



Mental Health of Health Care Workers at Imam Khomeini Hospital in Tehran During COVID-19 Pandemic

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Abstract

Background: In this study, screening of mental health problems among Health Care Workers (HCWs) was performed in order to assess the prevalence and severity of depression, anxiety, and perceived stress at Iran's largest teaching hospital during the COVID-19 pandemic.

Methods: In this cross-sectional study, HCWs who were working professionally in specific wards for COVID-19 patients were selected by availability sampling. The patients who met the inclusion criteria and answered the submitted questions were included in the study. Next, two instruments including HADS (Hospital Anxiety and Depression Scale) and PSS-4 (Perceived Stress Scale-4) were used.

Results: The study was conducted on 306 HCWs. The mean score and standard deviation of depression, anxiety, and perceived stress were 6.33 ± 4.10 , 8.33 ± 4.29 , and 6.88 ± 2.90 , respectively. Fifty-four percent and 36.6% of the participants showed some degree of anxiety and depression, respectively.

Conclusion: It is necessary to use screening methods for psychological disorders among HCWs, along with psychosocial support and appropriate psychological interventions in this field.

Keywords: Anxiety, COVID-19, Depression, Health care workers, Mental health

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Introduction

On January 30, 2020, the World Health Organization (WHO) named the outbreak of COVID-19 as Public Health Emergency of International Concern (PHEIC) (1). As of this writing (June 6, 2021), more than 172.6 million people have contracted the disease, and more than 3.7 million have died as a result (2). An outbreak of COVID-19 has put severe physical and psychological pressure on Health Care Workers (HCWs) (3). In many ways, this psychological stress seems unprecedented (4). Health care workers are at risk of mental health disorders due to the stressful effects of exposure to infection (Along with anxieties regarding isolation and stigma), as well as concerns about transmitting the infection to their friends and family (5). Stigma, as a social and moral phenomenon, along with various forms of social exclusion and worthlessness can cause a lot of emotional stress in these people, which is a prelude to the formation of psychological disorders (6). Other sources of stress among HCWs are selecting the strategies to allocate resources, which are mostly limited, to patients with similar conditions, fulfilling physical and mental health care needs of patients, and the ways to provide effective care for critically ill patients (7). Based on the growing evidence, COVID-19 could be an independent risk factor for stress in HCWs. Age, gender, place of work, department, and some psychological variables have been introduced as effective factors in the formation of symptoms of depression, anxiety, and stress among this group (8). From the past, stress in hospital work environments has been suggested as a risk factor for developing psychiatric disorders, including depression and anxiety (9). Outbreak of Severe Acute Respiratory Syndrome (SARS) also showed that working in a clinical setting during such pandemics imposes stress on HCWs (10). Attention to this issue is doubly important due to the extent and severity of the related unfavorable situation in the recent pandemic. In this regard, studies have been designed and implemented in some countries.

In a study in two Asian countries, the prevalence of symptoms of mental health disorders and the relationship between some variables such as physical symptoms and psychological outcomes of depression, anxiety, and stress among a group

of HCWs were evaluated. They found a significant relationship between the number and severity of physical symptoms and psychological outcomes. However, the role of other factors influencing the formation of psychological symptoms, such as the status of different occupational groups, the effect of education, distance from home to work, and the degree of exposure to the disease has not been studied (11).

Lu *et al*, in their study among hospital staff, compared the two groups of medical staff and administrative staff in terms of feelings of fear, anxiety, and depression. They reported the level of fear, depression, and anxiety was higher among medical staff than administrative staff. Personnel who were on the front line were the most vulnerable group to disease (4). In other studies, the higher prevalence of these disorders has been reported among females and nursing staff (3).

All in all, there is a lot of concern about the mental health of medical staff taking care of patients with COVID-19. However, in some countries, the supportive interventions required for their mental health problems are not provided (12).

Considering the existence of different influencing factors in the formation of symptoms of mental health disorders in different countries, including differences in the psychological background of HCWs, protective facilities and available resources, this study was conducted in the largest teaching hospital providing care for patients with COVID-19 in Iran (13).

