emerald PUBLISHING

Research Article

Healthcare Workers' General Health and Its Relation with Anxiety, Anger, and Posttraumatic Stress Disorder during COVID-19 Outbreak in Southeast Iran

Alireza Malakoutikhah [1] **Leila Ahmadi Lari** [2,3] **Pooya Baharloo** [4]
Rasmieh Al-Amer [5,6] **Mohamed Alnaiem** [7] **Hossein Khaluei** [8]
and Mahlagha Dehghan [1]

[1]*Nursing Research Center, Kerman University of Medical Sciences, Kerman, Iran*
[2]*Department of Critical Care Nursing, Hazrat Zeinab Faculty of Nursing and Midwifery, Larestan University of Medical Sciences, Larestan, Iran*
[3]*Nursing Research Center, Larestan University of Medical Sciences, Larestan, Iran*
[4]*Clinical Research Development Unit, Shahid Bahonar Hospital, Kerman University of Medical Sciences, Kerman, Iran*
[5]*School of Nursing, Yarmouk University, Irbid, Jordan*
[6]*School of Nursing and Midwifery, Western Sydney University, Penrith, Australia*
[7]*Mental Health Services, Hamad Medical Corporation, Doha, Qatar*
[8]*School of Nursing and Midwifery, Kerman University of Medical Sciences, Kerman, Iran*

Correspondence should be addressed to Mahlagha Dehghan; m_dehghan86@yahoo.com

Background. Healthcare workers during the COVID-19 pandemic played an effective role in providing preventive and curative measures. Scientific evidence confirmed that the outbreak of this disease has caused numerous psychological problems such as pre- and posttraumatic stress disorder (PTSD), anxiety, depression, and anger at a global level. This study is aimed at investigating the general health of healthcare workers and its relationship with anxiety, anger, and posttraumatic stress disorder during the outbreak of COVID-19. *Methods.* This research was a cross-sectional study conducted on 455 healthcare workers of four teaching hospitals in Kerman, southeast of Iran. The convenience sampling method was used. The research tools included the 12-Item General Health Questionnaire (GHQ-12), the Impact of Event Scale-Revised (IES-R), the trait anxiety section of State-Trait Anxiety Inventory (STAI), and the trait anger section of Trait-State Anger Expression Inventory 2 (STAXI-2). Data analysis was done in IBM SPSS Statistics version 25 and using Pearson's correlation tests, independent *t*-test, ANOVA, and multivariate linear regression. *Results.* 28.1% ($n = 128$) of the participants had mental health disorders. The mean score of anxiety was 43.99 ± 9.24 which was at moderate to high level of anxiety. The mean score of anger was 18.65 ± 5.72 which was at the moderate level. The mean score of PTSD was 34.77 ± 15.24 which was less than the midpoint of the questionnaire, i.e., the score of 44. The results of the multiple linear regression model that showed anxiety, anger, gender, and hospital were predictors of mental health ($P < 0.05$). *Conclusion.* The results of the present study showed that about a quarter of the healthcare workers faced with the COVID-19 pandemic had mental health disorders and suffered from moderate to high anxiety, moderate anger, and PTSD. It was also observed in this study that there was a weak to moderate significant correlation between general health and anxiety, anger, and PTSD in healthcare workers. So, healthcare workers need a lot of social and psychological support.

1. Introduction

In today's world, the spread of epidemic diseases, especially contagious viral diseases, is considered a serious threat to public health. One of the diseases that has recently spread and reached an epidemic level is the coronavirus disease 2019 (COVID-19) [1]. This virus spread rapidly in many countries and infected the whole world in less than a few months. The symptoms of this disease vary from mild to severe and generally include fever, cough, and respiratory disorders [1, 2].

It is worth mentioning that at the beginning of this pandemic, healthcare providers encountered a wide range of uncertainties and frequent changes in the management protocol indicating that the COVID-19 virus was a serious health threat. Although it is well known that healthcare providers are at a higher risk, it was not clear what the risk that might result from providing care to patients with COVID-19 infection. Bearing in mind that those who were the first group to deliver care for patients during an epidemic are at higher risk due to the lack of understanding of the behavior of such a new virus [3]. To illustrate, their duties and performance were associated with many challenges due to frequent changing of the management protocol, lack of personal protective measures (PPE), in addition to the high volume of workload during time pressure, and affected by unpredictable events resulting from a pandemic, including fear, doubt, suspicion, and uncertainty.

Moreover, Kerman province, situated in the southeastern region of Iran, is the largest province in the country with approximately 3 million residents [4]. The initial two instances of COVID-19 in Kerman were detected in March 2020. Over the subsequent months, the number of hospitalized cases related to COVID-19 rose to 40,765, and the number of deaths attributed to COVID-19 reached 4,825 in the province. On August 18, 2021, a total of 32 individuals passed away in Kerman due to COVID-19, marking the highest daily death toll since the onset of the pandemic [5]. Hospitals have also been challenged by various problems such as, but not limited to, providing a suitable physical environment for employees and patients and a lack of specialist staff. As a result, this new situation caused many physical and psychological problems for most healthcare workers, which could affect their health, the quality of their work, and the international and national health system. Consequently, healthcare workers with bad general health are not safe to deliver care to patients [6].

