Depression, anxiety, stress, and post-traumatic stress disorder among Iranian nursing caring for COVID-19 patients

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ABSTRACT

COVID-19 has put great physical and psychological pressure on medical staff worldwide, including Iran. As with any other disaster, it is worth paying attention to the risk of developing depression, anxiety, stress, and post-traumatic stress disorder (PTSD) among the healthcare team. This study aimed to determine the severity of depression, anxiety, stress, and PTSD status in healthcare staff involved in treating COVID-19 patients. 400 nurses and clinical assistants in a hospital occupied in treating COVID-19 were included in the study by the incidental sampling. The demographic information questionnaire, DASS-21, and Mississippi PTSD scales were applied to data collection. The mean score of PTSD in about half of the participants is severe. The mean score of re-experience sub-scale is higher than other sub-scales. Depression and stress are significantly higher in those infected with COVID-19. There is a significant difference between various age groups regarding the lack of depression. There is a significant difference in re-experience, alexithymia, and PTSD scores between participants with various marital statuses. Therefore, the existence of depression, stress, and PTSD among medical staff would be a major concern for the health ministry to protect the mental health of society members.

Introduction

The outbreak of COVID-19, in fast transmission, has become a global health emergency within just a few months (Wang et al., 2020). The sudden outbreak is transforming the psychological status and interpersonal relationships of millions worldwide (Asim et al., 2020). As the outbreak escalates, it will raise public health concerns (Sun et al., 2021) and cause psychological distress and problems like anxiety, uncertainty, and stigmatization that can be prevented by medical and psychiatric treatment (Xiang et al., 2020). Wide-ranging, negative, and psychological outcomes, such as anger, confusion, and post-traumatic stress symptoms in the current situation, may be associated with extended quarantine, fear of infection, frustration, a lack of basic supplies, insufficient information, financial problems, and stigma (Santos, 2020).

Moreover, confrontation with the acute situation of the COVID-19 pandemic has an inevitable impact on healthcare workers. Medical workers worldwide encounter enormous

pressure, including a high risk of infection and inadequate protection from contamination, overwork, frustration, isolation, sad patients, a lack of contact with their families, and exhaustion (Kang et al., 2020). Paramedics are more disposed to develop post-traumatic stress disorder (PTSD) symptoms than the general population (Kucmin et al., 2018). The development of PTSD, which results in chronic symptoms like intrusive memories, avoidance behaviors, irritability, and emotional numbing, is one of the main psychological consequences of the current pandemic (Sun et al., 2021). PTSD is a behavioral expression of neurobehavioral systems' pathology shaped by individual, environmental, and cultural factors. Individuals who suffer from PTSD re-live distressing instances of the traumatic event with vivid emotional proximity and high, imperative intensity.

In addition, a high percentage of PTSD symptoms (29.5%) has been found in the Italian population during the COVID-19 pandemic (Forte et al., 2020). A study in Wuhan, the first region of China, which has been affected by the COVID-19 pandemic, reported 5% of PTSD symptoms (Sun et al., 2021). A similar prevalence rate of PTSD also was reported in the Italian population (Favieri et al., 2020). Moreover, depression, anxiety, and stress symptoms were reported as high as 50.7%, 44.7%, and 73.4% among Chinese healthcare workers during the COVID-19 pandemic (Elbay et al., 2020).

The current study is important and needed to describe the mental health problems of healthcare workers treating infected patients with COVID-19 in Iran, especially the data regarding the distress caused by infectious disease outbreaks in the healthcare team. This study aimed to investigate depression, anxiety, stress, and PTSD in the staff of one of the primary hospitals for treating COVID-19. The first hypothesis of the current research included the different levels of depression, anxiety, stress, and PTSD in hospital staff with and without a history of being infected by COVID-19. The second hypothesis is demographic characteristics impact depression, anxiety, stress, and PTSD among hospital staff.

Method

Research Design

A quantitative method with comparative and correlational designs was applied in this study. The investigation was carried out following the latest version of the Declaration of Helsinki and was approved by an appropriate ethical committee, with the approval number IR.SBMU.NRITLD.REC.1399.147. Informed consent from the participants was obtained after the procedures were fully explained.

The questionnaires used for the current study were sent online to the study population, and those who met the inclusion criteria completed them. Data collection was from the middle of March 2020 until the middle of June 2020.

Participants

Four hundred nurses and clinical assistants were chosen with incidental sampling participating in this study during the Spring and Summer of 2020. The inclusion criteria were verbal informed consent and being a nurse or clinical assistant at COVID-19 wards. In contrast, the exclusion criteria were reluctance to continue participating in the research or quitting the job in the hospital.

