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The Prevalence of Post-Traumatic Stress Disorder and Mental Health among Nurses After the COVID-19 Pandemic: A Cross-sectional Study from Iran

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Abstract

Objectives: The high transmission and mortality rate of COVID-19, combined with the shortage of treatment facilities and the heavy workload on healthcare providers, especially nurses, can negatively impact mental health until one year later. We investigated the prevalence of post-traumatic stress disorder (PTSD) and mental health in nurses after the COVID-19 pandemic in public hospitals in Mazandaran (North of Iran).

Materials and Methods: In this cross-sectional study, 393 nurses from public hospitals in Mazandaran (North of Iran) were investigated. Stratified random sampling was used. The inclusion criteria were nurses with at least one year of work experience. The data were collected using the General Health Questionnaire-28 (GHQ-28), the PTSD Checklist for DSM-5 (PCL-5), and a demographic questionnaire. The data were analyzed using SPSS 26.

Results: In the present study, the mean scores for PTSD and mental health were 31.63 ± 18.33 and 30.72 ± 12.50, respectively. The overall prevalence of PTSD was 44.8% (176 nurses). The classification indicated a moderate disturbance in mental health. A significant relationship was also observed between a history of COVID-19 and PTSD ($P<0.05$). Significant relationships were found between age, work experience, number of children, a history of COVID-19, and mental health ($P<0.05$). Furthermore, an increase in the prevalence of PTSD was associated with an increase in the incidence of mental health disorders ($P<0.001$).

Conclusion: It is crucial to address PTSD and mental health among nurses after the COVID-19 pandemic. Regular assessment and monitoring of mental health levels, along with the implementation of appropriate intervention strategies, can help improve the mental health of nurses.

Keywords: Nurses, COVID-19, Post-traumatic stress disorder, Mental health, Iran

Introduction

The COVID-19 pandemic has been identified as the most severe respiratory crisis since the 1918 flu .The World Health Organization (WHO), following the increase in cases and rapid global spread of the virus in 2020, declared it the sixth global public health emergency. In response to the high rate of disease transmission, the issued guidelines aimed at reducing its spread. The pandemic was a great trial for healthcare systems and challenged their strengths and weaknesses (1). Factors such as the rapid transmission of the disease (2), the high mortality rate (3), shortages in healthcare systems (4), and the heavy workload (5, 6) have all contributed to the mental health disorder among healthcare providers (2-7). Post-traumatic stress disorder (PTSD), as defined by the DSM-5 diagnostic criteria, is a psychiatric condition that arises following exposure to a traumatic and life-threatening event. Symptoms of this disorder include anxiety, restlessness, efforts to avoid stimuli associated with the traumatic event, alterations in mood and emotions, and hyperarousal. These symptoms persist for more than a month after the traumatic event (8).

A terminal illness can be considered a traumatic experience. Mak et al reported that two years after the outbreak of acute respiratory syndrome (SARS), the most common long-term psychiatric disorder was PTSD, with an incidence of 47.8% (9). Esmaeili Dolabinejad et al reported an increased prevalence of PTSD among nurses during the COVID-19 pandemic (10). PTSD in nurses can have detrimental effects on their mental health.

Mental health is a crucial aspect of overall well-being. According to the WHO, mental health is a state in which individuals are aware of their abilities, can cope with normal life stresses, work productively, and contribute to their communities (11). A systematic review by da Silva Neto et al examined the psychological impact of the COVID-19 pandemic on healthcare workers and revealed higher levels of anxiety, depression, physical symptoms,

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Key Messages

- PTSD following the COVID-19 pandemic can cause mental health disorders in nurses. Continuous assessment of PTSD and mental health in nurses is essential.

and sleeplessness among healthcare providers than among others (12). Additionally, a review study by Khaki et al on the mental health of nurses during the COVID-19 pandemic revealed common psychological symptoms such as depression, anxiety, sleep disorders, and decreased mental health (13). It seems necessary to evaluate the impact of PTSD and mental health after COVID-19 due to the long-term complications of these disorders (14).

An increased workload, shortage of medical equipment, fear of contracting and transmitting COVID-19 to family members, the deaths of COVID-19 patients, and prolonged separation from family can all increase the risk of depression, anxiety, insomnia, and obsessive-compulsive disorder, ultimately increasing the risk of PTSD and mental health disorders among healthcare workers (15).

