Research Paper

General Health, Posttraumatic Stress Disorder, and Coping Strategies of Nurses Working in the COVID-19 Intensive Care Units

Majid Taheri[1], Fatemeh Mohaddes Ardabili[2*], Tahereh Najafighezeljeh[2], Mehri Bozorgnejad[2], Shima Haghani[3]

1. Department of Critical Care Nursing, Faculty of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran.
2. Department of Internal Surgical Nursing, Faculty of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran.
3. Department of Biostatistics, Faculty of Public Health, Iran University of Medical Sciences, Tehran, Iran.

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ABSTRACT

Background: Nurses working in intensive care units (ICUs) are more in direct contact with COVID-19 patients than other healthcare team members and are more vulnerable to mental disorders. This study aimed to determine the general health status, posttraumatic stress disorder, and coping strategies of nurses employed in the COVID-19 intensive care units.

Methods: It was a cross-sectional descriptive study. Using the census method, 102 nurses working in the COVID-19 intensive care units of Iran University of Medical Sciences in Tehran, Iran, were recruited as the sample in 2022. The general health questionnaire (GHQ-28), the impact of events-revised (IES-R), and the ways of coping questionnaire (WCQ) were used as research instruments. The data were analyzed using the Pearson correlation coefficient, independent t-test, and analysis of variance in SPSS software, version 16. The significance level was set at $P<0.05$.

Results: The overall mean of general health was 32.22±12.21, indicating mild psychological distress in most nurses. Somatic symptoms had the highest mean (9.16±4.06) among the GHQ-28 subscales. The mean posttraumatic stress disorder was 39.07±14.79. The means of problem-focused and emotion-focused coping strategies were 48.03±13.44 and 40.78±11.70, respectively. Most nurses (60.8%) generally suffered posttraumatic stress symptoms and used problem-focused coping strategies to deal with stressors during the COVID-19 pandemic. No significant relationship existed between the main variables and the nurses' characteristics ($P>0.05$).

Conclusion: Most nurses experienced mental disorders (general health disorders and posttraumatic stress) during the COVID-19 pandemic. To reduce the psychological impact of COVID-19 on nurses, paying attention to their mental health is essential. Given the adverse effect of COVID-19 on nurses, studying the relationship between these variables and the quality of nurses' performance is suggested.

*** Corresponding Author:**
Fatemeh Mohaddes Ardabili
Address: *Department of Internal Surgical Nursing, Faculty of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran.*
Tel: *+98 (912) 3386870*
E-mail: *Mohaddes.f@iums.ac.ir*

Highlights

- COVID-19 has negative effects on frontline nurses.
- Coping strategies are necessary to deal with stressful situations.
- Most nurses in this study suffered from mild psychological distress.
- Working during the pandemic can cause posttraumatic stress disorder in ICU nurses.
- Most nurses (60.8%) in this study suffered from posttraumatic stress symptoms and used problem-focused coping strategies to deal with their stress during the pandemic.

Plain Language Summary

COVID-19 caused serious death and injury worldwide. Nurses are on the front line of the fight against COVID-19 and may suffer physical and mental problems during the outbreak. This study was conducted on nurses working in the intensive care units of COVID-19 in Iran. The results showed that most participating nurses had mild psychological distress and posttraumatic stress symptoms and used problem-focused coping strategies more than emotion-focused ones. For this reason, it is necessary to pay more attention to the mental health of nurses during the pandemic.

1. Introduction

COVID-19 emerged in Wuhan, China 2019, causing an unprecedented epidemic (Cabarkapa et al., 2020). As the largest group of health workers, nurses play an important role in outbreaks such as the COVID-19 pandemic (Kovner et al., 2021). COVID-19 has affected the lives of nurses and their families worldwide, forcing them to work long hours in dangerous conditions (Gab Allah, 2021). Because of their close contact with COVID-19 patients, they are at a higher risk of contracting the disease (Dastyar & Karimiankakolaki, 2022). In addition, the use of personal protective equipment makes everyday tasks such as drinking water, breathing, and vision difficult for nurses, resulting in increased fatigue (Nie et al., 2020).