According to Table 1, most of the sample group were female (68.6%), married (55.2%), did not have children (62.3%), and had an academic education (77.1%) up to Ph.D. The mean age was 36.36±7.87 years old. The majority of participants were nurses (69.3%) and were not

infected by COVID-19, and did not show COVID-19 symptoms with negative COVID-19 test results for themselves or their families (86.7%).

Table 1
Demographic Data

Variable		Percentage
Gender	Male	31.4
	Female	68.6
Marital status	Single	40.3
	Married	55.2
	Widowed	1.5
	Divorced	3.0
Number of children	0	62.3
	1-2	34.4
	3≤	3.3
Educational level	High school diploma	22.9
	Academic education	77.1
Job title	Nurse	69.3
	Clinical assistant	30.7
History of being infected by Covid-19	Self and family member	13.3
	None	86.7

Instruments

The demographic information questionnaire, DASS-21, and Mississippi PTSD scale were used in this study. The demographic questionnaire has been applied to identifying gender, age, marital status, number of children, educational level, occupation, and also a history of being infected by COVID-19 in themselves and their immediate family members.

The DASS-21 is the short form of the DASS-42, produced by Lovibond and Lovibond (1995), as a self-report scale designed to measure the negative emotional states of depression, anxiety, and stress, each with seven questions, over the past week in adults. The answers are in four options: never, sometimes, often, and always. The scoring is between 0 to 3. The sum of scores is calculated and multiplied by two and then interpreted by the following Table 2.

Table 2
Categorization Based on Score of the DASS 21

Range	Depression	Anxiety	Stress
Normal	0 – 9	0 – 7	0 – 14
Mild	10 – 13	8 – 9	15 – 18
Moderate	14 – 20	10 – 14	19 – 25
Severe	21 – 27	15 – 19	26 – 33
Extremely severe	28+	20+	34+

The correlation of the DASS with the Beck Depression Inventory (BDI) in a sample with 717 students was high ($r = .4$) (Lovibond & Lovibond, 1995). In a sample of 1794, this scale was compared with two others scales about depression and anxiety. The Cronbach alpha was .95, .9, .93, and .97 for depression, anxiety, stress, and the total score, respectively (Henry & Crawford, 2005). The validity and reliability of this scale are confirmed in the Iranian sample, with the Cronbach alpha reported to be .94, .92, and .82 for depression, anxiety, and stress, respectively (Moradi Panah, 2005).

The Mississippi Scale for Combat-Related Post-traumatic Stress Disorder is a 39-item self-report scale. It is scored as Likert type, which includes 1-5 scores for each question; some are scored reversely. The total score would be from 0 to 195. Scores up to 65, between

65 to 130, and above 130 reflect the mild, moderate, and severe symptoms of PTSD, respectively. It includes four sub-scale: re-experience, interpersonal relationship problems, alexithymia, and lack of depression. The test's sensitivity and specificity were .93 and .89, respectively, when it was used to differentiate between a post-traumatic stress disorder (PTSD) group and two non-PTSD comparison groups (Keane et al., 1988). The scale was validated in the Iranian sample, with the reliability from internal correlation being .92 and the test-retest coefficient being .91 (Goodarzi, 2003).

Data Analysis

Descriptive analysis, ANOVA, Chi-square, and independent t-tests were applied to data analysis. All data were analyzed by SPSS-22.

Results

Table 3 shows the mean score of depression in participants with COVID-19 is significantly higher than participants with no history of infection with COVID-19 ($p < .01$). Even though the mean score of depression in participants with a history of infection with COVID-19 and without it, is in a normal range. However, there is no significant difference in the anxiety score of participants with a history of infection of COVID-19 and without it. The score of anxiety in both groups is in the normal range. The mean stress score in participants with COVID-19 is significantly higher than that of participants with no history of infection with COVID-19, even though the mean score of the stress of both groups is in the normal range.

Table 3
The t-test of the DASS Score

DASS scales	History of COVID-19	Mean ± SD	t	p
Depression	Infecting with COVID-19	8.00 ± 4.44	2.852	.014
	No history	3.90 ± 4.08		
Anxiety	Infecting with COVID-19	5.72 ± 3.00	1.861	.081
	No history	3.81 ± 3.90		
Stress	Infecting with COVID-19	10.18 ± 3.54	3.260	.004
	No history	6.14 ± 5.02		

Moreover, Table 4 shows the mean score of depression and the mean score of stress are significantly higher in those whose family member had been infected with COVID-19 ($p < .01$). However, there is no significant difference in the anxiety score of participants with a history of infection with COVID-19 in themselves or family members and without it.