The World Health Organization (WHO) defines general health as "a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community [7]." The nature of work during the pandemic was in relation to wearing personal protective measures (PPE), the risk of catching the virus and spreading it to others, while delivering hands-on care for patients, and exposing health workers to various health problems, such as physical, social, and psychological [8]. Scientific evidence confirmed that the outbreak of this disease has caused numerous psychological problems such as pre- and posttraumatic stress disorder (PTSD), anxiety, depression, and anger at a global level [9, 10]. With the sudden emergence of infections such as severe acute respiratory syndrome (SARS) and COVID-19, HCWs' anxiety has increased due to factors such as explosive patient growth, increased workloads, physical or emotional exhaustion, lack of protective gear, fear of exposure or transmission, and uncertainty about safety [11]. According to earlier research, female nurses have the highest risk of developing mental health issues among HCWs since they frequently interacted with COVID-19 patients who were both suspected and confirmed [12]. Also, clinicians experienced considerable psychological discomfort during the COVID-19 pandemic, including anxiety, sadness, insomnia, burnout, and psychological anguish [13–15].

Anxiety is a reaction to an unknown, internal, ambiguous, and uncontrollable danger among people, especially healthcare workers. Studies indicated a high rate of anxiety among healthcare workers during the COVID-19 pandemic [16]. Furthermore, the nature of this disease increases severe stress-causing reactions such as anger due to changes in working conditions, fear of being a carrier, stigma caused by the disease, anxiety, and insomnia problems in healthcare workers [17, 18].

According to the definition of the American Psychological Association in 2019, PTSD is a type of psychiatric disorder that can occur as a result of direct or indirect contact with traumatic events [19]. A study conducted in Italy reported that healthcare workers have suffered from PTSD managing patients with COVID-19 [20]. Healthcare workers in emergency care settings are particularly susceptible to developing posttraumatic stress disorder (PTSD) due to the highly stressful situations they encounter. These situations include managing critical medical emergencies, caring for severely traumatized individuals, frequently witnessing death and trauma, working in crowded environments, and dealing with disrupted sleep patterns caused by shift work. These factors significantly contribute to the increased risk of PTSD among healthcare workers in emergency care settings [21, 22]. The results of Carmassi et al.'s study, in Italy, showed a high rate of PTSD in healthcare workers during the COVID-19 pandemic [23]. A review study reported that the prevalence of PTSD reached up to 49% while anxiety and depression were at 40% and 37%, respectively [24]. Sahebi et al. also demonstrated in their review and meta-analysis that the overall prevalence of PTSD among healthcare workers during the COVID-19 pandemic was 13.52% [9]. The results of Khaki et al.'s study showed that PTSD, depression, anxiety, stress, sleep disorders, and fear in healthcare workers, especially nurses in the early stages of COVID-19, had increased significantly [25]. The results of several studies in India have shown that the COVID-19 pandemic has negative consequences on mental health. Among these consequences, we can mention anxiety and stress among HCWs [26–29].

It is evident from the literature that during the outbreak of COVID-19, healthcare workers have encountered severe psychological pressure and social isolation, reduced self-confidence, physical effects of the disease, side effects of drugs, fear of transmitting the virus to others, loneliness, anger, anxiety, depression, insomnia, and PTSD [22]. These causes disrupted

the social, occupational, and personal life of healthcare workers. Therefore, it is very important to help healthcare workers maintain overall good general health, and this should be a priority at a global scale because this would impact the positive outcomes for healthcare workers and their clients. Consequently, investigating the psychological impact of the COVID-19 pandemic on healthcare workers including physicians and nurses has become increasingly important [30]. Therefore, this study was conducted to assess the general health of healthcare workers and examine its association with anxiety, anger, and posttraumatic stress disorder (PTSD) during the COVID-19 outbreak in southeast Iran. The findings of this study could help inform interventions and support strategies to address the mental health needs of healthcare workers in similar contexts, ultimately improving their overall well-being and ability to provide effective care during challenging times.

1.1. Hypothesis. We hypothesize that there will be a significant correlation between healthcare workers' general health scores and their levels of anxiety, anger, and posttraumatic stress disorder during the COVID-19 outbreak in southeast Iran.

2. Materials and Methods

2.1. Design, Setting, and Sample. A cross-sectional study was conducted between 1ˢᵗ September 2021 to the end of January 2022 among healthcare workers at teaching hospitals in Kerman (Bahonar, Afzalipour, Shafa, and Shahid Beheshti Hospitals) who were in direct contact with patients. It is important to note that the hospitals included in the study are situated in the urban area of Kerman province.

The target population of this study included all healthcare workers of the aforementioned hospitals. We used Cochran's formula to estimate the sample size ($Z = 1.96$, $d = 0.05$, $N = 384$). According to dropout probability, 500 questionnaires were distributed. The convenience sampling method was used to collect data from all eligible healthcare workers in teaching hospitals in Kerman City. The first, fourth, and sixth authors were responsible for data collection. 475 participants completed the questionnaires, and 25 samples refused to participate in the study due to unwillingness. The inclusion criteria were being healthcare workers and having at least one year of work experience. The exclusion criteria were not completing the questionnaires (not completing more than a third of the questionnaires, etc.) and history of a mental illness (self-administered). Among 455 returned questionnaires, 17 questionnaires were removed from the analysis due to a large number of missing data and 3 were removed due to a history of a mental illness. Finally, 455 questionnaires were analyzed. Therefore, the effective response rate was 91%. Data collection in our study was carried out by nurses from each hospital involved, which likely fostered trust and rapport with participants. The familiarity between healthcare workers and data collectors may have contributed to the high motivation and willingness to participate, resulting in a 91% inclusion rate.

2.2. Measures. Measures in this study included five questionnaires, including demographic characteristics questionnaires,

the 12-Item General Health Questionnaire (GHQ-12), the Impact of Event Scale-Revised (IES-R), the trait anxiety section of State-Trait Anxiety Inventory (STAI), and the trait anger section of Trait-State Anger Expression Inventory 2 (STAXI-2), and they are described in the following section.

