Original Article

Post-Traumatic Stress Disorder and Its Related Factors in Nurses Caring for COVID-19 Patients

Abstract

Background: Post-Traumatic Stress Disorder (PTSD) is a mental disorder that can result from direct or indirect contact with traumatic events. The current study aimed to evaluate PTSD and its related factors in nurses caring for COVID-19 patients. **Materials and Methods:** This study was a descriptive correlational study. Using convenience sampling methods, 395 nurses were enrolled in the study. The study instruments included demographic information, Impact of Event Scale-Revised (IES-R), and General Health and Job Content Questionnaire (JCQ). Data were analyzed using the Pearson correlation test, *t*-test, ANOVA, and multiple regression analysis. **Results:** The mean (SD) age and work experience of the participants were 33.79 (6.74) years and 9.47 (6.47) years, respectively. Most nurses (86.60%) experienced PTSD. Multiple linear regression results showed general health ($R^2 = 0.51$, $p = 0.001$), job insecurity ($R^2 = 0.51$, $p = 0.042$), decision latitude ($R^2 = 0.51$, $p = 0.037$), and high age ($R^2 = 0.51$, $p = 0.049$) to be associated with an increase in PTSD, and having high social support ($R^2 = 0.51$, $p = 0.043$) was associated with a decrease in PTSD in nurses. **Conclusions:** Nurses have experienced high levels of PTSD after the fatal outbreak of COVID-19 disease. Stressful conditions associated with an increased likelihood of this disorder should be identified, and coping skills such as decision latitude (control) and social support should be strengthened to prevent the symptoms of this disorder in nurses.

Keywords: *COVID-19, mental health, stress disorders, post-traumatic, social support*

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Introduction

The widespread outbreak of coronavirus disease 2019 (COVID-19) and its rapid transmission has now become an emergency in physical and mental health.[1] According to the World Health Organization (WHO), between December 2019 and May 2020, about 6,019,299 new cases and 366,890 deaths were reported in more than 213 countries. At the same time in Iran, the numbers of cases and deaths were 146,661 and 7,677, respectively. Russia, Brazil, and the United States have reported the highest numbers of cases.[2] The psychological and social consequences of the COVID-19 pandemic disease have a wide impact on mental health.[3-5]

At the forefront of healthcare are nursing care providers and physicians, occupations that have been shown to be associated with an increase in mental health problems in epidemic crises.[6] Post-Traumatic Stress Disorder (PTSD) is a disorder that occurs after exposure to a severe stressor. The

characteristics of this disorder include a constant review of the traumatic stressor in the mind, re-experiencing it when awake or asleep, avoiding remembering it, and feeling overwhelmed.[7] In particular, nurses are vulnerable to the symptoms of PTSD. PTSD is a mental health problem that affects people who are exposed to potentially traumatic episodes. Healthcare providers are at increased risk for infection, loss of patients, responsibility for difficult treatment maintenance decisions, and disruption of natural support structures.[3,8] Existing studies have shown that the prevalence of PTSD can lead to chronic symptoms such as disturbing memories, avoidant behaviors, irritability, and emotional numbness. One of the most important psychological consequences is the current status.[9] Being affected by a fatal disease can result in experiencing a traumatic event. Some studies on the psychological status of nursing staff involved in treatment of Severe Acute Respiratory Syndrome (SARS) in 2003, under similar conditions

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as the current pandemic of COVID-19, showed that about 10% of nurses had high rates of PTSD.[10] According to a study by Lasalvia *et al*.[11] during the COVID-19 outbreak in Italy, 63% of healthcare workers reported symptoms of psychological distress. Lai *et al*.[8] reported that in China, 70% of respondents showed high levels of PTSD symptoms and anxiety caused by the COVID-19 epidemic. Two other studies in China reported the prevalence of PTSD in nurses to be 27% and 30%, respectively.[12,13]

COVID-19 spread rapidly in December 2019 and affected the care system of countries around the world. All health staff were mobilized to provide health services. Nurses' physical and mental health is directly related to their performance quality in caring for patients, job satisfaction, and work efficiency. Considering that limited studies on PTSD and influencing factors in nurses caring for patients with COVID-19 found in a literature search, the current study evaluated PTSD and its related factors in nurses caring for COVID-19 patients in Ardabil.

