clinic	17 (4.23)
Emergency	28 (6.97)
Pre-hospital	14 (3.48)
Surgery Room	9 (4.73)
Para clinic[a]	36 (8.96)
Health Centre[b]	189 (47.01)
Shift	
Rotational	191 (47.5)
Fixed	211 (52.5)
Having children	
Yes	245 (60.95)
No	157 (39.05)
City	
Ardabil	42 (10.45)
Bilehsavar	45 (11.19)
Khalkhal	238 (59.2)
Meshkinshahr	38 (9.45)
Parsabad	39 (9.7)
Age (in years)	
20–30	143 (35.6)
31–40	163 (40.5)
41–50	86 (21.4)
>50	10 (2.5)

TABLE 1 (Continued)

Variables	N (%)
Work experience (in years)	
<5	160 (39.8)
6–10	65 (16.17)
11–15	78 (19.4)
16–20	44 (10.95)
21–25	30 (7.46)
26–30	25 (6.22)
Crisis-related course	
Yes	291 (44.9)
No	111 (55.1)
Continuous presence in workplace during the COVID-19 outbreak	
Yes	388 (96.52)
No	14 (3.48)
Direct exposure to the patients with COVID-19	
Yes	340 (84.58)
No	62 (15.42)
Having critical situations (formerly)	
Yes	248 (70.65)
No	118 (29.35)

[a]Para-clinical department included radiology, laboratory, and pharmacy.
[b]Different sections of health centres were studied in present research.

in the scores of perceived stress, stress coping strategies (except problem-oriented) between hospital and health centres participants.

Table 3 shows that 294 of the participants adopted problem-oriented approach. The mean (SD) perceived stress and PTG were 27.7 ± 8.03 and 46 ± 31, respectively.

4.3 | Regression model

Multiple linear regression models were employed to examine the effect of each individual and occupational variable as well as coping strategies on perceived stress and PTG. Based on the results of the regression model, the type of adopted approach in the face of stress on perceptual stress was significant. By changing the approach from avoidance to emotion-oriented and problem-oriented, the amount of perceptual stress has increased by 4.07 and 3.21 units, respectively.

Table 4 shows a significant relationship between previous critical situations and perceptual stress so that the level of perceptual stress increased by 1.5 units. In addition, people with a crisis-related course expressed more 1.5 units on average on the perceptual stress. Participants with a bachelor's and professional doctorate had more perceptual stress than the reference group (diploma). By changing the status of individuals from the diploma group to the bachelor group and professional doctorate, their perceptual stress levels increased by 2.17 and 4.06 units, respectively. Healthcare professionals demonstrated 2.33 units of more stress in para-clinical departments compared to the inpatient wards. Finally, the results show

TABLE 2 The scores of perceived stress, stress coping strategies, and PTG.

Variable	Hospital				Health centre				Mean* difference	p-value
	Mean (SD)	Median	Minimum	Maximum	Mean (SD)	Median	Minimum	Maximum		
Perceived stress	31.25 (6.22)	31	9	56	29.82 (6.08)	30	1	52	1.42**	0.02
Stress coping strategies										
Problem-oriented	52.44 (8.51)	51	34	76	52.89 (8.96)	54	29	76	−4.48	0.60
Emotional-oriented	42.42 (8.94)	42	24	71	39.51 (9.46)	39	16	72	2.90***	0.002
Avoidance	45.47 (7.96)	45	24	71	43.58 (7.99)	43	24	67	1.89**	0.01
PTG	33.76 (29.92)	20.5	0	104	58.03 (25.71)	62.5	0	105	−24.26***	0.000
Recognizing new possibilities	8.25 (7.61)	6	0	25	14.19 (6.55)	15	0	25		
Relating to others	10.75 (9.43)	7	0	34	18.08 (8.61)	20	0	35		
Appreciation of life	5.03 (4.69)	3	0	15	8.8 (4.23)	10	0	15		
Personal strength	6.48 (6.06)	4	0	20	11.51 (5.38)	12	0	20		
Spiritual change	3.25 (3.34)	2	0	10	5.45 (3.08)	6	0	10		

*T-test was applied
**p-value <0.05
***p-value <0.01.

TABLE 3 The scores of the perceived stress and PTG according to stress coping strategies.

Variable	Frequency (%)	Mean (SD)[a]	Mean (SD)[b]
Stress coping strategies			
Problem-oriented	294 (73.13)	27.7 (8.03)	46 (31)
Emotional-oriented	42 (10.45)	31.31 (8.05)	44 (28)
Avoidance	43 (10.7)	30.63 (5.63)	42 (28)
Unknown	23 (5.73)		

[a]Perceived stress
[b]PTG.

that with the increase of each unit in the age of the participants, the level of perceptual stress decreases −0.16 units. No significant relationship was found between the other variables.