2.2.1. Demographic Characteristics Questionnaire. The form includes age, gender, marital status, level of education, field of study, work experience, income, hospital name, having experience with caring of a patient with COVID-19 (yes/no), being infected with COVID-19 (yes/no—how many times?), having a family member being infected with COVID-19 (yes/no), and having mental disorders (yes/no).

2.2.2. The General Health Questionnaire-12 (GHQ-12). The GHQ-12 consists of 12 items that detect shared symptoms found in different mental disorders, helping to distinguish mentally ill individuals from those who consider themselves healthy. Its primary goal is not to diagnose specific mental illnesses but rather to differentiate between mental illness and well-being. The questionnaire evaluates the psychological states of an individual during the previous month. Each response to the items can be considered as a Likert scale, with specific weights assigned to each level (0-1-2-3). This results in a score ranging from zero to 36. The higher the score, the worse the mental disorder. Internal reliability was in the range of 0.70 to 0.91. In addition, retest reliability after 7 to 14 days was reported as 0.84 and after 20 days as 0.79. Validity was reported by 17 studies indicating an average sensitivity of 0.84 and an average specificity of 0.92 [31]. Studies in Iran indicated that this scale is valid and reliable among Iranian society. Namjo et al. reported the content validity index and content validity ratio of the questionnaire as 0.92 and 0.96, respectively. Cronbach's alpha of the questionnaire was also reported as 0.82 [32].

2.2.3. The State-Trait Anxiety Inventory (STAI). Spielberger et al. designed the first version of STAI in 1970. It was revised in 1983. STAI consists of two sections, the state anxiety (20 items) that evaluates the individual's feelings "at this moment and at the time of response" and the trait anxiety (20 items) that measures people's general and ordinary feelings. This scale has a four-point format with a total score that ranges between 20 and 80. The developer also recommended using the following cutoff points to evaluate the levels of anxiety including scores of 20-31 = mild anxiety, 32-42 = moderate to low anxiety, 43-52 = moderate anxiety, 53-62 = relatively high anxiety, 63-72 = high anxiety, and 73 or higher = a sign of very high anxiety [33]. In Mahram's study, Cronbach's alpha was 0.91 for the state anxiety and 0.90 for the trait anxiety [34]. It should be noted that in this study, only the trait anxiety section was used. Since our data were collected 19 months after the onset of the COVID-19 pandemic, we aimed to measure anxiety levels that individuals may have experienced consistently throughout this period. By focusing on trait anxiety, which reflects individuals' enduring emotional tendencies, we sought to capture the long-term impact of the pandemic on participants' psychological well-being. This approach allowed us to explore

how individuals' baseline anxiety levels may have been shaped by their experiences over an extended period, providing valuable insights into the lasting effects of the pandemic on mental health.

2.2.4. The Trait-State Anger Expression Inventory 2 (STAXI-2).
Spielberger designed STAXI-2 in 1999. This inventory contains 57 items in 3 sections. The first section (15 items), the second (10 items), and the third (32 items). The first section measures state anger in three subscales, including state anger/feeling, state anger/verbal, and state anger/physical, and scored on a four-point Likert scale (not at all, a little, relatively, and very much). The second section measures trait anger in two subscales, trait anger/temperament and trait anger/reaction. The third section assesses anger expression in four subscales, anger expression-out, anger expression-in, anger control-out, and anger control-in. The second and third sections items are scored on a four-point Likert scale (almost never, sometimes, often, and almost always). The total score ranges from 0 to 96. A higher score indicates a more anger state. In this study, the second section (trait anger), with 10 items, was used. A score of 10 indicates the lowest level of anger, scores 10 to 20 mean a moderate level of anger, scores 20 to 30 mean a high level of anger, and scores 30 to 40 mean a very high level of anger [35]. According to Khodayari-Fard et al., this scale is reliable with Cronbach's alpha of 0.8, good test-retest reliability, and split-half [36]. During the extended period of the COVID-19 pandemic, individuals may have experienced ongoing stressors and challenges that could have influenced their baseline levels of anger and emotional responses. By concentrating on trait anger within the STAXI-2, we aimed to capture participants' enduring tendencies towards anger expression and control, providing insights into how these traits may have evolved over time in response to sustained external pressures.

2.2.5. Impact of Event Scale-Revised (IES-R).
Horowitz et al. designed the Impact of Event Scale (IES) to examine the psychological effect of an incidence [37]. IES was the first post-traumatic stress diagnostic tool, and it was designed before the criteria for PTSD were determined in DSM-III; hence, it lacks the arousal dimension of PTSD according to DSM-IV diagnostic criteria. Weiss designed the revised version in 1997 according to DSM-IV criteria. This revised version includes the arousal dimension. IES-R is a self-report scale that includes three main dimensions: intrusive thoughts, arousal, and avoidance. IES-R contains 22 items, 7 of which are additional to the 15 items of IES. Out of these 22 items, 8 items are related to avoidance symptoms, 8 items to intrusive thoughts, and 6 items to arousal symptoms. The scale is anchored on a five-point Likert scale format including 0 (never) to 4 (very much). Higher scores on the whole scale indicate a higher level of helplessness. A score equal to or above 33 means the presence of PTSD [38]. This scale is valid and reliable with a reported Cronbach's alpha of 0.96 [39] and 0.84 [40].