It is crucial to consistently monitor the symptoms of PTSD and evaluate mental health among nurses to provide preventive and therapeutic interventions for future epidemics after the COVID-19 pandemic. Therefore, this study aims to investigate the prevalence of PTSD and mental health among nurses after the COVID-19 pandemic in the Mazandaran province (North of Iran).

Materials and Methods

Study Design and Setting

This cross-sectional study was conducted on 393 nurses from public hospitals in Mazandaran province (North of Iran) from August2022 to March 2023. This study used the STROBE checklist for cross-sectional studies (16).

Sample Size, Study Participants, and Sampling Procedure

The sample size was calculated using Bagheri and colleagues' study (17), where the prevalence rate of PTSD was 47.8%. Also, considering the confidence interval (CI) of 95%, the precision rate of 0.07, and the ratio estimation formula, a total number of 393 individuals was finally estimated (17). The following formula was used to calculate the sample size:

$$n = \frac{(z_{1-\frac{\alpha}{2}})^2 \times pq}{d^2}$$

We recruited 393 nurses (261 women and 132 men) who have at least one year of work experience in public hospitals in Mazandaran province (North of Iran), do not have known mental disorders, or do not use psychiatric drugs. Stratified random sampling was used, and the studied society was divided into seven strata so that the members of each stratum were the same in terms of the characteristics under investigation.

Measures

The data for the study were collected using the PTSD Checklist for DSM-5 (PCL-5) (18), the General Health Questionnaire-28 (GHQ-28) (19), and a demographic information questionnaire.

The PCL-5 has been validated and reliable in Varmaghani and colleagues' study in Iran (20). This 20-item questionnaire assesses the presence and severity of PTSD according to DSM-5 criteria using a Likert scale. Specifically, five items pertain to re-experiencing the traumatic event, two items relate to avoidance, seven items address negative alterations in cognition and mood, and six items focus on hyperarousal. The questionnaire score was calculated by collecting all 20 items (from 0 to 80), with a cut-off point of 30 to diagnose PTSD (19). The reliability of the questionnaire was determined to be 0.92 using Cronbach's alpha test (19).

The study used the GHQ-28 Questionnaire to assess mental health, which was validated and reliable in Ebrahimi et al.'s study in Iran (21). The reliability of the questionnaire was determined to be 0.86 using Cronbach's alpha test (19). The total score was calculated by collecting the scores from the questionnaire's four dimensions: physical symptoms (questions 1 to 7), anxiety (questions 8 to 14), dysfunction (questions 15 to 21), and depression (questions 21 to 28). The questionnaire employs a Likert scale for scoring, with scores ranging from 0 to 21 indicating mild mental health disorders, scores ranging from 22 to 42 indicating moderate mental health disorders, and scores above 42 indicating severe mental health disorders. The cut-off point for this test was 21 to diagnose mental health disorders (19).

In this study, a researcher-made questionnaire was used to obtain the demographic characteristics' information, which included items focused on age, gender, level of education, marital status, having children, and employment status. Information related to exposure to COVID-19, such as work experience, history of exposure to and infection with the disease, and the level of involvement in the COVID-19 frontline, was also collected.

Data Collection

A convenience sample of nurses with inclusion criteria was selected. The study participants and the nurses who gave their consent completed self-administered questionnaires while they were in hospitals. Each questionnaire took about 15-20 minutes to complete.

Statistical Analysis

Data analysis was done using the SPSS software (version 26). The data were also described via percentage, mean, standard deviation (SD), median, quartile, minimum, and maximum. Further comparisons of categorical variables were fulfilled through the chi-square test. Non-parametric tests, such as the Mann-Whitney and Kruskal-Wallis, were employed to assess the relationships between

demographic variables, exposure to COVID-19, mental health, and PTSD.

Results

Characteristics of Participants

The majority of nurses in this study were female 261 (66.4%), married 305 (77.6%), aged between 40 and 50 years 123 (31.3%), had 1-2 children 212 (53.8%), and had 1-5 years of work experience 106 (26.9%). A significant number of nurses had a history of exposure 355 (90.3%) and infection with COVID-19 331 (84.33%).