For this purpose, in the current research, screening of these disorders among HCWs in Iran was performed in order to assess the prevalence and severity of depression, anxiety, and perceived stress at Imam Khomeini Hospital, Tehran, Iran. In this study, an attempt was made to better understand the needs of staff and assess the impact of degree of disease severity on staff mental health. Moreover, their mental health over a period of time was evaluated, comparing their mental health status in two periods including early disease outbreak in Iran (14), and after the relative decline of disease. Also, any possible changes in staff needs during the abovementioned time periods were investigated.

Based on the above procedure, after monitoring the situation and analyzing related data, it was decided to evaluate the two periods comparatively in order to

determine whether there was any difference between the effects of relative decline of disease on the mental health status of HCWs. A comparative study of the prevalence of symptoms of mental disorders including symptoms of depression, anxiety, and stress was performed among HCWs and comparison between subgroups was done according to participants' gender, educational status, place of residence in terms of distance from hospital to home.

Materials and Methods

This cross-sectional study was performed from March 25 to April 25, 2020. In this study, HCWs who were working professionally at Imam Khomeini Hospital, Tehran, Iran could participate in the study. The hospital has a total of 1160 beds in general wards and 89 beds in the Intensive Care Unit (ICU). Participants were hospital staff who either directly treated or dealt with COVID-19 patients. These included doctors, nurses, paramedics, and service personnel (such as those who transfer patients for diagnostic imaging or are responsible for cleaning inpatient wards).

HCWs could enter the study voluntarily if they wished to participate. They completed the informed consent form before filling out the questionnaire. The HCWs compared in the two time periods included people who participated in the entire study period. Participants could benefit from the free health services by registering their contact phone number if they wished to complete diagnostic or therapeutic procedures. They were informed that their information was considered confidential and was not available to any other individual or organization. Mental health services for participants were provided by specified psychiatrists and psychologists.

Data collection

Patient demographic information including age, sex, education, occupation, place of residence, job status, and exposure to patients with COVID-19 was collected based on questions asked before completing the questionnaire. Participants' depression and anxiety status were assessed based on the Hospital Anxiety and Depression Scale (HADS) and their perceived stress was measured through the Perceived Stress Scale-4 (PSS-4).

Participants were asked to state the reasons for their

anxiety from their own perspective and also to answer questions about their own strategies to reduce them.

Procedure

Study measuring instruments

HADS Anxiety and depression subscales in this instrument are valid tools for measuring the severity of emotional disorders. The use of this instrument plays an important role in identifying and managing emotional disorders in patients under investigation and treatment, in internal medicine and surgery wards (15).

Reliability and validity of this instrument in Iran has been calculated by Cronbach's α coefficient which turned out to be 0.78 for the HADS anxiety sub-scale and 0.86 for the HADS depression sub-scale. The questionnaire consists of 14 items and 2 sub-scales of depression and anxiety. Each item is evaluated with a four-point scale, which makes the maximum score for depression and anxiety in this questionnaire equal to 21 (16). Based on the final score, the severity of anxiety and depression was classified into three categories of normal (0–7), mild (8–10), moderate (11–14), and severe (15–21) (17).

Perceived Stress Scale-4

The Perceived Stress Scale (PSS) is one of the most widely used instruments for measuring stress. The original version has 14 items. Its short form has 4 items, which include 2 negative items and 2 positive items (18). Each item in this questionnaire can be evaluated by a five-point Likert-type scale that varies from 0 (Never) to 4 (Very often). This tool has suitable internal consistency ($\alpha=0.78$) (19).

The psychometric properties of PSS-4 version of this instrument have been evaluated in Iran which demonstrated adequate properties for measuring psychological stress among Iranian patients. In one study, the Cronbach's α coefficient for the PSS-4 was found to be 0.77 (20).