High-risk nursing environments, combined with increased work pressure, multiple tasks, lack of resources, and increased physical and psychological burden, can negatively impact nurses' physical and mental health (Niu et al., 2022). Working in COVID-19 wards also puts nurses' health at risk due to the nature of the work, the possibility of infection, and the stress of infecting those around them, which can lead to mental disorders (Khaki et al., 2022). The US sanctions during the outbreak of COVID-19 have worsened the situation in Iran and increased the death toll (Abtahi, 2021).

Nurses in COVID-19 intensive care units (ICUs) face heavy workloads and long-term exhaustion. They are concerned about patient mortality which may negatively affect their physical and mental health (Chegini et al., 2021). According to the World Health Organization (WHO), health is not just the absence of disease or infirmity but a complete physical, mental, and social well-being (Larsen, 2022). Physical and mental health are crucial factors in work efficiency and individual productivity. Nurses' health is particularly important in hospitals, where workplace stressors can negatively impact their well-being and quality of care (Alipoor & Inanloo, 2020).

In recent research, 58.7% of nurses and physicians participating in the study were at high risk of acute health disorders during the outbreak (Bizri et al., 2022). Poor general health can hinder nurses' ability to provide appropriate care and support to patients and increase the risk of medical errors and work-related injuries that can harm patients and nurses (Hojjati et al., 2010). Critical conditions caused by COVID-19 can lead to depression, anxiety, posttraumatic stress disorder (PTSD), and other mental disorders in nurses (Riedel et al., 2021).

PTSD is a type of mental disorder that occurs due to direct or indirect exposure to a traumatic event or intense psychological pressure, and the person responds with fear and panic (Li et al., 2021b). People with PTSD are 2 to 5 times more likely to commit suicide than others. During the COVID-19 outbreak, healthcare work-

ers may develop acute stress disorders that may progress to chronic PTSD (Dutheil et al., 2021). According to a study, the main risk factors for PTSD among healthcare workers are the female gender, the nursing profession, lower educational attainment, and concerns about COVID-19 (Blanco-Daza et al., 2022). A study showed that 38.8% of South African nurses had severe PTSD in the second wave of COVID-19 (Engelbrecht et al., 2021). During the COVID-19 outbreak, healthcare workers should use coping strategies to deal with the stressful conditions of the pandemic while they continue to face many other problems (Özçevik Subaşi et al., 2021).

Using coping strategies helps healthcare workers face stressful situations caused by COVID-19 (Taharaet al., 2020). Coping strategies in stressful conditions can prevent psychological crises in health workers and are necessary to deal with the negative effects of COVID-19 (Tahara et al., 2020). Identifying these strategies can provide valuable information for planning and implementing effective interventions to support the mental health of healthcare workers (Htay et al., 2021). Coping strategies used by people are different, and factors related to the existing situation can affect the choice of these strategies (Vagni et al., 2020). Two general coping strategies are used to deal with stressful situations: Problem-focused coping strategies to solve the problems or change the existing situation and emotion-focused coping strategies to reduce the emotional pressure caused by stressful situations (Huang et al., 2020). The choice and application of the coping method is different for different people. For example, in a study, an emotion-focused coping strategy was used more than a problem-focused coping strategy by nurses who cared for COVID-19 patients with pneumonia (Sinichi et al., 2020).

Nurses working in ICU always face difficult and stressful conditions that can affect their health and quality of care. These conditions are more difficult during the COVID-19 pandemic, and their negative effects are greater. According to what was mentioned, measuring the mental state and how nurses face these difficult conditions felt necessary. Therefore, the current study was conducted to determine the general health status, PTSD, and coping strategies of nurses working in the COVID-19 ICUs of Iran University of Medical Sciences (IUMS) medical training centers.

2. Materials and Methods

Design, setting, and sample

This research was a descriptive cross-sectional study. The research population included all nurses working in the COVID-19 ICUs in educational and treatment centers affiliated with IUMS (Hazrat Rasoul, Firouzgar, and Firouzabadi) in 2022. A total of 102 nurses were recruited by the census method.