Table 5 shows the relationship between stress coping strategies and PTG was not significant. The results show that with the change in the status of the personnel department from the inpatient department to the emergency department, the PTG rate increased by 20 units. Unlike the emergency ward, the samples of the pre-hospital and surgery room expressed lower PTG (−18.42 and −13.71 units, respectively) compared to the inpatient wards. The results show that people who worked in the hospital experienced significantly less growth than the people who worked in health centres (−21.17 units, p-value = 0.003). Participants with a work background of 6–10 years experienced less growth than people with a work experience of fewer than five years (−25.22 units, p-value = 0.02). By changing the status of employment from the temporary group to the contractual group, PTG increased by an average of 10.59 units. No significant relationship was found between the other variables.

5 | DISCUSSION

This study was conducted on exploring the perceived stress, stress coping strategies, and PTG among Iranian healthcare professionals. There were higher than average of perceived stress among the participants. About 80% of the participants took a problem-oriented approach to coping with stress. In addition, the total score of PTG was calculated as low to moderate. Given the pandemic status of COVID-19 disease, which affects all economic, political, and social aspects of the world, there are adverse psychological impacts of this viral disease on the mental health of people (Li, Wang, et al., 2020).

In this study, the healthcare professionals, especially in the hospital section, have experienced much stress. Other similar studies have reported moderate to high stress level among frontline personnel following the COVID-19 virus pandemic (Babore et al., 2020; Huang et al., 2020; Sanliturk, 2021; Zhang, Wang, et al., 2020). Cheong et al. and Zhong et al. reported that about a third of those with SARS were the health staff in two separate studies, who had stress and anxiety (Cheong & Lee, 2004; Zhong et al., 2003). Sirati et al. concluded in their study that more than 90% of the subjects

TABLE 4 Regression model of individual and occupational variables and perceived stress.

Variable	Regression coefficient (β)	Standard deviation	T statistics	p-value	Confidence interval	
					Lower	Upper
Copping strategies						
Problem-oriented	4.07	2.03	2*	0.04	0.06	8.07
Emotional-oriented	3.21	1.74	1.84**	0.06	−0.22	6.65
Unknown	2.86	3.06	0.94	0.35	−3.15	8.88
Avoidance	Reference	Reference	Reference	Reference	Reference	Reference
Workplace						
Hospital	1.46	1.55	0.94	0.34	−1.59	4.53
Health centre	Reference	Reference	Reference	Reference	Reference	Reference
Department						
Clinic	−1.23	1.53	−0.8	0.42	−4.24	1.77
Emergency	−0.63	0.96	−0.65	0.51	−2.53	1.27
Pre-hospital	1.27	1.75	0.72	0.46	−2.17	4.71
Health centre	0.52	1.67	0.31	0.75	−2.76	3.81
Surgery room	−1.36	1.33	−1.02	0.30	−3.99	1.26
Para clinic	2.43	1.42	1.71**	0.08	−0.36	5.22
Inpatient	Reference	Reference	Reference	Reference	Reference	Reference
Having children						
Yes	1.19	1.03	1.15	0.24	−0.84	3.22
No	Reference	Reference	Reference	Reference	Reference	Reference
Shift						
Rotational	−0.35	1.08	−0.33	0.74	−2.48	1.77
Fixed	Reference	Reference	Reference	Reference	Reference	Reference
Marital status						
Single	−0.31	1.1	−0.29	0.77	−2.48	1.84
Married	Reference	Reference	Reference	Reference	Reference	Reference
Sex						
Male	0.45	0.92	0.49	0.62	−1.36	2.27
Female	Reference	Reference	Reference	Reference	Reference	Reference
Work experience (in years)						
6–10	−3.16	2.56	−1.24	0.21	−8.2	1.87
11–15	−1.9	2.2	−0.86	0.39	−6.24	2.43
16–20	−2.03	2.03	−1	0.31	−6.04	1.97
21–25	−2.64	1.83	−1.44	0.15	−6.24	0.95
26–30	−1.19	2.2	−0.54	0.58	−5.52	3.13
<5	Reference	Reference	Reference	Reference	Reference	Reference
Having critical situations (formerly)						
Yes	1.5	0.64	2.35*	0.02	0.24	2.76
No	Reference	Reference	Reference	Reference	Reference	Reference
Crisis-related course						
Yes	1.5	0.73	2.04*	0.04	0.05	2.95
No	Reference	Reference	Reference	Reference	Reference	Reference

TABLE 4 (Continued)

Variable	Regression coefficient (β)	Standard deviation	T statistics	p-value	Confidence interval	
					Lower	Upper
Direct exposure to the patients with COVID-19						
Yes	−0.21	0.84	−0.25	0.79	−1.86	1.44
No	Reference	Reference	Reference	Reference	Reference	Reference
Continuous presence in workplace during the COVID-19 outbreak						
Yes	0.71	1.71	0.42	0.67	−2.65	4.09
No	Reference	Reference	Reference	Reference	Reference	Reference
Education level						
Bachelor's	2.17	1.18	1.84**	0.06	−0.15	4.50
Master's	0.87	1.51	0.57	0.56	−2.11	3.86
Professional Doctorate	4.06	1.93	2.1*	0.03	0.25	7.86
Diploma	Reference	Reference	Reference	Reference	Reference	Reference
Employment status						
Corporative	−0.21	1.09	−0.2	0.84	−2.36	1.93
Contractual	−0.48	0.96	−0.5	0.61	−2.38	1.42
Semi-official	1.2	1.38	0.87	0.38	−1.51	3.92
Official	1.4	1.49	0.94	0.34	−1.52	4.34
Temporary	Reference	Reference	Reference	Reference	Reference	Reference
Age	−0.16	0.09	−1.76**	0.08	−0.34	0.01

Note: R squared = 0.11.