Statistical analysis

All analyses were performed in SPSS v26 software (IBM,USA). For descriptive statistics, frequencies and proportions, median, and interquartile range (IQR) were reported. Kolmogorov-Smirnov test was used to evaluate the normal distribution. The

Mann-Whitney U and Kruskal-Wallis tests were used to compare the anxiety, stress, and depression scores. Kendall's correlation coefficient was used to compare the correlation between stress, anxiety, and depression scores. The minimum significance level for this study was set at 0.05. This study is based on the approval of the ethics committee of Tehran University of Medical Sciences (Ethics code: IR.TUMS.VCR.REC.1399.044). Participants were informed about the components of the study and its objectives upon entering the study. The current research was conducted in accordance with the Declaration of Helsinki.

Results

The questionnaires were sent to 500 HCWs, and finally, 306 of them (61%) participated in the study. Also, 5% missing data were excluded from the analysis. All measurable parameters were normally distributed (Table 1). The study was conducted on 306 health care workers (26.1% males and 73.9% females). In terms of comparing the two groups participating in the study and the total number of HCWs invited to the study (61%), there was no significant difference between this group and the total HCWs (p -value is equal to 0.91 and 0.74, respectively, in terms of the difference between education level and employment status). Information about the medians and interquartile ranges of mental health disorder symptoms for variables related to the health care workers is listed in (Table 2). Univariate analysis for assessing the relationship between moderate and severe depression, anxiety, and stress and variables of health care workers is listed in (Table 3). After turning quantitative scores of depression and anxiety into severe, moderate, mild, and normal subtypes, it was revealed that 9.5%

of individuals had severe anxiety. Severe depression was also observed in 3.6% of participants. The mode and median score that these people gave to their anxiety was 5 and 5.59. There was a positive and significant correlation between this score and the score calculated obtained through HADS ($r=0.46$, $p<0.001$). Anxiety in 25.5% of participants was due to their own health, in 90.5% was due to worries about the virus being transmitted to family and relatives, and in 4.9% was due to insufficient ability to manage patients with COVID-19. According to participants' statements, by taking some measures, the anxiety of HCWs can be reduced. These include providing adequate protective equipment such as gloves, masks, and others (79.9%), appreciation for the services of physicians and nurses and the treatment team (36.9%), provision of suitable places to stay and rest in the hospital (28.8%), the help and cooperation of psychologists and psychiatrists (16.7%), and the provision of appropriate training materials to deal with (14.4%) COVID-19 cases (Table 4).

To better understand the indicators under study, the participants in the study were examined in two time periods. One group during rising wave of COVID-19 ($N=148$) and one group after a relative decline in disease ($N=149$) were assessed. The anxiety of individuals during the rising wave was higher than the relative declining phase [Median (IQR) of anxiety equals 8(6-12) vs. 7] (4-9) during rising phase compared to partial decline stage ($p=0.03$), but in terms of depression and perceived stress, there was no difference between the two periods. Other related comparative information and statistically significant differences in two periods are listed in (Table 5).

Table 1. Tests of normality of measurable parameters of the study

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistics	df	Sig.
Depression	0.095	306	0.000	0.962	306	0.000
Anxiety	0.096	306	0.000	0.982	306	0.001
Perceived stress	0.085	306	0.000	0.983	306	0.001

a. Lilliefors significance correction.

Table 2. Medians and interquartile ranges of mental health disorder symptoms for variables related to the health care workers