Post-traumatic Stress Disorder and Mental Health in Nurses

According to the study's findings, the mean scores for PTSD and mental health were 31.63 ± 18.33 and 30.72 ± 12.50, respectively. A total of 176 nurses (44.8%) had scores within the range of 31-80 points, indicating PTSD and the need for treatment intervention. The mean mental health score for nurses was 29.42 ± 4.66. Most nurses had scores within the range of 22-42, indicating moderate mental health disorders (Table 1).

PTSD was found to be significantly associated with a history of COVID-19. Additionally, the mental health of nurses was significantly correlated with variables such as age, work experience, number of children, and history of COVID-19 infection during the pandemic ($P < 0.05$) (Table 2). Furthermore, the chi-square test revealed a statistically significant relationship between PTSD and mental health ($P < 0.001$) (Table 3).

Discussion

This study aims to determine the prevalence of PTSD and mental health among nurses after the COVID-19

Table 1. Frequency Distribution and Mean Scores of PTSD and Mental Health in Nurses

	Variable	Score Domain	Frequency (%)	Mean Score
Mental health	Poor	0-21	106 (26.9%)	30.72 ± 12.50
	Moderate	22-42	208 (53%)	
	Severe	>42	79 (20.1%)	
PTSD	No	0-30	217(55.2%)	31.63± 18.33
	Yes	31-80	176(44.8%)	

Table 2. The Relationship Between Underlying Environmental Variables, Mental Health, and PTSD in Nurses

Variable		Absolute Frequency (%)	*P* Value of Mental Health	*P* Value of PTSD
Gender	Male	132 (33.6%)	0.56	0.95
	Female	261 (66.4%)		
History of exposure to COVID-19	Yes	355 (90.3%)	0.18	0.09
	No	38 (9.7%)		
History of contracting COVID-19 infection	Yes	331 (84.3%)	0.023	0.036
	No	62 (15.6%)		
Age (y)	20-30	117 (29.9%)	0.031	0.95
	31-40	120 (30.6%)		
	41-50	123 (31.3%)		
	> 50	33 (8.2%)		
Marital status	Single	88 (22.4%)	0.13	0.68
	Married	305 (77.6%)		
Number of children	None	146 (37.3%)	0.011	0.59
	1-2	211 (53.8%)		
	> 2	36 (9%)		
Work experience (y)	1-5	105 (26.9%)	0.046	0.75
	6-10	96 (24.6%)		
	11-15	32 (8.2%)		
	16-20	58 (14.9%)		
	> 20	102 (25.4%)		
Education level	Bachelor's degree	316 (80.6%)	0.66	0.32
	Master's degree	67 (17.2%)		
	PhD	10 (2.2%)		
Nurses' involvement in the COVID-19 frontline	<1 month	105 (26.8%)	0.292	0.79

Table 3. The Relationship Between PTSD and Mental Health

Variable	The Relationship Between PTSD and Mental Health Disorder	Statistical Test, *P* Value
	41.192, df=2	Chi-square, <0.001

pandemic. According to the research findings, approximately half of the nurses (44.8%) were found to have PTSD and moderate mental health disorders. PTSD was significantly associated with a history of COVID-19 infection. Nurses' mental health was significantly related to age, work experience, number of patients, and a history of COVID-19 infection during the pandemic. The study also revealed that an increase in PTSD was associated with an increase in mental health disorders.

During the COVID-19 epidemic in Iran, research has indicated that PTSD ranged from 23.5% to 33.3% (10, 22). Given the higher prevalence of PTSD (44.8%) among nurses working in public hospitals in Mazandaran (North of Iran), addressing this issue should be a top priority.

Moreover, PTSD was more common among nurses with a history of COVID-19, which is consistent with the findings of previous studies by Bucca et al (23) and Moon et al (24). A history of COVID-19 is an essential factor in increased PTSD scores. Additionally, improvement and easy access to personal protective equipment during epidemics can reduce PTSD.

The present study revealed that approximately three-quarters of the nurses (73%) experienced mental health disorders. Research conducted during the COVID-19 epidemic in Iran revealed that the prevalence of mental health disorders varied from 33.40% to 51.56% (12,14). A study by Khaki et al in Iran indicated that nurses with mental health disorders had higher levels of anxiety and stress, which negatively impacted their satisfaction. A decrease in satisfaction is directly related to a decrease in the quality of patient care (13). Given the very high prevalence of mental health disorders among nurses during the COVID-19 epidemic, regular monitoring and effective resilience interventions are recommended to address nurses' mental health disorders and enhance their satisfaction.