*Significant at the 0.05 level

**Significant at the 0.1 level.

experienced moderate to severe stress, more severely in the health staff than the non-health staff (Sirati Nir et al., 2020). Other studies in Iran also showed that the level of anxiety and depression of healthcare workers (physicians and nurses) was higher than the general level of society during the COVID-19 pandemic (Hassannia et al., 2020; Kaveh et al., 2020). In the present study, considering that the hospital section staff has direct contact with patients of more critical conditions, they have experienced more stress.

Previous experience of critical situations, crisis-related training courses, degree, department, and age were closely related to the level of stress perceived in this study. In the study of Sanlıtürk's, the level of occupational stress was affected by gender, the number of children, years of experience in intensive care, and the type of work shift (Sanliturk, 2021). Sirati et al. showed that men and people taking certain medications experience more stress (Sirati Nir et al., 2020). In some studies, younger people, such as students, were more likely to be exposed to generalized anxiety disorder during the development of the COVID-19 virus (Huang & Zhao, 2020; Qiu et al., 2020). These findings are consistent with the results of the present study, which indicate that stress decreases with age. It might be that older people can more efficiently manage stressful situations. In this study, previous experience of critical situations and crisis-related courses led to higher levels of stress indicating impracticality of such courses. On the other hand, being aware of a critical situation or higher education may have led to more stress. Another reason for the difference

in results with previous studies may be due to differences in working conditions and studied job and work variables.

According to the results, problem-oriented approach was the most common coping strategy. However, in two studies on nurses and nursing students, it has been demonstrated that avoidance or secrecy coping mechanisms were the dominant coping strategies against their physio-psycho-social status (Matos et al., 2010; Wang et al., 2015). Rolin et al. showed that healthcare workers endorsing problem-focused coping strategies had lower levels of the perceived threat and higher levels of perceived control in their response to the COVID-19 pandemic (Rolin et al., 2021). In the present study, a statistically significant relationship was found between coping strategies and stress levels. Similarly, Hasan et al. concluded a significant relationship between the perceived stress level and the adoption of a coping mechanism (Hasan et al., 2018). In another study, Morse et al. found that the coping strategy could help individuals face and handle a stressful situation, which can affect the level of general health (Morse et al., 2012). Unexpectedly, even though the study participants employed effective coping strategies (problem-oriented), they experienced higher levels of stress, which might be related to the unknown nature of the disease. On the other hand, having insufficient knowledge about a phenomenon can heighten the stress level.

In this study, PTG was low to moderate among participants with its rate higher in health centres than in hospitals. Pan Cui et al.

TABLE 5 Regression model of individual and occupational variables and PTG.

Variable	Regression coefficient (β)	Standard deviation	T statistics	p-value	Confidence interval	
					Lower	Upper
Copping strategies						
Problem-oriented	2.38	7.42	0.32	0.749	−12.22	16.98
Emotional-oriented	5.04	6.4	0.79	0.431	−7.55	17.64
Unknown	−7.89	10.2	−0.77	0.44	−27.95	12.17
Avoidance	Reference	Reference	Reference	Reference	Reference	Reference
Workplace						
Hospital	−21.17	7.11	−2.988***	0.003	−35.16	−7.18
Health centre	Reference	Reference	Reference	Reference	Reference	Reference
Department						
Clinic	−6.59	7.41	−0.89	0.37	−21.17	7.98
Emergency	20.79	5.87	3.54***	0	9.23	32.34
Pre-hospital	−18.42	8.38	−2.2*	0.02	−34.91	−1.93
Health centre	−1.99	7.79	−0.26	0.79	−17.31	13.32
Surgery room	−13.71	6.83	−2.01*	0.04	−27.15	−0.27
Para clinic	−8.02	5.72	−1.4	0.16	−19.28	3.23
Inpatient	Reference	Reference	Reference	Reference	Reference	Reference
Having children						
Yes	−2.95	4.93	−0.6	0.55	−12.64	6.74
No	Reference	Reference	Reference	Reference	Reference	Reference
Shift						
Rotational	−0.71	3.97	−0.18	0.857	−8.53	7.1
Fixed	Reference	Reference	Reference	Reference	Reference	Reference
Marital status						
Single	4.99	4.56	1.09	0.27	−3.98	13.97
Married	Reference	Reference	Reference	Reference	Reference	Reference
Sex						
Male	−5.55	3.55	−1.56	0.12	−12.55	1.44
Female	Reference	Reference	Reference	Reference	Reference	Reference
Work experience (in years)						
6–10	−25.22	11.36	−2.22*	0.02	−47.56	−2.88
11–15	−12.32	9.49	−1.3	0.19	−30.98	6.33
16–20	−11.78	8.44	−1.4	0.16	−28.37	4.81
21–25	−9.36	7.79	−1.2	0.23	−24.68	5.96
26–30	0.18	7.53	0.02	0.98	−14.64	15
<5	Reference	Reference	Reference	Reference	Reference	Reference
Having critical situations (formerly)						
Yes	−3.31	3.53	−0.94	0.34	−10.26	3.62
No	Reference	Reference	Reference	Reference	Reference	Reference
Crisis-related course						
Yes	0.75	3.68	0.21	0.83	−6.48	8
No	Reference	Reference	Reference	Reference	Reference	Reference
Direct exposure to the patients with COVID-19						
Yes	−5.46	4.23	−1.29	0.19	−13.8	2.86
No	Reference	Reference	Reference	Reference	Reference	Reference