Variables		N	Percentage	Median (IQR) of depression		Median (IQR) of anxiety		Median (IQR) of perceived stress	
Gender	Female	226	73.9	6 (IQR=3-9)		8 (IQR=6-12)		7 (IQR=5-9)	
	Male	80	26.1	5 (IQR=3-8)		7 (IQR=4-9)		6 (IQR=4-8)	
Direct exposure	No	54	17.6	4.5 (IQR=2.8-8)		8 (IQR=5-10)		7 (IQR=4-9)	
	Yes	252	82.4	6(IQR=3-9)		8(IQR=5-11.8)		7 (IQR=5-9)	
Being anxious	No	39	12.7	2(IQR=1-4)		4(IQR=2-5)		4 (IQR=3-6)	
	Yes	267	87.3	7(IQR=4-10)		8(IQR=6-12)		7 (IQR=5-9)	
Academic degrees	Associate degree and lower	39	12.7	7 (IQR= 5-11)		9 (IQR= 7-13)		7 (IQR=5-9)	
	Bachelor	155	50.7	6 (IQR= 3-9)		8 (IQR= 5 -12)		7 (IQR=5-9)	
	Master and GP	29	9.5	5 (IQR= 3-8)		7 (IQR= 3.5 -10)		7 (IQR=4-8)	
	Specialist and PhD	55	18.0	6 (IQR= 2-8)		8 (IQR= 6-10)		8 (IQR=5-9)	
	Fellowship graduate	28	9.2	4 (IQR=1.25-7)		7 (IQR=5-10)		6 (IQR=4.3-8)	
Place	The city where the hospital was located	262	85.6	6 (IQR=3-9)		8.5 (IQR=5-11.8)		7 (IQR=5-9)	
	Outside the city where the hospital was located	44	14.4	4.5(IQR=2-9)		8 (IQR=5-11)		6(IQR=4-8)	
Work group	Paramedic	25	8.2	8 (IQR=4.5-11.5)		8(IQR=7-12)		7 (IQR=4-8)	
	Nurse	133	43.5	7(IQR=3-10)		8(IQR=5-12.5)		7 (IQR=5-9)	
	Physician	86	28.1	5 (IQR =2-7)		7 (IQR=5-10)		6.5 (IQR=5-9)	
	Service personnel	4	1.3	7.5(IQR=2.5-9.5)		6.5(IQR=3.3-12)		5.5 (IQR=3.5-9)	
	Others	58	19.0	6(IQR=3-9)		9(IQR=5-12)		8 (IQR=6-9)	
Response period	Rising wave	148	49.8	6 (IQR=3-9)		8 (IQR=6-12)		7 (IQR= 5-9)	
	Partial decline	149	50.2	6 (IQR=3-9)		7 (IQR= 5-10)		7 (IQR= 5-9)	

Table 3. Univariate analysis for assessing relationship between moderate and severe depression, anxiety, and stress and variables related to health care workers

Variables	N	No. of cases with moderate and severe depression (%)			No. of cases with moderate and severe anxiety (%)			No. of cases of with moderate and sever perceived stress		
		OR	p value		OR	P value		OR	p value	
Gender	Female	226	39 (17.3)	1	76 (33.6)	1	106 (46.9)	1		
	Male	80	11 (13.8)	0.76 (0.37-1.58)	12 (15.0)	0.345 (0.18-0.68)	27 (33.8)	0.58 (0.34-0.98)	0.04	

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Median of age	≤37	158	27 (17.1)	1		46 (29.1)	1		76 (48.1)	1	
	>37	148	23 (15.5)	0.89 (0.49-1.64)	0.71	42 (28.4)	0.97 (0.59-1.58)	0.89	57 (38.5)	0.68 (0.43-1.07)	0.09
Direct exposure	No	54	8 (14.8)	1		12 (22.2)	1		25 (46.3)	1	
	Yes	252	42 (16.7)	1.15 (0.51-2.61)	0.74	76 (30.2)	1.51 (0.75-3.03)	0.24	108 (42.9)	0.87 (0.48-1.57)	0.64
Being anxious	No	39	1			1 (2.6)			5 (12.8)	1	
	Yes	267	49 (18.4)	8.54 (1.15-63.72)	0.01	87 (32.6)	18.37 (2.48-135.99)	<0.001	128 (47.9)	6.26 (2.38-16.50)	<0.001
Academic degrees	Associate degree and lower	39	10 (25.6)	1		17 (43.6)	1		17 (43.6)	1	
	Bachelor	155	28 (18.1)	0.64 (0.28-1.46)		49 (31.6)	0.60 (0.29-1.23)		65 (41.9)	0.94 (0.46-1.89)	
	Master and GP	29	4 (13.8)	0.45 (0.13-1.66)	0.24	7 (24.1)	0.41 (0.14-1.19)	0.052	14 (48.3)	1.21 (0.46-3.17)	0.54
	Specialist and PhD	55	6 (10.9)	0.36 (0.12-1.08)		10 (18.2)	0.29 (0.11-0.73)		28 (50.9)	1.34 (0.59-3.06)	
	Fellowship graduate	28	2 (7.1)	0.22 (0.05-1.11)		5 (17.9)	0.28 (0.09-0.89)		9 (32.1)	0.61 (0.22-1.69)	
Place	The city where the hospital was located	262	44 (16.8)	1		75 (28.6)	1		118 (45.0)	1	
	Outside the city where the hospital was located	44	6 (13.6)	0.78 (0.31-1.96)	0.60	13 (29.5)	1.05 (0.52-2.11)	0.90	15 (34.1)	0.63 (0.32-1.23)	0.18
Work group	Paramedic	25	7 (28.0)	1		8 (32.0)	1		8 (32.0)	1	
	Nurse	133	28 (21.1)	0.69 (0.26-1.80)		45 (33.8)	1.09 (0.44-2.71)		55 (41.4)	1.50 (0.60-3.72)	
	Physician	86	8 (9.3)	0.26 (0.09-0.82)	0.04	15 (17.4)	0.45 (0.16-1.23)	0.06	38 (44.2)	1.68 (0.66-4.32)	0.35
	Others	62	7 (11.3)	0.33 (0.10-1.06)		20 (32.3)	1.01 (0.37-2.74)		32 (51.6)	2.27 (0.85-6.02)	