Table 4
DASS Score Based on History of COVID-19

	History of COVID-19	Mean ± SD	F	p
Depression	Self	7.66 ± 4.36	4.58	.013
	Family member	8.40 ± 5.02		
	None	3.90 ± 4.08		
Anxiety	Self	6.33 ± 1.96	1.35	.266
	Family member	5.00 ± 4.06		
	None	3.81 ± 3.90		
Stress	Self	9.83 ± 3.43	3.25	.045
	Family member	10.60 ± 4.03		
	None	6.14 ± 5.02		

According to Table 5, about half of the sample group members had severe PTSD symptoms. However, there is no significant difference in the severity of PTSD between participants with and without a history of COVID-19 infection.

Table 5
PTSD Severity

History of COVID-19	The severity of PTSD (%)			x^2	p
	Mild	Moderate	Severe		
Yes	23.5	16.5	60.0	1.57	.45
No	14.5	31.5	54.0		
Total	19.0	24.0	57.0		

Table 6 shows the independent t-test of PTSD scores in total and each sub-scale. The results indicate no significant difference in PTSD in total and each sub-scale between people with and without a history of being infected by COVID-19, in themselves, or their immediate family members.

Table 6
Scores of the PTSD Sub-scales Based on History of Covid-19

Sub-scales	t	p
Re-experience	- .592	.562
Interpersonal relationship problems	.170	.868
Alexithymia	-1.137	.271
Lack of depression	.644	.531
PTSD	- .300	.760

According to Table 7, there is a significant difference in anxiety between various age groups ($p < .05$). Even though all participants are in the normal range of anxiety, participants in age groups of 20-30 years old suffered less anxiety than other age groups. Also, people in the age group of 51 to 60 years old had higher anxiety compared to others. In one of the PTSD sub-scales, namely lack of depression, there is a significant difference in various age groups, with participants in the age groups of 20-30 and 31-40 having the highest and lowest scores, respectively.

Table 7
Difference of PTSD and DASS Sub-scales Based on Age Groups

Sub-scales	Ages	Mean ± SD	F	p
Depression	20-30 years old	2.90 ± 3.79	2.336	.081
	31-40 years old	4.43 ± 3.56		
	41-50 years old	5.60 ± 5.24		
	51-60 years old	11		
Anxiety	20-30 years old	2.36 ± 2.66	3.185	.029
	31-40 years old	4.50 ± 3.55		
	41-50 years old	4.25 ± 4.08		
	51-60 years old	11		
Stress	20-30 years old	4.72 ± 4.99	2.002	.122
	31-40 years old	8.00 ± 4.80		
	41-50 years old	6.55 ± 5.12		
	51-60 years old	10		

Table 7

Continued

Sub-scales	Ages	Mean ± SD	F	p
Re-experience	20-30 years old	43.04 ± 4.35	.402	.752
	31-40 years old	42.13 ± 5.64		
	41-50 years old	43.05 ± 3.80		
	51-60 years old	39.00 ± 1.00		
Interpersonal relationship problems	20-30 years old	32.36 ± 4.12		
	31-40 years old	30.83 ± 3.71		
	41-50 years old	31.15 ± 2.85	1.075	.365
	51-60 years old	28.00 ± .10		
Alexithymia	20-30 years old	40.13 ± 5.02		
	31-40 years old	38.60 ± 4.90	.553	.648
	41-50 years old	39.30 ± 4.90		
	51-60 years old	36.00 ± .50		
Lack of depression	20-30 years old	40.13 ± 3.31		
	31-40 years old	37.16 ± 4.84	2.621	.050
	41-50 years old	39.50 ± 3.42		
	51-60 years old	38 ± .20		
PTSD	20-30 years old	155.68 ± 13.32		
	31-40 years old	148.73 ± 15.23	1.311	.278
	41-50 years old	153 ± 12.24		
	51-60 years old	141 ± 1.1		

Table 8 shows a significant difference in depression between participants with various marital statuses ($p < .01$). The mean score of depression is significantly higher in divorced participants than in other ones. A significant difference in PTSD score and the sub-scales score, namely re-experience and alexithymia, is also found based on marital status. Married people had the highest score in re-experience, alexithymia, and PTSD scores. However, the findings of this study show no difference in depression, anxiety, stress, and PTSD based on gender, number of children, educational level, and job status