TABLE 5 (Continued)

Variable	Regression coefficient (β)	Standard deviation	T statistics	p-value	Confidence interval	
					Lower	Upper
Continuous presence in workplace during the COVID-19 outbreak						
Yes	−2.34	7.72	−0.3	0.76	−17.53	12.84
No	Reference	Reference	Reference	Reference	Reference	Reference
Education level						
Bachelor's	3.86	5.02	0.77	0.44	−6.01	13.74
Master's	8.7	7.37	1.18	0.23	−5.79	23.19
Professional Doctorate	5.34	7.79	0.69	0.49	−9.98	20.67
Diploma	Reference	Reference	Reference	Reference	Reference	Reference
Employment status						
Corporative	5.42	5.65	0.96	0.33	−5.68	1.93
Contractual	10.59	4.51	2.35*	0.01	1.72	1.42
Semi-official	5.58	6.38	0.88	0.38	−6.96	3.92
Official	8.85	6.25	1.42	0.15	−3.44	4.34
Temporary	Reference	Reference	Reference	Reference	Reference	Reference
Age	0.2	0.44	0.45	0.65	−0.67	1.07

Note: R squared = 0.3.

* Significant at the 0.05 level

***Significant at the 0.01.

reported that the PTG of frontline nurses was at a medium to high level and influenced by working years, self-confidence in frontline work, awareness of risk, psychological intervention or training and deliberate rumination (Pan Cui et al., 2021). Peng et al. also found that the average score of PTGI in frontline nurses was moderate. The PTG score increased significantly in individuals who had support from family members and friends, had psychological comfort and had children (Peng et al., 2021). In this study, PTG was related to department, workplace, work experience, and employment status. However, no statistical correlation was found between PTG and the coping strategies. It seems that the personnel with more stable employment status have paid more attention to the issue of suitable stress management. Unlike the present study, positive coping strategies were significantly associated with elevated PTG in several studies (Finstad et al., 2021; Kalaitzaki et al., 2021; Rajandram et al., 2011).

The findings of the present study show the mental state of a large number of healthcare professionals. This information might be used to design and implement programmes to reduce occupational stress, strengthen morale and develop rational decision-making strategies in critical situations. Also, mental health experts might provide counselling services for improving mental state and positive attitude style. Two earlier studies showed that teaching job coping strategies can reduce job stress (Ebert et al., 2016; Sohrabi et al., 2019). The results of the study of Khatoni et al. showed that stress immunization training on the level of job stress of nurses working in selected military hospitals was not associated with a significant reduction in their job stress (Khatoni et al., 2020). Xu et al. reported that the scores of PTG and its subscales were significantly higher after intervention

(Xu et al., 2016). Further studies can focus on the accuracy of the training practicality.

5.1 | Strengths and limitations

There are several strengths in this study. First, the issues of perceived stress, coping strategies, and PTG are the three fundamental problems, rarely studied together in studies conducted in Iran. In this study, the studied healthcare professionals were among the vulnerable occupations, especially during the COVID-19 pandemic, which might exacerbate the rate of stress. Second, the participants were satisfied with the content of the studied factors in this study. On the other hand, further studies may be required in other settings and among other healthcare staff to generalize the findings. Furthermore, other longitudinal studies are required for a more accurate assessment of the constructs covered in this study.

6 | CONCLUSION

Considering that the stress in health professional leads to a quantitative and qualitative drop in health services, identifying the stress level in healthcare professionals in the work environment encourages strategies to reduce the effects of stress and improve the quality of service delivery. It is clear from the results of this study that the Iranian healthcare professionals experienced more rate of stress due to the nature of their job and the unknown nature of the new

pandemic. It highlights the importance of supportive programmes. Nursing managers can reduce stress as much as possible by providing appropriate protective equipment, division of labour, and working hours. However, many participants used a problem-based strategy to deal with stress, indicating a rational approach to the issue. In addition, many people studied especially in health centres expressed a higher level of mental function in this study (high PTG). Social support and professional psychological intervention should be applied to further improve the PTG level. The leaders should pay attention to PTG and the factors influencing it and offer solutions to retain mental health. In this way, they can reduce tensions in the work environment. Given that many participants have high levels of stress despite previous experience, related training courses and positive coping strategies, it seems that designing practical training courses, specifying relevant concepts in syllabuses, support strategies, and appropriate counselling ameliorate the performance of the healthcare professionals.

CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

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REFERENCES

Babore, A., Lombardi, L., Viceconti, M. L., Pignataro, S., Marino, V., Crudele, M., Candelori, C., Monique Bramanti, S., & Trumello, C. (2020). Psychological effects of the COVID-2019 pandemic: Perceived stress and coping strategies among healthcare professionals. *Psychiatry Research*, *293*, 113366. https://doi.org/10.1016/j.psychres.2020.113366

Beck, C. T., Eaton, C. M., & Gable, R. K. (2016). Vicarious posttraumatic growth in labor and delivery nurses. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *45*(6), 801–812. https://doi.org/10.1016/j.jogn.2017.04.123

Cheong, D., & Lee, C. (2004). Impact of severe acute respiratory syndrome on anxiety levels of front-line health care workers. *Hong Kong Medical Journal*, *10*(5), 325–330.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*(4), 385–396. https://doi.org/10.2307/2136404

Ebert, D. D., Lehr, D., Heber, E., Riper, H., Cuijpers, P., & Berking, M. (2016). Internet-and mobile-based stress management for employees with adherence-focused guidance: Efficacy and mechanism of change. *Scandinavian Journal of Work, Environment & Health*, *42*(5), 382–394. https://doi.org/10.5271/sjweh.3573

Endler, N. S., & Parker, J. (1990a). *Coping inventory for stressful situations*. Multi-Health systems Incorporated.

Endler, N. S., & Parker, J. D. (1990b). Multidimensional assessment of coping: A critical evaluation. *Journal of Personality and Social Psychology*, *58*(5), 844–854. https://doi.org/10.1037/0022-3514.58.5.844

Feingold, J. H., Hurtado, A., Feder, A., Peccoralo, L., Southwick, S. M., Ripp, J., & Pietrzak, R. H. (2022). Posttraumatic growth among health care workers on the frontlines of the COVID-19 pandemic. *Journal of Affective Disorders*, *296*, 35–40. https://doi.org/10.1016/j.jad.2021.09.032

Finstad, G. L., Giorgi, G., Lulli, L. G., Pandolfi, C., Foti, G., León-Perez, J. M., Cantero-Sánchez, F. J., & Mucci, N. (2021). Resilience, coping strategies and posttraumatic growth in the workplace following COVID-19: A narrative review on the positive aspects of trauma. *International Journal of Environmental Research and Public Health*, *18*(18), 9453. https://doi.org/10.3390/ijerph18189453

Ghoreyshi Rad, F. (2010). Validation of Endler & Parker coping scale of stressful situations. *International Journal of Behavioral Sciences*, *4*(1), 1–7.

Hasan, A. A., Elsayed, S., & Tumah, H. (2018). Occupational stress, coping strategies, and psychological-related outcomes of nurses working in psychiatric hospitals. *Perspectives in Psychiatric Care*, *54*(4), 514–522. https://doi.org/10.1111/ppc.12262

Hassannia, L., Taghizadeh, F., Moosazadeh, M., Zarghami, M., Taghizadeh, H., Dooki, A. F., Alizadeh Navaei, R., & Hedayatizadeh-Omran, A. (2020). Anxiety and depression in health workers and general population during COVID-19 epidemic in Iran: A web-based cross-sectional study. *MedRxiv*. https://doi.org/10.1101/2020.05.05.20089292

Huang, J. Z., Han, M., Luo, T., Ren, A., & Zhou, X. (2020). Mental health survey of 230 medical staff in a tertiary infectious disease hospital for COVID-19. *Zhonghua lao dong wei sheng zhi ye bing za zhi = Chinese Journal of Industrial Hygiene and Occupational Diseases*, *38*, E001. https://doi.org/10.3760/cma.j.cn121094-20200219-00063

Huang, Y., & Zhao, N. (2020). Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: A web-based cross-sectional survey. *Psychiatry Research*, *288*, 112954. https://doi.org/10.1016/j.psychres.2020.112954

Jin, Y., Xu, J., Liu, H., & Liu, D. (2014). Posttraumatic stress disorder and posttraumatic growth among adult survivors of Wenchuan earthquake after 1 year: Prevalence and correlates. *Archives of Psychiatric Nursing*, *28*(1), 67–73. https://doi.org/10.1016/j.apnu.2013.10.010

Kalaitzaki, A., Tamiolaki, A., & Tsouvelas, G. (2021). From secondary traumatic stress to vicarious posttraumatic growth amid COVID-19 lockdown in Greece: The role of health care workers' coping strategies. *Psychological Trauma: Theory, Research, Practice, and Policy*, *14*(2), 273–280. https://doi.org/10.1037/tra0001078