2.3. Data Collection.
After issuing the study's ethical approval and final coordination with the authorities took place, sampling began. Researchers made a visit at an arranged time so that there was no disruption in the work process of the employees. To ensure a diverse sample, questionnaires were provided to healthcare workers in different shifts, different working hours, and different working days (holidays and weekends). In addition, it was tried that participants with different characteristics be included in the study. The participants were asked to answer the questions of the questionnaires carefully.

2.4. Ethical Considerations and Consent to Participate.
The Ethics Committee of Kerman University of Medical Sciences approved the project (IR.KMU.REC.1399.649). The participants signed an informed consent form. The consent form contained the study's purpose and objectives, the confidentiality of the data, and the anonymity of participants. The participants were also assured that they could withdraw from the study at any time.

2.5. Data Analysis.
Data were analyzed with IBM SPSS version 25 software. Frequency, percentage, mean, and standard deviation were used to describe the study variables. Pearson's correlation test was used to determine the correlation between GHQ-12 score and anxiety, anger, and PTSD, considering that they followed a normal distribution. Independent t-test and one-way analysis of variance (ANOVA) test were used to examine the difference between demographic characteristics regarding GHQ-12 score, considering the establishment of parametric conditions (Kolmogorov–Smirnov test, skewness and kurtosis, and Levene's test for equality of variances). Multivariate linear regression was used to determine predictors of GHQ-12 score. All significant variables in bivariate analysis were included in the multiple linear regression model. The Mahalanobis d^2 index was examined to check the multivariate outliers. Accordingly, there were no outliers to be excluded from the analysis. The multivariate normality was checked using Mardia's normalized multivariate kurtosis value, which was 1.5. Therefore, the multivariate normality was confirmed. The significance level was considered >0.05.

3. Results

The mean age of the participants was 33.39 ± 7.07 years (Min = 23 and Max = 63). The majority of the participants were females, married, with bachelor's degrees, and with 1-5 years of work experience. The majority had experience caring for patients infected with COVID-19 and infected with COVID-19 themselves (Table 1).

The mean score of GHQ was 11.97 ± 6.27 which was less than the midpoint of the questionnaire, i.e., the score of 18. The mean score of anxiety was at a moderate to high level of anxiety. The mean score of anger was at a moderate level. According to the cut point of ≥ 33 for PTSD, 55.7% ($n = 253$) of participants had the symptoms of PTSD based on the IES-R results (Table 2).

There was a significant weak to moderated correlation between GHQ score and anxiety, anger, and PTSD scores (correlations range between $r = 0.28$-0.58((Table 2). The

TABLE 1: The participants' demographic characteristics and their relation with general health ($N = 455$).

Variable	N (%)	General health		Statistical test	P value
		Mean	SD		
Age (yr.)*					
23-30	206 (45.9)	11.43	6.0		
31-40	167 (37.2)	12.66	6.21	$F = 1.81$	0.16
>40	76 (16.9)	11.78	6.86		
Gender					
Male	88 (19.3)	10.22	5.49	$t = -2.94$	0.003
Female	367 (80.7)	12.39	6.38		
Marital status*					
Unmarried	124 (27.4)	11.80	6.40	$t = -0.44$	0.66
Married	328 (72.6)	12.09	6.23		
Educational level					
Practical nursing	8 (1.8)	15.75	7.22		
B.Sc.	372 (81.8)	12.03	6.29		
M.Sc.	41 (9.0)	10.48	5.64	$F = 1.44$	0.22
MD	7 (1.5)	10.86	7.31		
PhD/specialty	27 (5.9)	12.59	6.08		
Major*					
Operating room	25 (5.5)	13.68	7.06		
Nursing	334 (73.6)	11.84	6.19		
Anesthesiology	38 (8.4)	11.36	5.43		
Medicine	33 (7.3)	12.06	6.30	$F = 1.52$	0.17
Midwifery	14 (3.1)	13.21	7.27		
Laboratory	2 (0.4)	4.0	5.66		
Nursing assistant	8 (1.7)	15.75	7.22		
Work experience (yr.)*					
1-5	194 (43.0)	11.52	5.88		
5.1-10	73 (16.2)	11.23	6.26	$F = 2.45$	0.09
>10	184 (40.8)	12.75	6.64		
Hospital					
A	152 (33.4)	13.10	6.96		
B	123 (27.0)	10.29	5.80	$F = 5.19$	0.002
C	140 (30.8)	11.90	5.54		
D	40 (8.8)	13.12	6.31		
Monthly income (million rials-IRR)*					
20-40	6 (1.3)	14.83	8.13		
40-60	36 (8.0)	11.60	5.78		
60-80	149 (33.0)	11.90	6.81	$F = 0.68$	0.61
80-100	214 (47.5)	12.27	6.0		
>100	46 (10.2)	11.11	6.01		
Caring for patients infected with COVID-19					
Yes	408 (89.9)	12.06	6.28	$t = 0.80$	0.42
No	46 (10.1)	11.27	6.25		
Infected with COVID-19					
Yes	328 (72.4)	12.13	6.52	$t = 0.78$	0.44
No	125 (27.6)	11.62	5.60		

TABLE 1: Continued.

Variable	N (%)	General health		Statistical test	P value
		Mean	SD		
Relatives infected with COVID-19					
Yes	408 (89.7)	12.10	6.34	$t = 1.28$	0.20
No	47 (10.3)	10.86	5.58		
History of mental disorders*					
Yes	34 (7.5)	18.85	7.68	$t = 7.01$	<0.001
No	419 (92.5)	11.39	5.81		

*Missing value. 1 USD = 250,000 IRR at the time of study; t = independent t-test; F = analysis of variance.

GHQ score was higher in females than males. In addition, participants working in different hospitals had significantly different levels of mental health. Participants with a positive history of mental disorders had significantly higher GHQ scores than others (Table 1).