Table 4. Frequency of anxiety and depression among subgroups of health care workers

		Anxiety		Depression	
		Frequency	Percentage	Frequency	Percentage
Valid	Normal	141	46.1	194	63.4
	Mild	77	25.2	62	20.3
	Moderate	59	19.3	39	12.7
	Severe	29	9.5	11	3.6

Table 5. Comparative analysis of the condition of health care workers in the periods of rising wave and partial decline of COVID-19

Variables		First wave	Partial decline	p value
Gender	Female	114(77.0)	104(69.8)	0.16
	Male	34(23.0)	45(30.2)	
Direct exposure	No	33(22.3)	21(14.1)	0.07
	Yes	115(77.7)	128(85.9)	
Are you anxious about COVID-19?	No	14(9.5)	24(16.1)	0.09
	Yes	134(90.5)	125(83.9)	
Reasons for anxiety				
I'm worried about my health	No	112(75.7)	105(70.5)	0.31
	Yes	36(24.3)	44 (29.5)	
I'm worried about transmitting the disease to my family members	No	19(12.8%)	9(6.0%)	0.05
	Yes	129(87.2%)	140(94.0%)	
I don't have enough skills to manage COVID-19 patients	No	140(94.6%)	142(95.3)	0.78
	Yes	8(5.4%)	7(4.7%)	
How does your anxiety decrease?				
Providing adequate protection	No	34(23.0)	27(17.1)	0.30
	Yes	114(77.0)	122(81.9)	
Providing a convenient resting place in the hospital	No	115(77.7)	96(64.4)	0.01
	Yes	33(22.3)	53(35.6)	
Providing appropriate training materials to deal with COVID-19 patients	No	136(91.9)	118(79.2)	0.002
	Yes	12(8.1)	31(20.8)	
Appreciation of the services of nurses and medical teams	No	115(77.7)	73(49.0)	<0.001
	Yes	33(22.3)	79(51.0)	
Getting help from a psychologist and psychiatrist	No	131(88.5)	120(80.5)	0.06
	Yes	17(11.5)	29(19.5)	
Academic degrees	Associate degree and lower	16(10.8)	22(14.8)	0.001
	Bachelor	58(39.2)	91(61.1)	
	Master and GP	7(4.7)	21(14.1)	
	Specialist and PhD	42(28.4)	12(8.1)	
	Fellowship graduate	25(16.9)	3(2.0)	
Place	The city where the hospital was located	114(77.0)	142(95.3)	0.001
	Outside the city where the hospital was located	34(23.0)	7(4.7)	

Occupation	Paramedic	9(6.1)	16(10.7)	0.001
	Nurse	52(35.1)	77(51.7)	
	Physician	67(45.3)	18(12.1)	
	Service personnel	1(0.7)	3(2.0)	
	Others	19(12.8)	35(23.5)	

Discussion

In this study, the level of depression, anxiety, and perceived stress was examined among HCWs at Imam Khomeini Hospital, Tehran, Iran during the outbreak of COVID-19. The main purpose of this study was to investigate the formation and duration of anxiety, depression, and stress among HCWs in the face of COVID-19 pandemic. In this study, special attention has been paid to the formation of anxiety and strategies to reduce it from the perspective of HCWs involved in the pandemic. Also, the difference between these approaches in two different periods of time, including the rising wave and decline stage, has been investigated.