Karagiorgou, O., Evans, J. J., & Cullen, B. (2018). Post-traumatic growth in adult survivors of brain injury: A qualitative study of participants completing a pilot trial of brief positive psychotherapy. *Disability and Rehabilitation*, *40*(6), 655–659. https://doi.org/10.1080/09638288.2016.1274337

Kato, T. (2012). Development of the coping flexibility scale: Evidence for the coping flexibility hypothesis. *Journal of Counseling Psychology*, *59*(2), 262–273. https://doi.org/10.1037/a0027770

Kaveh, M., Davari-tanha, F., Varaei, S., Shirali, E., Shokouhi, N., Nazemi, P., Ghajarzadeh, M., Feizabad, E., & Ashraf, M. A. (2020). Anxiety levels among Iranian health care workers during the COVID-19 surge: A cross-sectional study. *MedRxiv*. https://doi.org/10.1101/2020.05.02.20089045

Khatoni, S., Pishgooie, S. A. H., & Khodabakhsh, M. R. (2020). Determining the effectiveness of stress inoculation training on Nurses' job stress at selected military hospitals. *Military Caring Sciences Journal*, *7*(1), 26–34.

Lev-Wiesel, R., Goldblatt, H., Eisikovits, Z., & Admi, H. (2009). Growth in the shadow of war: The case of social workers and nurses working in a shared war reality. *British Journal of Social Work*, *39*(6), 1154–1174. https://doi.org/10.1093/bjsw/bcn021

Li, S., Wang, Y., Xue, J., Zhao, N., & Zhu, T. (2020). The impact of COVID-19 epidemic declaration on psychological consequences: A study on active Weibo users. *International Journal of Environmental Research and Public Health*, *17*(6), 2032. https://doi.org/10.3390/ijerph17062032

Li, X., Yu, H., Bian, G., Hu, Z., Liu, X., Zhou, Q., Yu, C., Wu, X., Yuan, T. F., & Zhou, D. (2020). Prevalence, risk factors, and clinical correlates of insomnia in volunteer and at home medical staff during the COVID-19. *Brain, Behavior, and Immunity*, *87*, 140–141. https://doi.org/10.1016/j.bbi.2020.05.008

Main, A., Zhou, Q., Ma, Y., Luecken, L. J., & Liu, X. (2011). Relations of SARS-related stressors and coping to Chinese college students' psychological adjustment during the 2003 Beijing SARS epidemic. *Journal of Counseling Psychology*, *58*(3), 410–423. https://doi.org/10.1037/a0023632

Maroufizadeh, S., Zareiyan, A., & Sigari, N. (2014). Psychometric properties of the 14, 10 and 4-item "perceived stress scale" among asthmatic patients in Iran. *Payesh (Health Monitor)*, *13*(4), 457–465.

Martínez, J. P., Méndez, I., Ruiz-Esteban, C., Fernández-Sogorb, A., & García-Fernández, J. M. (2020). Profiles of burnout, coping strategies and depressive symptomatology. *Frontiers in Psychology*, *11*, 591. https://doi.org/10.3389/fpsyg.2020.00591

Matos, P. S., Neushotz, L. A., Griffin, M. T. Q., & Fitzpatrick, J. J. (2010). An exploratory study of resilience and job satisfaction among psychiatric nurses working in inpatient units. *International Journal of Mental Health Nursing*, *19*(5), 307–312. https://doi.org/10.1111/j.1447-0349.2010.00690.x

Mo, Y., Tao, P., Liu, G., Chen, L., Li, G., Lu, S., Zhang, G., Liang, R., & Huang, H. (2021). Post-traumatic growth of nurses who faced the COVID-19 epidemic and its correlation with professional self-identity and social support. *Frontiers in Psychiatry*, *12*, 562938. https://doi.org/10.3389/fpsyt.2021.562938

Montero-Marín, J., Prado-Abril, J., Piva Demarzo, M. M., Gascon, S., & García-Campayo, J. (2014). Coping with stress and types of burnout: Explanatory power of different coping strategies. *PLoS One*, *9*(2), e89090. https://doi.org/10.1371/journal.pone.0089090

Morse, G., Salyers, M. P., Rollins, A. L., Monroe-DeVita, M., & Pfahler, C. (2012). Burnout in mental health services: A review of the problem and its remediation. *Administration and Policy in Mental Health and Mental Health Services Research*, *39*(5), 341–352. https://doi.org/10.1007/s10488-011-0352-1

Mosolova, E., Chung, S., Sosin, D., & Mosolov, S. (2020). Stress and anxiety among healthcare workers associated with COVID-19 pandemic in Russia. *Psychiatria Danubina*, *32*(3–4), 549–556. https://doi.org/10.24869/psyd.2020.549

Munawar, K., & Choudhry, F. R. (2021). Exploring stress coping strategies of frontline emergency health workers dealing Covid-19 in Pakistan: A qualitative inquiry. *American Journal of Infection Control*, *49*(3), 286–292. https://doi.org/10.1016/j.ajic.2020.06.214

Najafi Gharehasani, E., Yazdanbakhsh, K., & Moment, K. (2020). Predicting vicarious post traumatic growth based on cognitive flexibility and cognitive reappraisal in nurses providing services to Kermanshah earthquake victims. *Journal of Health and Care*, *22*(1), 17–24.