For further analysis, all significant variables were included in the multiple linear regression model. The GHQ score was treated as the dependent variable, and anxiety, anger, PTSD, gender, hospital, and history of mental health were treated as independent variables. The results showed that anxiety, anger, gender, and hospital were predictors of mental health (Table 3).

4. Discussion

This study is aimed at investigating the healthcare workers' general health and its relationship with anxiety, anger, and PTSD during the outbreak of COVID-19. The results of the present study showed that there was a weak to moderate significant correlation between general health and anxiety, anger, and PTSD in healthcare workers. Given that PTSD is a clinical diagnosis that should be confirmed by a psychiatrist, it is essential to clarify that in this study, the term PTSD is utilized based on the scale scores.

In the current study, it was found that about a quarter of healthcare workers were affected by mental health issues. This prevalence rate of 28.1% may seem relatively low when compared to the findings of Vizheh et al.'s systematic review on the mental health of healthcare workers during the COVID-19 pandemic, where the lowest reported rates of anxiety, depression, and stress among healthcare workers were 24.1%, 12.1%, and 29.8%, respectively. On the other hand, the highest reported percentages for these mental health indicators were 67.55%, 55.89%, and 62.99% [41]. However, taking into account a national Iranian mental health survey conducted before COVID-19 in 2011, Hajebi et al. reported a 12-month prevalence rate of anxiety disorders at 15.6% in the general population [42]. Additionally, Zhu et al. discovered that the prevalence of depression was 21% before COVID-19, rising to 26% during the pandemic [43], which still represents a significant increase. These findings collectively suggest that a notable proportion of healthcare workers in Iran have been impacted by mental health disorders during the pandemic.

This finding highlights the urgent need to prioritize the mental well-being of healthcare workers and provide them with the necessary support and resources. Healthcare workers experiencing mental health disorders may face challenges in delivering optimal care to COVID-19 patients. Mental health issues can impact job performance, decision-making abilities, and overall quality of care. Addressing these mental health concerns is crucial for maintaining the well-being of healthcare workers and ensuring the provision of high-quality care during the pandemic.

Healthcare workers in this study have been facing unprecedented challenges, including long working hours, increased workload, and exposure to the virus. They have had to adapt to rapidly changing protocols and guidelines, often working in high-pressure environments with limited resources. Therefore, healthcare workers have been experiencing high levels of stress, anxiety, and burnout. The results of a systematic study showed that have reported a negative impact on the mental health of healthcare workers during the COVID-19 pandemic [25]. In a review of healthcare workers, Saragih et al. reported that the pandemic had a significant negative impact on healthcare workers' mental health, and more than a quarter of the healthcare workforce had mental health problems during the COVID-19 pandemic [24]. In another study, the results showed that healthcare workers experience a high degree of depression and anxiety symptoms, and their mental health was at risk [44]. During viral pandemics, healthcare workers' mental health encountered serious challenges because of the death of their colleagues, threats to their lives, fear of getting infected, lack of an effective social support system, and high workload which all increase mental disorders [41]. Among the important factors that threaten mental health are the stressful nature of the profession, high work pressure, shift variables, fatigue, and organizational and individual factors [45]. However, according to the study conducted by Li et al. in China, it was reported that healthcare workers who were not on the front line experienced higher levels of mental distress compared to their counterparts who were on the front lines. Interestingly, the study also found that COVID-19-related mental health challenges were higher among the general population compared to healthcare workers on the front lines, but lower than healthcare workers who were not directly involved in frontline duties [46]. A potential explanation could be because, the strict quarantine policies implemented in China allowed the general public to stay at home and gain knowledge about the epidemic, potentially increasing their awareness and understanding. The general public also faced social isolation, loneliness, lack of social integration, and fear

TABLE 2: Description of and the relation between general health with anxiety, anger, posttraumatic stress disorders, and moral injury among the participants.

Variable	Mean (SD)	Range	General health	
			r	P value
General health	11.97 (6.27)	0-36	—	—
Anxiety	43.99 (9.24)	22-65	0.58	<0.001
Anger	18.65 (5.72)	10-40	0.52	<0.001
Posttraumatic stress disorder	34.77 (15.24)	0-80	0.28	<0.001

r = Pearson's correlation coefficient.

TABLE 3: Multiple regression analysis summary for underlying variables of the general health of healthcare workers during the COVID-19 outbreak ($N = 455$).

Variable		B	SE‡	β	t	P	95% confidence interval for B	R^2
	(Constant)	-8.93	2.02		-4.41	<0.001	-12.93 to -4.93	
	Anxiety	0.28	0.05	0.42	5.80	<0.001	0.19–0.38	
General health	Anger	0.34	0.08	0.31	4.36	<0.001	0.19–0.50	49%
	Gender	3.59	0.99	0.22	3.62	<0.001	1.63–5.54	
	Hospital B	-1.62	0.77	-0.13	-2.10	0.04	-3.16 to -0.10	

‡Standard error. $F = 32.98$; P value < 0.001; adjusted $R^2 = 0.47$.

of infection, contributing to their higher levels of mental distress. On the other hand, self-efficacy and locus of control in such circumstances are important for coping with the trauma [47], and frontline healthcare workers were likely to have been psychologically prepared for their roles, which may have helped them cope better with the challenges. Additionally, a study in Australia found that while the mental health of healthcare workers improved as the epidemic crisis reduced, it did not fully return to preepidemic levels, indicating a lasting impact on their well-being [48]. Also, due to ongoing high stress levels and continued exposure to the initial stages of COVID-19, workers have not been able to return to their pre-epidemic levels of health [49].