HCWs who were anxious about COVID-19 significantly experienced more depression and stress. This may be a sign of underlying distress (21). In both time periods, the majority of participants were in direct contact with COVID-19 patients. Most were concerned about their own health and the transmission of the disease to their families. Over time, they became more concerned about transmitting the disease to their families. This issue can be due to their increased awareness about the ways of transmission and the role of cyberspace in raising their awareness (22). Also, increased information in this field and familiarity with modes of disease transmission to family members of other HCWs could be effective in managing the stressful conditions (23).

Concerns about lack of proper skills to manage COVID-19 were seen in a large number of HCWs in both study periods. Perhaps, the most important reason for this is the lack of sufficient knowledge about various aspects of the disease due to the specific and unknown nature of COVID-19 (24,25). Also, the high level of anxiety and stress associated with exposure to the disease may reduce the normal capacity of HCWs (26).

The HCWs themselves believed that providing care equipment, facilitating hospital stays, and admiration and encouragements by others could be effective in

improving this situation. Living in harsh working conditions in an environment with serious health risks may have created the need for support from those involved. They believed that because of the risk and worrying situation, they should be given more support by management systems.

More than half of HCWs were anxious, and about a third of them had moderate to high perceived stress. Also, more than a third of them experienced some degree of depression and more than a third of depressed HCWs experienced moderate to severe levels.

In a similar study in China at the time of the spread of COVID-19, especially during the rising wave of the disease, HCWs had experiences such as excitability, irritability, and psychologic distress (27). In Iran, due to the two-month observation of China's experience at the beginning of the outbreak of COVID-19, there were many concerns about the transmission of the disease among HCWs. This was seen even when the disease subsided and caused a great deal of distress among the HCWs (28,29). One of the most important issues was the lack of equipment in Iran due to the economic problems, which led to restrictions on the adequate supply of HCWs at the early stages of the disease (30). Convenient resting places in hospitals and proper training in managing COVID-19 patients have also been emphasized as important variables in both studies including HCWs. These last two situations, especially in our study, were more pronounced during the relative decline of COVID-19, possibly due to the prolongation of the disease in the community and emergence of new needs among the personnel. The interesting point about both studies was that HCWs did not discover their mental health problems to seek help from psychologists or psychiatrists. Therefore, they did not feel the need for participating in counselling sessions. The results of our study, which show a high prevalence of mental health disorders such as depression, anxiety, and perceived stress by HCWs, indicate the need

for promoting the staff awareness in this regard. It seems that performing appropriate interventions to screen for these disorders in this group of people and the necessary care and treatment measures in this area can be effective strategies in managing stressful conditions (31). One of the solutions that can be applied due to the time constraints faced by HCWs and the risks of transmitting the disease is the use of web-based training. An example of this is Internet-based Cognitive Behavioral Therapy (I-CBT) interventions. Another useful strategy is using learning management systems that allow the user to benefit from several facilities without the need for technical knowledge (32).

The strategies such as admiring the efforts of HCWs and providing emotional support are considered as health-protective behaviors in the hospital working environment and play an important role in reducing HCWs' stress. These methods can even be effective in improving the professional performance of staff (33). It seems that maintaining the mental health of personnel is beneficial in controlling infectious diseases efficiently (27). Liang *et al* reported severe symptoms of depression in a large number of staff working in the isolated wards with COVID-19 patients, as well as in staff in other unrelated departments. They did not report a significant difference between the two groups of staff and emphasized the need for follow-up and care to protect the mental health of hospital staff during such epidemics (34).