Pan Cui, P., Wang, P. P., Wang, K., Ping, Z., Wang, P., & Chen, C. (2021). Post-traumatic growth and influencing factors among frontline nurses fighting against COVID-19. *Occupational and Environmental Medicine*, *78*(2), 129–135. https://doi.org/10.1136/oemed-2020-106540

Peng, X., Zhao, H.-Z., Yang, Y., Rao, Z.-L., Hu, D.-Y., & He, Q. (2021). Post-traumatic growth level and its influencing factors among frontline nurses during the COVID-19 pandemic. *Frontiers in Psychiatry*, *12*, 910. https://doi.org/10.3389/fpsyt.2021.632360

Qiu, J., Shen, B., Zhao, M., Wang, Z., Xie, B., & Xu, Y. (2020). A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: Implications and policy recommendations. *General Psychiatry*, *33*(2), e100213. https://doi.org/10.1136/gpsych-2020-100213

Rajandram, R. K., Jenewein, J., McGrath, C., & Zwahlen, R. A. (2011). Coping processes relevant to posttraumatic growth: An evidence-based review. *Supportive Care in Cancer*, *19*(5), 583–589. https://doi.org/10.1007/s00520-011-1105-0

Rhee, Y. S., Ko, Y. B., & Han, I. Y. (2013). Posttraumatic growth and related factors of child protective service workers. *Annals of Occupational and Environmental Medicine*, *25*(1), 1–10. https://doi.org/10.1186/2052-4374-25-6

Rolin, S. N., Flis, A., & Davis, J. J. (2021). Work coping, stress appraisal, and psychological resilience: Reaction to the COVID-19 pandemic among health care providers. *Psychology & Neuroscience*, *15*(2), 131–146. https://doi.org/10.1037/pne0000257

Sanliturk, D. (2021). Perceived and sources of occupational stress in intensive care nurses during the covid-19 pandemic. *Intensive and Critical Care Nursing*, *67*, 103107. https://doi.org/10.1016/j.iccn.2021.103107

Sébille, V., Hardouin, J. B., Giral, M., Bonnaud-Antignac, A., Tessier, P., Papuchon, E., Jobert, A., Faurel-Paul, E., Gentile, S., Cassuto, E., Morélon, E., Rostaing, L., Glotz, D., Sberro-Soussan, R., Foucher, Y., & Meurette, A. (2016). Prospective, multicenter, controlled study of quality of life, psychological adjustment process and medical outcomes of patients receiving a preemptive kidney transplant compared to a similar population of recipients after a dialysis period of less than three years–the PreKit-QoL study protocol. *BMC Nephrology*, *17*(1), 1–9. https://doi.org/10.1186/s12882-016-0225-7

Shen, X., Zou, X., Zhong, X., Yan, J., & Li, L. (2020). Psychological stress of ICU nurses in the time of COVID-19. *Critical Care*, *24*, 1–3. https://doi.org/10.1186/s13054-020-02926-2

Sirati Nir, M., Karimi, L., & Khalili, R. (2020). Research paper the perceived stress level of health care and non-health care in exposed to covid-19 pandemic. *Iranian Journal of Psychiatry and Clinical Psychology*, *26*(3 Spec), 294–305. https://doi.org/10.32598/ijpcp.26.3405.1

Sohrabi, F., Khanjani, M., Aazami, Y., Khanjani, E., Sharifi, P. M., & Froghi Neghad, E. (2019). The effectiveness of the stress immunization program on coping with stress strategies, emotion regulation strategies and mental health in female-headed households covered by the welfare organization. *Journal of Sabzevar University of Medical Sciences*, *26*(4), 431–444.

Stutts, L. A., Bills, S. E., Erwin, S. R., & Good, J. J. (2015). Coping and posttraumatic growth in women with limb amputations. *Psychology, Health & Medicine*, *20*(6), 742–752. https://doi.org/10.1080/13548506.2015.1009379

Tahara, M., Mashizume, Y., & Takahashi, K. (2021). Coping mechanisms: Exploring strategies utilized by Japanese healthcare workers to reduce stress and improve mental health during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, *18*(1), 131. https://doi.org/10.3390/ijerph18010131

Taubman-Ben-Ari, O., & Weintroub, A. (2008). Meaning in life and personal growth among pediatric physicians and nurses. *Death Studies*, *32*(7), 621–645. https://doi.org/10.1080/07481180802215627

Tedeschi, R. G., & Calhoun, L. G. (1996). The posttraumatic growth inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress*, *9*(3), 455–471. https://doi.org/10.1007/BF02103658

Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry*, *15*(1), 1–18. https://doi.org/10.1207/s15327965pli1501_01

Tian, F., Li, H., Tian, S., Yang, J., Shao, J., & Tian, C. (2020). Psychological symptoms of ordinary Chinese citizens based on SCL-90 during the level I emergency response to COVID-19. *Psychiatry Research*, *288*, 112992. https://doi.org/10.1016/j.psychres.2020.112992

Tomita, M., Takahashi, M., Tagaya, N., Kakuta, M., Kai, I., & Muto, T. (2017). Structural equation modeling of the relationship between posttraumatic growth and psychosocial factors in women with breast cancer. *Psycho-Oncology*, *26*(8), 1198–1204. https://doi.org/10.1002/pon.4298

Tuncay, T., & Musabak, I. (2015). Problem-focused coping strategies predict posttraumatic growth in veterans with lower-limb amputations. *Journal of Social Service Research*, *41*(4), 466–483. https://doi.org/10.1080/01488376.2015.1033584

Venkatesh, A., & Edirappuli, S. (2020). Social distancing in covid-19: What are the mental health implications? *BMJ*, *369*, m1379. https://doi.org/10.1136/bmj.m1379

Walton, R. L. (2002). *A comparison of perceived stress levels and coping styles of junior and senior students in nursing and social work programs.* Marshall University.

Wang, S. M., Lai, C. Y., Chang, Y.-Y., Huang, C.-Y., Zauszniewski, J. A., & Yu, C.-Y. (2015). The relationships among work stress, resourcefulness, and depression level in psychiatric nurses. *Archives of Psychiatric Nursing*, *29*(1), 64–70. https://doi.org/10.1016/j.apnu.2014.10.002

Xu, X., Hu, M.-L., Song, Y., Lu, Z.-X., Chen, Y.-Q., Wu, D.-X., & Xiao, T. (2016). Effect of positive psychological intervention on posttraumatic growth among primary healthcare workers in China: A preliminary prospective study. *Scientific Reports*, *6*(1), 1–7. https://doi.org/10.1038/srep39189

Yin, H., Huang, S., & Lv, L. (2018). A multilevel analysis of job characteristics, emotion regulation, and teacher well-being: A job demands-resources model. *Frontiers in Psychology*, *9*, 2395. https://doi.org/10.3389/fpsyg.2018.02395

Zhang, C., Yang, L., Liu, S., Ma, S., Wang, Y., Cai, Z., Hui, D., Ruiting, L., Lijun, K., Meili, S., Jihui, Z., Zhongchun, L., Bin, Z., & Su, M. (2020). Survey of insomnia and related social psychological factors among medical staff involved in the 2019 novel coronavirus disease outbreak. *Frontiers in Psychiatry*, *11*, 306. https://doi.org/10.3389/fpsyt.2020.00306

Zhang, X. T., Shi, S. S., Ren, Y. Q., & Wang, L. (2021). The traumatic experience of clinical nurses during the COVID-19 pandemic: Which factors are related to post-traumatic growth? *Risk Management and Healthcare Policy*, *14*, 2145–2151. https://doi.org/10.2147/RMHP.S307294

Zhang, Y., Wang, C., Pan, W., Zheng, J., Gao, J., Huang, X., Cai, S., Zhai, Y., Latour, J. M., & Zhu, C. (2020). Stress, burnout, and coping strategies of frontline nurses during the COVID-19 epidemic in Wuhan and Shanghai, China. *Frontiers in Psychiatry*, *11*, 1154. https://doi.org/10.3389/fpsyt.2020.565520

Zhong, N., Zheng, B., Li, Y., Poon, L., Xie, Z., Chan, K., Li, P., Tan, S., Chang, Q., Xie, J., Liu, X., Xu, J., Li, D., Yuen, K., Peiris, J., & Guan, Y. (2003). Epidemiology and cause of severe acute respiratory syndrome (SARS) in Guangdong, People's Republic of China, in February, 2003. *The Lancet*, *362*(9393), 1353–1358. https://doi.org/10.1016/S0140-6736(03)14630-2

Zhou, Y., Yang, Y., Shi, T., Song, Y., Zhou, Y., Zhang, Z., Guo, Y., Xixi, L., Yonging, L., Goujan, X., Teris, C., Yu-tao, X., & Yanqing, T. (2020). Prevalence and demographic correlates of poor sleep quality among frontline health professionals in Liaoning Province, China during the COVID-19 outbreak. *Frontiers in Psychiatry*, *11*, 520. https://doi.org/10.3389/fpsyt.2020.00520

Zhu, J., Sun, L., Zhang, L., Wang, H., Fan, A., Yang, B., Li, W., & Xiao, S. (2020). Prevalence and influencing factors of anxiety and depression symptoms in the first-line medical staff fighting against COVID-19 in Gansu. *Frontiers in Psychiatry*, *11*, 386. https://doi.org/10.3389/fpsyt.2020.00386