Materials and Methods

This descriptive correlational study was conducted from June 2020 to August 2020, in hospitals devoted to treating COVID-19 cases in Ardabil. Using the convenience sampling method, nurses from three teaching hospitals (Imam Khomeini, Imam Reza, and Fatemi) who cared for patients with COVID-19 were found to be eligible for the study. Inclusion criteria were having more than 6 months of clinical experience and a willingness to participate in the study. Nurses employed in departments not involved with COVID-19 and those submitting incomplete questionnaires were excluded. The sample size was determined using the Cochran's formula for infinite populations ($P = 0.57$, $z = 1.96$, d = 0.05).[14] Based on this formula, the required size was estimated at 376, which was then increased to 413 with the probability of 10% attrition. Questionnaires were sent online to 660 nurses who met the inclusion criteria through email and social networking after surveying, the identification of participants could not be examined by the electronic software. As study tools may include items that could create negative emotions, participants were informed that they could avoid answering any questions that might be distressing. Ultimately, 395 nurses completed the questionnaires thoroughly. The response rate in this study was 395.66(59%). Completed questionnaires were automatically stored in Porsline software, protected by password and accessible only to research investigators.

Participants were asked to complete demographic and occupational information including age, gender, work experience, marital status, educational status, work position, department, and monthly income.

The Impact of Event Scale-Revised was developed by Weiss and Marmar (1997) in accordance with DSM-IV criteria for PTSD diagnosis.[15] The Persian version of this scale has been validated in Iran.[16] The IES-R scale has 22 items, of which eight are related to avoidance symptoms, eight to intrusive thoughts, and six to hyperarousal symptoms. Respondents report the frequency of experience of each symptom in the past 7 days by rating it from 0 (never) to 4 (too much). Scores can range from zero to 88. A total PTSD score of 25 is considered as the cut-off point for a full PTSD experience, and a score of 18 to 24 indicates a moderate level of PTSD.[17] Higher scores indicate higher stress levels. A Cronbach's alpha value of 0.79 was obtained in Weiss and Marmer study; in the present study, it was 0.86.

The General Health Questionnaire (GHQ-12) comprises 12 questions. The items of this measurement tool are scored on a Likert scale from zero (not at all) to 3 (much higher than usual). The range of scores is between zero and 36, and scores higher than 14 indicate unfavorable general health. This tool has been translated in Iran, and its reliability has been confirmed by Cronbach's alpha method at the rate of 0.87.[18] In this study, a Cronbach's alpha value of 0.73 was obtained.

To measure the factors affecting PTSD in nurses, a 25-item Job Content Questionnaire (JCQ) was used in four different dimensions selected from the full version of the JCQ. Dimensions selected for this study include psychological job demands (5 items), which assesses a person's mental effort, the quantity of work, and time constraints for doing work; decision latitude (9 cases), which includes two separate but complementary subscales of "skill discretion" (six cases); decision-making authority (three cases); skill discretion subscale, which assesses learning opportunities, development of creativity and skills, and experience of diversity in work jobs; and decision-making authority subscale, which assesses independence in doing a personal job and the ability to make decisions or participate in work-related decisions; social support scale (8 items), which includes the two subscales of coworker support and supervisor support that measure the support of coworkers and supervisors; and job insecurity (3 items), which assesses job stability and frequency of dismissals. JCQ items were scored on a four-point scale from 1 (strongly disagree or never) to 4 (strongly agree or often). The score of this questionnaire was calculated in accordance with the JCQ User Guide.[19] The Persian version of the Job Content Questionnaire (P-JCQ) has been approved in Iran.[20] The Cronbach's alpha value of the questionnaire of 0.77 was obtained in this study.

SPSS version 22 software (produced by IBM SPSS Statistics) was used for data entry and statistical analysis. Descriptive statistics of mean, range, standard deviation, frequency, and percentage were calculated to describe the demographics of participants and study variables. To assess the relationships between study variables and mean

PTSD score, the *t*-test, ANOVA, and Pearson correlation coefficient were used, and to identify the predictors of nurses' PTSD, multiple linear regression was used.