The inclusion criteria were at least one month of work experience in the COVID-19 ICU and a bachelor's degree or higher in nursing. In case of unwillingness to cooperate or incompleteness of the questionnaires, the sample was excluded from the study. Sampling lasted 2 months, and the nurses completed the questionnaires during off-duty hours. The possibility of a small sample size was raised in the Alumni Council of the Faculty of Nursing and Midwifery of IUMS, and its members confirmed the adequacy of the sample size.

Study instruments

The research tools used in the study included a demographic questionnaire to collect information on age, gender, work experience, work experience in COVID-19 ICU, education, marital status, satisfaction with personal protective equipment, history of infection with COVID-19, general health questionnaire (GHQ-28), the impact of event scale-revised (IES-R) and ways of coping questionnaire (WCQ).

The GHQ-28 was introduced by Goldberg and Hillier in 1979. The items of this tool assess the mental health status of the individual in the last month. It consists of 4 subscales (somatic symptoms, anxiety/insomnia, social dysfunction, and severe depression), each comprising 7 items. The score of each subscale ranges from 0 to 21. Items 1 to 7 are related to the somatic symptoms subscale, 8 to 14 are related to anxiety/insomnia, 15 to 21 are related to the social dysfunction subscale, and 22 to 28 are associated with the severe depression subscale. The items are scored on a 4-point Likert scale from 0 to 3, with 0=better than usual, 1=same as usual, 2=worse than usual, and 3=much worse than usual.

Items 15, 17, 18, 19, 20, 21 are scored in inverse. The total score ranges from 0 to 84. The cut-off point of the questionnaire is 23. Scores between 0 and 22 indicate no psychological distress, scores between 23 and 40 indicate mild psychological distress, scores 41-60 indicate moderate psychological distress, and scores 61-84

suggest severe psychological distress. The mean score of each subscale is 6. Scores from 0 to 6 indicate no psychological distress, scores from 7 to 11 indicate mild psychological distress, scores from 12 to 16 indicate moderate psychological distress, and scores from 17 to 21 suggest severe psychological distress (Goldberg & Hillier, 1979). Taghavi assessed the validity and reliability of the Persian version of the questionnaire. The reliability coefficients were calculated using 3 methods: Test re-test, split-half, and Cronbach α, which were 0.70, 0.93, and 0.90, respectively. The concurrent validity of the questionnaire, as measured by the Middlesex hospital questionnaire, was 0.55 (P<0001) (Taghavi, 2002).

The impact of the event scale-revised (IES-R) scale was constructed by Weiss and Marmar in 1997. It is a list of difficulties people sometimes feel after stressful life events and indicates how distressing each difficulty has been for the respondent during the past seven days (Keane & Wilson, 2004). This self-reporting tool consists of 22 items and three main dimensions: Intrusive thoughts, hyperarousal, and avoidance of PTSD when dealing with specific events in life. It indicates how distressing each difficulty has been for the respondent during the past 7 days. This scale is scored on a Likert-type scale from 0 (not at all) to 4 (extremely). The total score ranges from 0 to 88 (Weiss & Marmar, 1997). The scale has high internal consistency (α coefficient 0.96) (Creameret al., 2003). The best cut-off point of this scale is 33 (Creamer et al., 2003). Accordingly, a score of 33 or more indicates PTSD and scores less than 33 suggest no PTSD. The validity and reliability of the Persian version of this scale were evaluated in 2006, and its Cronbach α coefficient was estimated to be between 0.67 and 0.87, its test re-test reliability was 0.8-0.98 (P<0.001), and its convergent validity was confirmed (Panaghi et al., 2006). In this study, the validity of this questionnaire was substantively conducted by 3 faculty members from the Faculty of Nursing at IUMS. The instrument's internal consistency was also measured using the Cronbach α coefficient (0.912).