Lai *et al* in a study of 1257 HCWs in 34 hospitals during the outbreak of COVID-19 demonstrated that 60.5% of people who worked in hospitals in Wuhan, i.e. a significant proportion of HCWs, had symptoms of depression, anxiety, and insomnia (50.4, 44.6 and 34%, respectively) (35). These results are close to the results of our study and show similar conditions for HCWs in terms of mental health problems induced by COVID-19. The study also found an increased prevalence of symptoms among nurses, women, front-line HCWs, and staff at the Wuhan Epidemic Center. In our study, there was a higher prevalence in women than in men, which could be a sign of greater vulnerability of the female sex during epidemics. This may emphasize the need to pay more attention to the mental health care of female staff, especially during epidemics. One of the reasons for this situation in

this pandemic could be the increased responsibility of women in family affairs and the care of children and the elderly, which can aggravate concerns in this gender (36).

Maunder *et al*, based on SARS 'outbreak experience, noted clear clinical distress among one-third to one-half of HCWs. They said distress was more likely to occur during colleagues' infection which results in the fear of getting sick while helping them, worrying about transmitting the disease to the family and endangering their health, and induced feeling of job stress and interpersonal isolation (10). In our study, about one-third to one-half of HCWs had symptoms of depression, anxiety, and perceived stress. This indicates that the personnel conditions in our study are close to the conditions that existed for the personnel during the SARS epidemic. It also suggests that the presence of similar conditions in case of outbreak of infectious diseases may have the same effect on communities, especially the staff responsible for patient care, and subsequently learning from previous experiences can be effective in overcoming obstacles in new situations. The common challenges are social isolation with its consequences such as increased interpersonal distance, stigma, and reduced social interaction, as well as problems about rapport and communication with the family as the main source of emotional support.

In a review article, Aghili and Arbabi reviewed the mental health of staff after epidemics and reported increased stress, depression, and anxiety among HCWs (37). They identified the most common problems among women, nurses, and front-line personnel. They suggested monitoring and providing the services required by the HCWs in the field of mental health maintain their well-being and promote their effective performance. They emphasized the need to pay attention to these needs at both individual and organizational levels.

It seems that taking care of the mental health of the staff is very important, especially during epidemics. Psychological first aid, counselling sessions at mental health clinics, using health-care technology such as tele-psychiatry along with timely psychosocial support and appropriate psychological interventions can be facilitators for managing such stressful conditions (38). It is important to pay attention to various aspects of

HCWs' support, and this can include the provision of personal supportive equipment, appropriate facilities in the workplace, and effective psychological support (39).

This study was conducted in a situation where there were many concerns about this new disease and its risk of transmission and mortality. The lack of readiness of Iranian hospitals, especially due to economic problems, in terms of equipment and staff required, was one of the sources of concern. Therefore, effective participation of staff in such situations was unlikely. However, at the end of the study, useful results were obtained. One of the limitations of our study is that it is cross-sectional, in which the possibility of longitudinal follow-up of cases was low. The effect of response bias among the participants, due to their occupational status and time constraints during the spread of the COVID-19, was another limitation of the study. However, in order to reduce these conditions, at the beginning of the study, participants were informed briefly about the importance of this study. Another important limitation of our study is that a comparison between two relatively different groups of HCWs was carried out during the two periods of rising wave and decline stage.

Conclusion

In this study, the mental health of HCWs in Iran's largest teaching hospital during the outbreak of COVID-19 was examined. High levels of mental health problems were seen among HCWs. More than half of them experienced some degrees of anxiety, and more than a third experienced some degrees of depression. Compared to the initial wave of the disease and its relative decline, concerns about the transmission of the disease to the family, the demand for a convenient place to rest in the hospital, and the need for staff encouragement by others had increased. According to the results of the study, it is very important to pay attention to the mental health of HCWs who are managing COVID-19 patients. Healthcare policymakers need to meet the needs of

HCWs including provision of personal protective equipment, adequate resting facilities during their hospital stay, and fulfilling their emotional needs. It is necessary to use screening methods for psychiatric disorders, along with providing psychosocial support and appropriate psychological interventions in this field.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Data availability

The data of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions. *All authors were equally involved in preparing the manuscript (Conceptualization and design of the study, searching for articles, writing the final draft, *etc.*)

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