Ethical considerations

All aspects of the study, including its aim, voluntary participation, confidentiality, duration of the study, and potential advantages and disadvantages of the study were explained in the online invitation. An online consent form was also forwarded to participants who were instructed to read it carefully and click the "agree" button at the bottom of the consent form if they wished to participate in the study. By not including demographic information on the questionnaire, the anonymity of the participants was ensured. This study was conducted with ethical considerations and after obtaining the necessary permits (ethics code IR.ARUMS.REC.1399.035). The authors certify that they have obtained all appropriate consent.

Results

A total of 395 nurses (72.90% female) completed and returned the online survey form. The mean (SD) age of participants was 33.79 (6.74) years, and the mean (SD) work experience was 9.47 (6.47) years. The majority of participants were married (74.70%) and had a bachelor's

degree (90.90%). More than half of the nurses (55.20%) were working in a general ward, and 34.70% had a mean monthly income of 40 to 50 million IRR per month. Among nurses' demographic factors, only one factor showed a significant relationship with nurses' PTSD symptoms; this factor was nurses' work experiences ($r = 0.11$, $p = 0.028$). [Table 1]. A total of 86% of nurses experienced PTSD. Considering a score of 25 and above as indicating a complete PTSD experience, 79.50% of respondents had complete PTSD, and 7.10% had PTSD with scores of 18 to 24 [Table 2]. The mean (SD) PTSD score among nurses was 37.28 (15.98) with scores ranging from 0 to 88. The results for the three PTSD subscales are shown in Table 2. On the general health scale, the mean (SD) score was 13.45 (4.35), with scores ranging from 0 to 36. In the job content questionnaire, the mean (SD) scale of decision latitude was 64.28 (7.86) with scores ranging from 24 to 96, and the mean (SD) scale of social support was 21.76 (4.09) with scores ranging from 8 to 32. The results for the remaining job content subscales are shown in [Table 3].

According to the results, there was a positive and significant relationship between general health and PTSD ($r = 0.27$, $p < 0.005$) and between job insecurity and PTSD ($r = 0.14$, $p < 0.005$). Statistical analysis also showed that there is an

Table 1: Demographic characteristics and its relationship with posttraumatic stress disorder mean score in nurses who worked during a coronavirus disease2019 outbreak (*n*=395)

Variables	Mean (SD)	*n* (%)	Statistical test and p value
Age***	33.79 (6.74)		$r=0.07, p=0.13$
Work Experience ***	9.47 (6.47)		$r=0.11, p=0.028$
Gender****			
Male		107 (27.10)	$t=-1.25, p=0.20$
Female		288 (72.90)	
Marital Status****			
Single		100 (25.30)	$t=-1.92, p=0.056$
Married		295 (74.70)	
Educational Status *****			
Associate		14 (3.50)	$F=0.10, p=0.90$
Bachelor		359 (90.90)	
Master OR PhD		22 (5.60)	
Work Position*****			
Nurse		369 (93.40)	$F=0.24, p=0.78$
Staff		14 (3.50)	
Supervisor		12 (3.00)	
Department*****			
ED*		107 (27.10)	$F=0.07, p=0.92$
General		218 (55.20)	
ICU		70 (17.70)	
Income*****(Million/Mont)**			
20-30		47 (11.90)	$F=0.23, p=0.87$
30-40		132 (33.40)	
40-50		149 (44.70)	
50<		67 (17.00)	

*Emergency Department, **Million Rials, ***Pearson r correlation, ****t-test for independent group, *****Analysis of variance

inverse and significant relationship between social support and PTSD ($r = -0.13$, $p < 0.005$) [Table 4]. Multiple regression analysis (prediction of PTSD symptoms) showed that the following predictions had a significant stimulus

effect on the likelihood of PTSD symptoms: General health ($\beta = 0.25$, $R^2 = 0.51$, $p = 0.001$), job insecurity ($\beta = 0.11$, $R^2 = 0.51$, $p = 0.042$), job control ($\beta = 0.10$, $R^2 = 0.51$, $p = 0.037$) and age ($\beta = 0.10$, $R^2 = 0.51$, $p = 0.049$). The only factor that significantly reduced the likelihood of PTSD symptoms was social support ($\beta = -0.10$, $R^2 = 0.51$, $p = 0.043$) [Table 5].