Table 8

Difference between PTSD and DASS Based on Marital Status

Sub-scales	Marital status	Mean ± SD	F	p
Depression	Single	4.11 ± 4.5	4.240	.009
	Married	3.56 ± 3.46		
	Widowed	1		
	Divorced	13.5 ± 3.53		
Anxiety	Single	3.19 ± 3.24	2.340	.081
	Married	4.05 ± 3.46		
	Widowed	1		
	Divorced	9.50 ± 7.77		
Stress	Single	5.85 ± 4.84	1.990	.123
	Married	5.95 ± 4.74		
	Widowed	3.00 ± 2.82		
	Divorced	14.00 ± 4.88		
Re-experience	Single	42.33 ± 3.82	6.517	.001
	Married	43.75 ± 3.96		
	Widowed	40.00 ± 2.30		
	Divorced	30.00 ± 13.43		
Interpersonal relationship problems	Single	31.44 ± 4.11	.434	.729
	Married	31.48 ± 3.33		
	Widow	32.00 ± 1.20		
	Divorced	28.50 ± 2.12		

Table 8
Continued

Sub-scales	Marital status	Mean ± SD	F	p
Alexithymia	Single	38.77 ± 4.53	5.173	.003
	Married	40.40 ± 4.03		
	Widow	39.00 ± 3.50		
	Divorced	28.00 ± 11.31		
Lack of depression	Single	39.14 ± 4.12	2.588	.061
	Married	38.08 ± 3.82		
	Widow	42.00 ± 2.40		
	Divorced	31.50 ± 7.77		
PTSD	Single	151.70 ± 13.47	4.833	.004
	Married	153.72 ± 10.95		
	Widow	153.00 ± 4.50		
	Divorced	118.50 ± 34.64		

Discussion

The findings of the current study show the mean score of PTSD in about half of the members of the sample group is severe. Just 19% of them had mild PTSD, and 24% had moderate symptoms of PTSD. No difference in PTSD between hospital staff with and without a history of COVID-19; therefore, the first hypothesis is rejected. These findings show the serious development of PTSD in a life-threatening pandemic, whether or not the participants have been infected. Because the depth of catastrophic direct encountering with patients with COVID-19 would be so unknown and stressful, which seems that affect everyone similarly and especially cause multiple remembering of the unpleasant situations in mind.

Some studies have shown that medical staff exposed to H7N9 patients and disaster relief medical staff have the highest score in re-experiencing dimension (Tang et al., 2017), which is compatible with our findings when considering the psychological status of people when confronted with a large epidemic. Other studies reported that the incidence of PTSD in nurses caring for COVID-19 patients was 16.83% (Y.-X. Wang et al., 2020). A study in Singapore hospitals between February and March 2020 found many healthcare workers had anxiety (14.5%), depression (8.9%), and PTSD (7.7%) (Tan et al., 2020). Furthermore, another study among pulmonary patients with and without cancer found PTSD level is influenced by hopeless and ambiguous views about the future of the disease (Safa et al., 2014). So, according to the results of the current study about the existence of PTSD symptoms in nursing staff – which are mostly congruent with other research which has been described – it is important to pay attention to PTSD symptoms in the healthcare team of COVID-19.

The first hypothesis stating the difference among hospital staff based on a history of COVID-19 was confirmed in the domain of depression and stress. Accordingly, although the mean score of depression in both groups of participants is in the normal range, depression in the participant with a history of COVID-19 is significantly higher. Moreover, depression was significantly higher in those whose family members had been infected with COVID-19. In addition, although stress in all participants is in the normal range, it is significantly higher in the group of participants with a history of COVID-19 than in the other group. Especially it is also higher in those whose family members have been infected with COVID-19. It shows the burden of COVID-19 on family members of hospital staff because of the mental pressure they felt in encountering the disease and fearing transferring it to their family members and feeling guilty about it. Some studies show that 64.7% of physicians had depressive symptoms, 51.6% had anxiety, and 41.2% had stress during the early COVID-19 pandemic in Turkey, using

DASS-21. Among China healthcare workers, 50.4% reported symptoms of depression, 44.6% anxiety, and 71.5% reported distress during the COVID-19 pandemic (Elbay et al., 2020).