The results of the present study showed that the healthcare workers' levels of anxiety were moderate to high. This pandemic has resulted in considerable levels of anxiety around the world. To illustrate, the COVID-19 outbreak has created a wide range of risk factors for mental health difficulties among healthcare workers who provided hands-on care for infected patients, such as but not limited to stressful situations, fear of being infected and transmitting the disease to their families, uncertainty due to low levels of controllability of the outbreak, lack of work experience due to the nature of the disease, vicarious trauma related to death of their colleagues, helplessness, moral injury, and high workload [15, 16]. Considering the factors mentioned, it is evident that healthcare workers have shouldered a significant burden of physical and mental stress. This highlights the need for healthcare officials to pay greater attention to the well-being of healthcare workers and make adequate preparations to support them. However, the results of Dastyar's study were in disagreement with our study and reported low levels of anxiety [50], and this could be related to methodological differences. Importantly, although advances in detecting

and treating COVID-19 are progressing, it remains potentially a deadly and serious disease even after about three years.

Turning to anger, the participants of this study had a moderate level of anger. These findings lend support to previous literature around the world [51]. Anger could be a result of high-pressure work, unsuitable physical environments, increasing the number of infected patients, requiring everyone to use personal protective equipment (PPE) job insecurity, and low wages [24]. However, healthcare workers provide uninterrupted services to people in need, and their professional values and perspective, detailed training in communication concepts, and anger management courses during their studies have helped in achieving better anger control [52, 53].

Furthermore, this study revealed that more than half of the healthcare workers suffered from PTSD during the COVID-19 pandemic. This finding is particularly significant as it highlights the profound psychological impact of the pandemic on healthcare workers. The high prevalence of PTSD symptoms among healthcare workers underscores the urgent need for mental health support and interventions. PTSD can have debilitating effects on individuals, affecting their daily functioning, relationships, and overall quality of life. It can also impair job performance and increase the risk of burnout and turnover among healthcare workers [54–56].

Consistent with the current study's results, Huang et al. showed that in the COVID-19 epidemic, the incidence of PTSD among Chinese medical staff is high [57]. Esmaeili Dolabinejad et al. reported that 88% and 12% of healthcare workers had severe to moderate levels of PTSD indicating that none of the staff members had mild PTSD [58]. In a review study, PTSD among healthcare workers was reported at 73% of healthcare workers and could have a long-term effect between 6 months and 3 years after the outbreak [57, 59]. One

of the reasons for the difference in the aforementioned studies could be attributed to the increase in mental preparation and strict infection control measures after the experience of SARS in Singapore.

This study was carried out nineteen months into the COVID-19 pandemic, and symptoms of PTSD typically start within three months of the traumatic event, although they may also appear later. In order to be diagnosed with PTSD, an individual must experience symptoms for more than one month [60], which was consistent with our sampling time. Additionally, these symptoms must be significant enough to disrupt daily functioning, such as relationships or work [60]. Our data cannot confirm this disruption, and it is important to note that in this study, only the scale scores were used as the criteria for evaluating PTSD.

Results of the present study showed that there was a weak to moderate significant correlation between general health and anxiety, anger, and PTSD. Also, anxiety, anger, gender, and hospital were found to be predictors of mental health and collectively explain 49% of the variance, and this indicates a substantial influence of these variables on mental health outcomes. This is a significant finding, as it highlights the importance of considering these factors when assessing and addressing mental health in the healthcare system. In agreement with the current study results, it was reported that the prevalence of mental health disorders in healthcare workers was high during COVID-19 in France; anxiety was 60%, depression was 36%, and PTSD was reported by 28%. Also, anxiety, depression, PTSD, personality traits, gender, work environment, and self-perception were predictors of mental health [61]. Also, Nesic et al. indicated that anger and its regulation are relevant factors for PTSD [62]. In Italy, during the COVID-19 pandemic, 23% of healthcare workers had severe PTSD, 22% had moderate to severe anxiety, and 19% had moderate to severe depression, and all were predictors of mental health and caused disturbance in the healthcare workers' performance [23]. In a review study, Shahed Hagh Ghadam et al. showed that during the COVID-19 pandemic, negative psychological effects such as PTSD, depression, anxiety, sleep disorders, and anger in healthcare workers had increased significantly [63]. Gilleen et al., during the outbreak of COVID-19, showed that about a third of healthcare workers had anxiety, depression, and PTSD in the UK. Also, anxiety, depression, PTSD, gender, work environment, frontline work, and having a mental disorder were some of the factors affecting the mental health of the healthcare workers [64]. Lai et al. reported that a significant proportion of healthcare workers had symptoms of depression, anxiety, stress, and insomnia during the pandemic in China, and depression, anxiety, stress, insomnia, gender, hospital, and frontline work were the factors affecting mental health [15]. Early outbreaks of SARS, Ebola, and other epidemics showed that healthcare workers face significant psychological consequences, including burnout, anxiety, PTSD, and anger [44]. Treating and caring for patients with critical illness who die despite the best efforts of healthcare workers affect not only their professionalism but also their overall morale and determination. Many health workers, in such critical situation, face other chal-lenges such as lack of resources, low payment, or access to basic equipment, which adds more pressure while they are simultaneously trying to save the patients. These side factors cause huge damage to healthcare workers' mental health followed by massive losses to public health. Despite these unfavorable conditions, we see these healthcare workers working around the clock to provide care to the patient and their family members to the best of their ability [24].