Lazarus and Folkman developed the way of coping questionnaire (WCQ) (Lazarus and Folkman, 1984). It consists of 66 items which are scored on a 4-point Likert scale, with 0 (not used), 1 (used somewhat), 2 (used quite a bit), and 3 (used a great deal). The total score ranges from 0 to 198. High scores in each subscale indicate higher use of the mentioned coping strategy. The questionnaire has 8 subscales to measure 8 coping methods. It is divided into problem-focused coping strategies (seeking social support: 6 questions, accepting responsibility: 4 questions, planful problem-solving: 6 items, and positive reappraisal: 7 questions) and emotion-focused strategies (confrontive coping: 6 items, distancing: 6 items, self-controlling: 6 items, escape-avoidance: 8 questions). The total score of the problem-focused coping strategy ranges from 0 to 69, and the emotion-focused coping strategies' score ranges from 0 to 78. Sixteen items in this questionnaire are deviant and do not include any subscale (Lazarus and Folkman, 1984). In Iran, the validity and reliability of this tool were examined by Padyab and Ghazinoor in 2012, who reported its construct reliabilities ranging from 0.6 to 0.84 (Padyab & Ghazinour, 2009). Since a comparison between the means of the subscales of this tool was not possible, the mean on a 0 to 100 basis was used in this study.

Data analysis

Data analysis was performed using SPSS software, version 16 in descriptive statistics and inferential statistics. In the descriptive statistics section, frequency distribution tables were used for qualitative research variables and minimum, maximum, Mean±SD indices were used for the quantitative variables. In the inferential statistics section, the Pearson correlation coefficient was used to investigate the correlation between demographic information and general health and the correlation between demographic data and posttraumatic stress. Also, the independent t-tests and analysis of variance at a significant level of 0.05 were used.

3. Results

Most nurses were female (62.7%), younger than 30 years (52%), and married (56.9%). Most nurses (48%) had <5 years of professional experience, and 81.4% had previously contracted COVID-19 (Table 1).

The nurses' mean general health was 32.22±12.21, indicating mild psychological distress. The means of somatic symptoms, anxiety/insomnia, and social dysfunction were 9.16±4.06, 9.05±4.21, and 8.64±2.70, respectively. The average values of these subscales also indicate mild psychological distress. The mean of depression symptoms was 5.35±4.31, meaning the studied nurses did not have mental distress in this subscale. The mean PTSD was 39.07±14.79, and 62 participants (60.8%) suffered from PTSD symptoms (Table 2).

Based on 0 to 100, among the subscales of emotion-focused strategies, the self-controlling subscale, with mean of 46.82±14.26, and the escape-avoidance subscale, with mean of 37.90±16.64 had the highest and lowest means, respectively. Among the problem-focused strategies, the positive reappraisal subscale, with mean

Table 1. Frequency distribution of demographic characteristics of nurses working in COVID-19 ICUs

Personal Characteristics		No. (%)	Mean±SD	Min-max
Age (y)	<30	53(52)	31.78±6.89	24-51
	30-39	31(30.4)		
	≥40	18(17.6)		
Gender	Male	38(37.3)	-	-
	Female	64(62.7)		
Work experience (y)	<5	49(48)	7.94±5.90	1-25
	5-9	18(17.6)		
	10-14	18(17.6)		
	≥15	17(16.7)		
COVID-19 work experience (m)	<6	17(16.7)	17.03±8.15	1-25
	6-11	13(12.7)		
	11-17	12(11.8)		
	>17	60(58.8)		
Marital status	Single	44(43.1)	-	-
	Married	58(56.9)		
Satisfaction with personal protective equipment	Yes	75(73.5)		
	No	27(26.5)		
History of infection with COVID-19	Yes	83(81.4)		
	No	19(18.6)		

Client- Centered Nursing Care

of 49.71±16.44, had the highest mean, and the seeking social support subscale, with mean of 45.86±16.59, had the lowest mean (Table 3).

According to Table 4, general health and PTSD were not significantly associated with the personal characteristics of the subjects.