Table 2: Post-Traumatic Stress Disorder (PTSD) classification

Variables	*n* (%)
PTSD	
Full PTSD (scores of 25 and higher)	314 (79.50)
Moderate PTSD (scores 18-24)	28 (7.10)
No PTSD (scores 0-17)	53 (13.40)

Table 3: Mean (standard deviation) of post-traumatic stress disorder(PTSD), general health, and dimensions of job content (*n*=395)

Variable	Mean (SD)	Min	Max	Range
Total PTSD	37.28 (15.98)	00	75	00-88
Avoidance	13.61 (5.79)	00	29	00-32
Intrusion	12.60 (5.68)	00	25	00-28
Hyperarousal	11.06 (6.15)	00	28	00-28
General Health	13.42 (4.35)	03	27	00-36
Job Content				
Decision Latitude	68.24 (7.86)	48	92	24-96
Job Demand	35.72 (5.42)	18	48	12-48
Social Support	21.76 (4.09)	08	32	8-32
Job Insecurity	5.89 (1.42)	03	11	3-12

Table 4: Correlation coefficients of relationship between general health and dimensions of job content with Post-Traumatic Stress Disorder(PTSD) in nurses caring for COVID-19* patients (*n*=395)

Post-Traumatic Stress Disorder		
Variables	*r*	*p*
General Health	0.27	<0.001
Decision Latitude	0.07	0.12
Job Demand	0.07	0.11
Social Support	−0.13	<0.001
Job Insecurity	0.14	<0.001

*Coronavirus Disease 2019

Discussion

The results of this study showed that most nurses who provided care for COVID-19 patients experienced PTSD, and only 13.40% had no experience of PTSD. In the study conducted by Jung *et al.*[14] on cases of MERS disease, more than half of the nurses providing care to patients experienced PTSD, but 42.90% of the nurses did not experience PTSD. Studies conducted during the outbreak of SARS and avian influenza also showed that 10% to 20% of hospital staff experienced high levels of PTSD.[10,21] Based on the results, the number of nurses who experienced full PTSD during the COVID-19 outbreak is higher compared with the above-mentioned studies. This result suggests the severity of the psychological impact of the COVID-19 crisis on nursing staff. The reasons for the higher rate of PTSD in the present study can be attributed to extensive news coverage of COVID-19, high mortality, socioeconomic problems caused by this disease, different organizational structures, and social support in different communities.

The result of linear regression revealed that PTSD had a significant positive correlation with general health, which was in line with the results of a study conducted by Jung *et al.*[14] in South Korea during the MERS outbreak. The relationship between PTSD and mental health is both intensified and weakened by positive personality traits (extroversion, agreeableness, openness to experience, and conscience) and negative personality traits (mood instability).[22] As nurses are the primary caregivers of infectious patients, they are at a higher risk of contracting COVID-19 compared with other groups of people in the community. This issue can cause a feeling of panic or fear of being infected or transmitting the infection to others,

Table 5: Multiple regression analysis predicting post-traumatic stress disorder* among nurses caring for COVID-19 patients

Variables	*B*	SE**	β	*t*	*p*	*R²*	Adjusted *R²*	*F*	*p*
(Constant)	6.83	11.63		−0.54	0.58	0.12	0.10	7.000	<0.001
Age	0.25	0.12	0.10	1.97	0.04				
Gender	2.71	1.76	0.07	1.54	0.12				
Marital Status	2.74	1.90	0.07	1.43	0.15				
General Health	0.92	0.18	0.25	5.05	<0.001				
Decision Latitude	0.21	0.10	0.10	2.09	0.03				
Job Demand	0.008	0.15	0.00	0.04	0.96				
Social Support	0.42	0.20	0.10	2.03	0.04				
Job Insecurity	1.25	0.61	0.11	2.04	0.04				

*Dependent Variable: Post-Traumatic Stress Disorder **Standard Error

including family members and friends. Concerns about the prevalence of the disease, including increasing numbers of patients, providing health services to COVID-19 patients, maintaining social distances, and quarantining communities can exacerbate fear among nurses, affect their mental and emotional health and practice, and eventually cause PTSD. Thus, it is necessary to maintain the desired general health in nurses to prevent unfavorable effects of posttraumatic stress in nurses.