Based on the findings of the present study, gender was a predictor of mental health and women had more mental health disorders than men, which was in line with the findings of studies around the world [15]. One of the reasons for this is that most healthcare workers are women who are responsible for parenting and household duties in addition to their work duties. However, in the study of Alnazly et al. in Jordan, male participants received statistically higher scores for fear, depression, anxiety, and stress [65]. It seems that different cultures and beliefs, different tools, and different facilities can affect the intensity of the influence of gender on mental health.

4.1. Study Limitations. The study used self-report instruments which could have increased the social desirability bias. In addition to that, the current study employed a cross-sectional design which precludes inferring a definitive cause and effect relationship. Cross-sectional studies provide a snapshot of data collected at a single point in time, which makes it difficult to determine the direction of causality or the sequence of events. Also, this study was conducted in a limited population in one of the provinces of Iran, which makes it difficult to generalize our results to other populations. Iran is a diverse country with variations in culture, socioeconomic status, and healthcare access across different provinces. Therefore, the findings may not be applicable to individuals living in other provinces or regions with different characteristics. To enhance the external validity of the findings, future studies could consider conducting multiprovince or nationwide research. This would involve including participants from different provinces in Iran to capture a more diverse sample. By doing so, researchers can gain a better understanding of the broader population and increase the generalizability of the results. Additionally, conducting similar studies in different countries or regions with similar demographics could provide a comparative perspective and help identify commonalities or differences in the findings. Finally, the study excluded those who had a mental illness to avoid subject burden; while the inclusion criteria were justified, they were likely not to represent all healthcare workers. Another limitation of the present study is that the assessment of nurses' mental health was solely based on a questionnaire, rather than incorporating in-depth psychological interviews. This reliance on self-reported data through a questionnaire may potentially be constraining the accuracy of our findings. Also, questionnaires rather overestimate mental disorders due to the specificity of the tests. However, we believe that the mentioned limitations did not affect the rigor of the data because the study was done in tertiary hospitals which receive referrals from all over southeast Iran.

5. Conclusions

The results of the present study showed that about a quarter of the healthcare workers faced with the COVID-19 pandemic had mental health disorders and suffered from moderate to high anxiety, moderate anger, and PTSD. The COVID-19 disease had significant consequences on the mental health of healthcare workers. Factors affecting mental health should be considered to support healthcare workers in such crises. It was also observed in this study that there was a weak to moderate significant correlation between general health and anxiety, anger, and PTSD in healthcare workers. So anxiety, anger, gender, and hospital were predictors of mental health. Efforts to reduce anxiety and anger can improve people's general health. It is recommended to conduct more studies on other factors affecting the mental health of healthcare workers. Healthcare workers are a special group that needs a lot of social and psychological support. To ensure the continued effective work of these people, their mental health status should be monitored, and timely and continuous interventions should be provided to support them. Pandemic psychological interventions, including risk management and resilience training, are recommended effective methods for managing psychological effects in healthcare workers.

Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Additional Points

Significance and Contribution of the Study. This study makes a significant contribution to the literature by shedding light on the mental health challenges faced by healthcare workers during the COVID-19 pandemic. By identifying factors such as gender, history of mental health issues, and workplace environment that influence mental health outcomes, this research provides valuable information for developing tailored interventions and support programs for healthcare workers. Ultimately, our study is aimed at raising awareness about the importance of prioritizing mental well-being in healthcare settings and advocating for policies that promote resilience and psychological support for frontline workers facing unprecedented challenges.

Conflicts of Interest

There is no financial, affiliations, intellectual property, personal, ideology, or academic conflict of interest to be declared.

Authors' Contributions

AM and MD designed the study. AM, PB, and HK collected the data. AM and MD contributed to the study design, and they provided critical feedback on the study and analysis and inputted to the draft of this manuscript. AM, LAL, and RA wrote the manuscript. All authors have read and approved the final manuscript.

References

[1] Z. Wu and J. M. McGoogan, "Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention," *Journal of the American Medical Association*, vol. 323, no. 13, pp. 1239–1242, 2020.

[2] Worldometers, "Coronavirus updates," 2022, https://www.worldometers.info.

[3] N. Asadi, F. Salmani, S. Pourkhajooyi, M. Mahdavifar, Z. Royani, and M. Salmani, "Investigating the relationship between corona anxiety and nursing care behaviors working in corona's referral hospitals," *Iranian Journal of Psychiatry and Clinical Psychology*, vol. 26, no. 3, pp. 306–319, 2020.

[4] "The population of the counties in Kerman," http://www.citypopulation.de/en/iran/kerman/.

[5] "CDC, K, Daily reported of COVID-19," https://zil.ink/kmu.

[6] E. Garosi, M. Khosravi Danesh, and A. Mazloumi, "Nurses and coronavirus: challenges and consequences," *Iran Occupational Health Journal*, vol. 17, no. 1, pp. 1–5, 2020.

[7] M. Amiri, H. Vahedi, S. R. Mirhoseini, A. R. Eghtesadi, and A. Khosravi, "Study of the relationship between self-efficacy, general health and burnout among Iranian health workers," *Osong Public Health and Research Perspectives*, vol. 10, no. 6, pp. 359–367, 2019.

[8] L. Esmaeilpour and E. Jafarjalal, "The association of the quality of work life and general health of the nurses in psychiatric wards," *Iran Journal of Nursing*, vol. 32, no. 117, pp. 69–79, 2019.

[9] A. Sahebi, A. Yousefi, K. Abdi et al., "The prevalence of post-traumatic stress disorder among health care workers during the COVID-19 pandemic: an umbrella review and meta-analysis," *Frontiers in Psychiatry*, vol. 12, p. 764738, 2021.