The current study's second hypothesis, including the impact of demographic data on depression, anxiety stress, and PTSD, is confirmed in the domain of age and marital status. In the PTSD sub-scale, persons in their twenties have the lowest score of lack of depression, but in the fourth decade, they have the highest lack of depression. It may result from rising positive emotions at the beginning of adulthood, which would be reduced in the next decade due to more social occupation, especially when encountering a crisis. On the other hand, the highest score of PTSD score and its two sub-scales, namely re-experience and alexithymia in married people, is controversial in the current study. Indeed, marriage does not necessarily increase mental health and the quality of relationships, but it would be the better determinative factor. Also, the number of children did not correlate with depression, anxiety, stress, and PTSD in the current study. It shows that the pressure of being encountered with a life-threatening virus would not be reduced or increased by familial support, especially at the beginning of the virus pandemic. Some other factors may play a role in this regard. The familial affiliations would exacerbate the anxiety because of worry about the family members. This kind of anxiety would be reduced in single and childless people. On the contrary, a previous study found predictors of PTSD symptoms during infectious diseases prevalence, such as SARS and H1N1, including gender, age, degree of exposure to the infectious disease, the experience of being infected, and having family, friends, or acquaintances that have been infected (Xu et al., 2011).

Depression was higher in divorced participants. It reflects the mental burden of divorce even when confronted with a completely different issue, like a disease. A previous study has demonstrated that marriage or having children may improve mental health (Association, 2013; Sadock et al., 2017). This study found that higher scores of DASS-21 existed among single healthcare workers, whereas having a child was associated with lower DASS-21 scores. In addition, those living with their spouse and children had lower scale scores than those who lived alone during the COVID-19 pandemic. A previous study found being single increased the odds of depression in hospital staff, even three years after the SARS outbreak (Elbay et al., 2020).

In this study, all participants have a medium range of anxiety; younger participants suffered less anxiety than older age groups. On the contrary, people in the age group of 51 to 60 years old had higher anxiety compared to others. It implies that younger participants manage anxiety better than other age groups with the power of youth. Other studies have shown that young individuals show higher rates of depression due to isolation during COVID-19 (Renaud-Charest et al., 2021). Another study found higher scores of DASS-21 existed among young healthcare workers (Elbay et al., 2020). Women and frontline workers in China had a higher risk of developing psychiatric problems during the COVID-19 pandemic (Elbay et al., 2020).

Also, the current study shows that males and females are equal in confronting the life-threatening pandemic in showing PTSD symptoms. These findings do not align with some other studies that females were prone to develop higher levels of PTSD both in COVID-19 and H1N1 outbreaks (Sun et al., 2021; Xu et al., 2011). Moreover, as reported by some other studies, females are about twice as likely to develop PTSD symptoms (D. E. A. Christiansen, 2012). It would result from the fact that females usually experience higher levels of associated risk factors, like depression, physical anxiety sensitivity, and helplessness (D. M. Christiansen & Hansen, 2015). The relative equality of females and males in confronting the stressful situation in the current study shows inconsistency with other results in this regard. It

may describe that Iranian women in our society have become more compatible during the past years due to many problems in the country like war, earthquake, and economic crisis.

Neither education nor job status significantly impacted depression, anxiety, stress, and PTSD. One possible reason might be that the sample group was in a relatively similar situation, which made them less affected by education and job status. But some other studies have shown that nurses exposed to COVID-19 with high job satisfaction have lower PTSD scores, necessitating reducing the PTSD level by trying to improve job satisfaction (Y.-X. Wang et al., 2020). Higher scores of depression, anxiety, and stress in healthcare workers of COVID-19 existed among those with less work experience or who worked in the frontline (Elbay et al., 2020). Higher DAS-21 scores between them were associated with increased working hours, increased number of COVID-19 patients cared for, receiving lower support from peers and supervisors, and feelings of incompetence about COVID-19 tasks (Elbay et al., 2020).

The current research involved nurses and clinical assistants from a hospital due to the limited time and access to the sample group. So, it is suggested that future researchers include more variety of hospitals whose staff deal with COVID-19 departments directly to obtain more precise results. Because of the emergency conditions of the pandemic, data gathering was done online, which would affect the research results. But in some cases where there was a need for a psychiatrist or psychologist in COVID-19 treatment wards, they had shown up in the wards to provide sufficient information about the online questionnaires. Besides, the probable psychological stress of the respondents to the questionnaires would affect the responses. Therefore, it is suggested that future researchers have follow-up research and investigate the role of depression, anxiety, and stress among hospital staff during a pandemic such as COVID-19 to provide optimum psychological services for study participants.

Conclusion

The hospital staff who had been occupied with treating patients with COVID-19 have symptoms of PTSD, whether having a history of COVID-19 or not. Moreover, those who had been infected with COVID-19, even themselves or family members, had higher depression and stress than those who did not have COVID-19 infection. Marital status and age are two demographic characteristics that have a significant impact. Being married is a determinant factor of a higher PTSD score and its two sub-scales, namely re-experience and alexithymia. On the other hand, being divorced predicts a higher depression. Young people have the lowest anxiety, whereas older people have the highest anxiety.

Acknowledgment

Declarations

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