The multiple linear regression model showed a statistically significant positive relationship between PTSD and job insecurity, which is consistent with the evidence obtained in similar studies.[23] Job insecurity can increase psychological distress and impair mental health. The current situation created by COVID-19 with less control and low willpower highlights two necessary conditions for job insecurity, as the effects of the disease on governments, organizations, and health workers are sudden and uncontrollable.[24] It should be noted that communities are affected by the economic and living conditions caused by COVID-19, which have unpleasant social and economic consequences.

The results of linear regression showed that aging increases the likelihood of PTSD symptoms in nurses, which was in line with the study of Szałachowski *et al*.[25] It can be said that as people get older, their ability to adapt and cope with stressful work conditions decreases, and PTSD increases. Increased stress may also occur in older nurses, due to age-related burnout and poor physical ability to work at the highest level.

The results of linear regression showed that PTSD had a statistically significant positive relationship with decision latitude, which was consistent with the study Feeley *et al*.[26] The demand-control model states that job demand puts pressure on workers, and this pressure is exacerbated by the lack of job resources under this framework the most stressful job conditions are exactly what many nurses now face in responding to the COVID-19 virus[6,27]: High job demand with little control over work increases the likelihood of stressful situations such as PTSD.

The present study confirmed that PTSD had a significant negative relationship with social support. In other words, nurses' PTSD decreases with increased social support. In investigating nurses' mental disorders, Sue *et al*.,[28] also found that strong social and family support provides protection against acute stress and has a positive effect on general performance over time. In a study conducted by Lancee *et al*.[29] the support of caregivers and coworkers was found to be important in preventing the development of PTSD in nurses during the SARS outbreak. The study conducted by Jung *et al*.,[20] on SARS outbreak showed that the support of caregivers plays a supporting role in preventing PTSD and its effects such as turnover. Social support also plays a major role in reducing psychological stress. Strengthening social support among nurses can reduce the effect of job stress on their health.[6,13,30] Because of the strong transmission of the virus, nurses are forced to be alone in the room when finishing work to reduce infection. Thus, active mobilization of the nurses' social support system is essential. Managers should encourage and guide nurses at the right time and create a harmonious, safe, and encouraging work environment. Leisure activities and training on how to rest and relax should be properly planned to help staff reduce PTSD.[6]

Accordingly, with the COVID-19 epidemic and the resultant unfavorable conditions in the community continuing, it is possible that reduced mental health and the rise of chronic PTSD among health workers will be seen. It is necessary for health managers to have a proper understanding of these conditions and take the necessary measures to improve the job security of nurses to improve mental disorders and reduce posttraumatic stress.

This study had some limitations to be identified. Firstly, this study examined only nurses in Ardabil, so its results cannot be generalizable to all Iranian nurses. Second, the self-report questionnaire may have a measurement bias, which can affect the results. Finally, given the special demands of the nursing job and fatigue, work pressure, and time constraints in completing the questionnaires during the COVID-19 disease outbreak, a similar study should be conducted after complete control of the disease and in stable conditions to compare the results under different conditions by easy access to study populations and further explanations for cooperation and completing the questionnaires.

Conclusion

COVID-19 is an acute infectious respiratory disease that has raised international concerns about global health. Nurses are always at the forefront of health crises and are now facing the COVID-19 epidemic. The current study revealed that there was a significant increase in stress levels and outbreaks of PTSD in nurses caring for COVID-19 patients. Having decision latitude, high social support, and mental health, and having necessary job security play a significant role in changing the level of PTSD. Future interventions at the organizational and national levels are needed to enhance social support among nurses during the COVID-19 outbreak to reduce psychological distress among them. The current results also revealed that being given decision-making authority allows nurses to adopt the most appropriate coping strategies. Clinical strategies and policies are also essential to supporting nurses' psychological health in response to the COVID-19 crisis. According to the results of the current study (higher prevalence of PTSD symptoms in older nurses), the current situation, and the persistence of the COVID-19 pandemic, it is necessary to employ younger nursing staff to compensate for the lack of nursing and improve PTSD in nurses caring for COVID-19 patients. In

this situation, maintaining the physical and mental health of nurses working in hospitals related to COVID-19 is among the necessities of nursing and hospital managers' planning.

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Conflicts of interest

Nothing to declare.

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