An increase in PTSD has been associated with greater damage to mental health (8). An increase in occupational stress (9), which was widespread during the COVID-19 epidemic (12), was identified as one of the factors contributing to PTSD. Work-related stress can be alleviated through a range of managerial policies, including reducing working hours, enhancing the status of nursing, offering financial incentives, and providing clinical governance support for nurses during crises (24,25).

Older age among nurses was considered a protective factor in improving mental health (24,26). The relationship between age and mental health has also been supported by the studies of Yeni Elbay et al (27), Souri et al (28), and Moon et al (24). These findings are consistent with the results of the present study. This association was due to the increase in work experience and the reduced emotional reactivity of nurses at older ages.

The present study demonstrated that higher work experience was associated with a more favorable mental health status, which is consistent with the findings of Esmaeili Dolabinejad et al (10). This could be attributed to the work experience and the exposure of nurses to critical situations, which act as protective factors (15,27).

A history of COVID-19 infection was found to be associated with mental health disorders. Xu and colleagues' study identified a history of COVID-19 infection as a risk factor for nurses' mental health, consistent with the results of the present study (29).

The presence of children and family support can potentially alleviate the mental strain of contracting COVID-19 during the epidemic. Research has suggested that parents generally experience better mental health, a trend that is consistent with the results of the present study (8,30). Additionally, factors such as family intimacy and strong relationships among family members may also contribute (8,27).

In the present study, we did not find a significant association between sex and mental health and PTSD. This finding differs from that of previous research, which has indicated that women are more predisposed to elevated levels of PTSD and mental health disorders during the COVID-19 outbreak and similar events, such as the other flu pandemic (29,31,32). This difference can be because women in Iran often encounter more risk factors such as depression, anxiety, physical sensitivity, and hopelessness (33). The similar levels of PTSD and mental health disorders between the two genders in our study, despite differing from the findings of other studies, might suggest that women have developed resilience as a result of their exposure to various challenges such as war, earthquakes, and economic crises in our country in recent years. When confronted with crises such as a pandemic, women may not necessarily react more than men.

Limitations and Suggestion

This research was conducted for the first time in public hospitals affiliated with Mazandaran University of Medical Sciences and utilized a suitable sample size. The limitation of the study was that the data were collected after introducing the COVID-19 vaccination program in Iran. The study did not investigate data before the COVID-19 vaccine rollout and the increased potential for psychological injuries. To obtain generalizable results, it is suggested that more extensive studies with larger sample sizes should be conducted in other provinces affected by COVID-19. Furthermore, further research is needed to

assess the effect of depression, anxiety, stress, and other psychological disorders on healthcare workers facing COVID-19 over a longer period of time to provide more effective psychological services to support nurses and healthcare workers.

Conclusions

This study showed a high prevalence of PTSD and a moderate mental health disorder in nurses. Therefore, it is important to evaluate psychiatric disorders for nurses after the COVID-19 pandemic. Also, physicians should treat the symptoms induced by this disorder in nurses.

Authors' Contribution

Conceptualization: Kamelya Goudarzi, Mahbod Manochehri Rad.
Data curation: Mahbod Manochehri Rad, Neda Asgharian,Masome Rafat.
Formal analysis: Kamelya Goudarzi, Samiyeh Kazemi.
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Validation: Kamelya Goudarzi.
Visualization: Samiyeh Kazemi.
Writing–original draft: Samiyeh Kazemi, Mahbod Manochehri Rad.
Writing–review & editing: Kamelya Goudarzi, Samiyeh Kazemi, Amaneh Mahmoudian.

Conflict of Interests

Authors declare that they have no conflict of interests.

Ethical Issues

This study was approved by the Research Ethics Committee of Mazandaran University of Medical Sciences, Mazandaran, Iran (Code: IR.MAZUMS.3.REC.1401.14833). We explained the study's objective to the participants and assured them that they were free to leave at any moment during the study. Participants in the study were those who agreed and signed the consent form.

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