4. Discussion

According to the results related to general health, most studied nurses suffered from mild psychological distress. Somatic symptoms had the highest mean among the general health subscales. According to Bahramnejad et al.'s study, which was conducted on nurses working in COVID-19 reference hospitals, most nurses had mild general health disorder (Bahramnejad et al., 2021). Also, the general health of nurses working in COVID-19 hospitals in the Zakari et al. (2021) study showed mild mental distress. The study results in Mexico on nurses working in COVID-19 reference hospitals and nurses working in non-COVID-19 centers showed that the somatic symptoms subscale had the highest mean among nurses working in COVID-19 reference hospitals (Arriaga et al., 2021).

The results of our study showed that most nurses had PTSD symptoms. In line with our research, the average PTSD score among frontline nurses in another study was significantly higher than that of nonfrontline nurses. The IES-R tool was also used in this study, which showed that most frontline nurses with COVID-19 have experienced PTSD symptoms (Li et al., 2021a). The study by Ranieri et al. (2021) that was carried out on nurses caring for COVID-19 patients in Italy showed that most subjects had experienced PTSD symptoms.

Table 2. Statistical indicators of general health and its subscales and posttraumatic stress disorder in nurses working in COVID-19 intensive care units

General Health and Its Subscales		No. (%)	Mean±SD	Min-max
Somatic symptom	No psychological distress	26(25.6)	9.16±4.06	1-20
	Mild	49(48)		
	Moderate	23(22.5)		
	Severe	4(3.9)		
Anxiety/Insomnia	No psychological distress	27(26.5)	9.05±4.21	1-21
	Mild	49(48)		
	Moderate	22(21.6)		
	Severe	4(3.9)		
Social dysfunction	No psychological distress	21(20.6)	8.64±2.70	3-19
	Mild	66(65.7)		
	Moderate	13(12.7)		
	Severe	1(1)		
Depression symptom	No psychological distress	63(31.8)	5.35±4.31	0-19
	Mild	30(29.4)		
	Moderate	7(6.9)		
	Severe	2(2)		
General health	No psychological distress	21(20.6)	32.22±12.21	9-65
	Mild	57(55.9)		
	Moderate	23(22.5)		
	Severe	1(1)		

Posttraumatic Stress	No. (%)	Mean±SD	Min-max
No symptoms	40(39.2)	39.07±14.79	9–72
With symptoms	62(60.8)		

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PTSD is one of the mental disorders that can be triggered in people by traumatic events of the COVID-19 pandemic. Acute and chronic occupational stress in medical centers can lead to many stress disorders. Because medical staff are exposed to daily and repetitive stress, the risk of PTSD is much higher among medical staff than among other community members (Ebrahimi et al., 2021).

Our study showed that the nurses used problem-focused coping strategies more often. According to Lazarus & Folkman (1984), when the stressor is controllable from people's perspective, they use problem-focused strategies and, otherwise, an emotion-focused coping strategy, and when dealing with professional stress in the interactions and social relationships, they often employ problem-focused strategy. Also, they will hire an emotion-focused coping strategy when their stress is related to people's health and well-being.

Table 3. Statistical indicators of problem-focused coping strategy and its subscales

Coping Strategy and Subscale		Minimom	Maximom	Mean±SD
Emotion-focused subscales	Confronting coping	16.67	100	41.44±15.49
	Distancing	11.11	88.89	42.64±16.28
	Self-controlling	9.52	90.48	46.82±14.26
	Escape-avoidance	0	79.17	37.90±16.64
	Total emotion-focused copying	17.28	86.42	40.78±11.70
Problem-based subscale	Seeking social support	5.56	94.44	45.86±16.59
	Accepting responsibility	8.33	91.67	46.73±17.55
	Planful problem-solving	11.11	88.89	49.12±16.07
	Positive reappraisal	9.52	95.24	49.71±16.44
	Total problem-focused copying	14.49	89.46	48.03±13.44

Client- Centered Nursing Care

In a study by Jameshorani et al. (2022) on physicians and nurses working in COVID-19 wards to determine the association between COVID-19-induced anxiety and coping styles, in most cases, the subjects used problem-focused coping strategies more often. It seems that the problem-focused coping strategy is effective in reducing posttraumatic stress symptoms, and this strategy is effective in reducing the mental distress of healthcare workers.

Table 4. Numerical indicators of general health and posttraumatic stress disorder of the nurses working in the COVID-19 intensive care units according to demographic characteristics

Personal Characteristics		No.	GHQ-28 Mean±SD	Results	IES-R Mean±SD	Results
Sex	Male	38	30.31±11.55	t=1.21 df=100 P=0.89	37.21±15.87	t=0.98 df=100 P=0.59
	Female	64	33.35±12.54		40.18±14.12	
Marital status	Single	44	33.02±11.65	t=0.57 df=100 P=0.51	40.18±14.32	t=0.65 df=100 P=0.54
	Married	58	31.62±12.69		38.24±15.21	
Satisfaction with personal protective equipment	Yes	75	31.88±11.55	t=0.47 df=100 P=0.18	38.90±14.49	t=-0.19 df=100 P=0.56
	No	27	33.18±14.09		15.89±39.55	
History of infection with COVID-19	Yes	83	32.42±12.37	t=0.33 df=100 P=0.83	40.21±14.43	t=1.63 df=100 P=0.83
	No	19	31.36±11.81		34.10±15.73	

Variables	Values			
	r	p	r	P
Age (y)	0.12	0.20	0.06	0.52
Work experience (y)	0.08	0.38	0.08	0.41
COVID-19 work experience (m)	0.04	0.64	0.09	0.36

Client- Centered Nursing Care

A short-term longitudinal study was conducted in two waves during the COVID-19 pandemic to determine the impact of perceived organizational support on PTSD symptoms of frontline healthcare workers and to examine the mediating roles of coping self-efficacy and coping strategies in this regard. The results showed that perceived organizational support through the mediation of problem-focused coping strategies and the sequential mediating effect of coping self-efficacy and problem-focused coping strategies had a significant indirect impact on PTSD symptoms (Zhou et al., 2021). However, regarding the effect of emotion-focused coping, the results are contradictory; in some studies, emotion-focused coping reduced the psychological distress of healthcare workers (Lorente et al., 2020), but in others, such results have not been achieved (Zhou et al., 2020).

A study conducted on 168 nurses in COVID-19 wards showed that most nurses had used emotion-focused coping strategy to deal with the situation (Babaie et al., 2022). In a study to determine the relationship between coping strategies, turbulence tolerance, and psychological hardiness with coronavirus anxiety, nurses and medical staff used emotion-focused coping strategies more than problem-focused coping strategy (Kalhori, 2021). The results of this study are not in line with ours. This difference can be related to the smaller sample size of our research or the difference between nurses' demographic characteristics and the duration of nurses' contact with COVID-19 patients in our study and this study. One of the study limitations is the decreased number of ICU nurses due to the end of the sixth wave of COVID-19 in Iran and the decrease in the number of ICUs during this period. Finally, cross-sectional studies have limitations, so the results should be used cautiously.

5. Conclusion

This study was conducted to determine the general health status, PTSD, and coping strategies of Iranian nurses working in COVID-19 intensive care units.

The results indicated that most nurses had mild general health disorders, and the somatic symptom subscale had the highest mean. The results also showed that most nurses had experienced PTSD and were more likely to use problem-focused coping strategies.

Paying attention to nurses' mental health is crucial to reduce the psychological effects of COVID-19 on nurses and increasing their job efficiency, especially in critical situations of the pandemic. Accordingly, these nurses should have access to mental health services. Providing stress reduction programs and creating a supportive work environment could be effective. By taking care of nurses, we can also improve patient outcomes and the overall quality of healthcare. Determining the relationship between the main variables of this study and the quality of nurses' performance during the pandemic is suggested in future studies.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Iran University of Medical Sciences (Code: 1100.1400.REC.IUMS.IR). The study's objectives were explained, the nurses were assured of the confidentiality of their information, and written informed consent was obtained from all the subjects.

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Authors' contributions

The authors equally contributed in preaparation of this article.

Conflict of interest

The authors declared no conflict of interest.

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