[10] B. O. Rodríguez and T. L. Sánchez, "The psychosocial impact of COVID-19 on health care workers," *International Brazilian Journal of Urology*, vol. 46, suppl 1, pp. 195–200, 2020.

[11] S. Park, Y. Lee, T. Kim, and S. J. Jung, "Anxiety and COVID-19 related stressors among healthcare workers who performed shift work at four COVID-19 dedicated hospitals in Korea," *Journal of Occupational and Environmental Medicine*, vol. 63, no. 10, pp. 875–880, 2021.

[12] S. Cabarkapa, S. E. Nadjidai, J. Murgier, and C. H. Ng, "The psychological impact of COVID-19 and other viral epidemics on frontline healthcare workers and ways to address it: a rapid systematic review," *Brain, Behavior, & Immunity-Health*, vol. 8, article 100144, 2020.

[13] M. C. C. Lee, S. Thampi, H. P. Chan et al., "Psychological distress during the COVID-19 pandemic amongst anaesthesiologists and nurses," *British Journal of Anaesthesia*, vol. 125, no. 4, pp. e384–e386, 2020.

[14] S. Pappa, V. Ntella, T. Giannakas, V. G. Giannakoulis, E. Papoutsi, and P. Katsaounou, "Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis," *Brain, Behavior, and Immunity*, vol. 88, pp. 901–907, 2020.

[15] J. Lai, S. Ma, Y. Wang et al., "Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019," *JAMA Network Open*, vol. 3, no. 3, article e203976, 2020.

[16] V. R. Hachesu, S. Naderyan Fe'li, K. Maajani, R. Hokmabadi, and F. Golbabaei, "Prevalence of anxiety and depression in Iranian health care workers during the COVID-19 pandemic: a systematic review and meta-analysis," *Journal of Health and Safety at Work*, vol. 12, no. 1, pp. 123–140, 2022.

[17] Y. Söğütlü, L. Söğütlü, and S. Ş. Göktaş, "Relationship of covid-19 pandemic with anxiety, anger, sleep and emotion regulation in healthcare professionals," *Journal of Contemporary Medicine*, vol. 11, no. 1, pp. 41–49, 2021.

[18] Y. C. Yip, K. H. Yip, and W. K. Tsui, "The transformational experience of junior nurses resulting from providing care to COVID-19 patients: from facing hurdles to achieving psychological growth," *International Journal of Environmental Research and Public Health*, vol. 18, no. 14, p. 7383, 2021.

[19] M. Schuster and P. A. Dwyer, "Post-traumatic stress disorder in nurses: an integrative review," *Journal of Clinical Nursing*, vol. 29, no. 15-16, pp. 2769–2787, 2020.

[20] L. Ghio, S. Patti, G. Piccinini et al., "Anxiety, depression and risk of post-traumatic stress disorder in health workers: the relationship with burnout during COVID-19 pandemic in Italy," *International Journal of Environmental Research and Public Health*, vol. 18, no. 18, p. 9929, 2021.

[21] C. De Pasquale, D. Conti, C. Dinaro, R. A. D'Antoni, E. La Delfa, and S. Di Nuovo, "The COVID-19 pandemic and post-traumatic stress disorder: emotional impact on healthcare professions," *Frontiers in Psychiatry*, vol. 13, article 832843, 2022.

[22] C. Carmassi, C. Foghi, V. Dell'Oste et al., "PTSD symptoms in healthcare workers facing the three coronavirus outbreaks: what can we expect after the COVID-19 pandemic," *Psychiatry Research*, vol. 292, article 113312, 2020.

[23] C. Carmassi, V. Dell'Oste, E. Bui et al., "The interplay between acute post-traumatic stress, depressive and anxiety symptoms on healthcare workers functioning during the COVID-19 emergency: a multicenter study comparing regions with increasing pandemic incidence," *Journal of Affective Disorders*, vol. 298, no. Part A, pp. 209–216, 2022.

[24] I. D. Saragih, S. I. Tonapa, I. S. Saragih et al., "Global prevalence of mental health problems among healthcare workers during the Covid-19 pandemic: a systematic review and meta-analysis," *International Journal of Nursing Studies*, vol. 121, article 104002, 2021.

[25] S. Khaki, M. Fallahi-Khoshkenab, N. Arsalani, R. Mojtaba, N. Sadeghy, and T. Nematifard, "Mental health status of nurses during the COVID-19 pandemic: a systematic review," *Mental Health*, vol. 2, no. 1, pp. 36–52, 2022.

[26] A. Sharma and R. Kumar, "Psychological distress and coping styles among baccalaureate nursing students: promoting mental health of future nurses in COVID-19 pandemic," *Journal of Education and Health Promotion*, vol. 11, no. 1, p. 331, 2022.

[27] S. Dharra and R. Kumar, "Promoting mental health of nurses during the coronavirus pandemic: will the rapid deployment of nurses' training programs during COVID-19 improve self-efficacy and reduce anxiety?," *Cureus*, vol. 13, no. 5, article e15213, 2021.

[28] R. Kumar, K. Beniwal, and Y. Bahurupi, "Pandemic fatigue in nursing undergraduates: role of individual resilience and coping styles in health promotion," *Frontiers in Psychology*, vol. 13, article 940544, 2022.

[29] R. Kumar, A. Das, V. Singh, P. K. Gupta, and Y. A. Bahurupi, "Rapid survey of psychological status of health-care workers during the early outbreak of COVID-19 pandemic: a single-Centre study at a tertiary care hospital in northern India," *Journal of Medical Evidence*, vol. 2, no. 3, pp. 213–218, 2021.

[30] A. L. Rollins, G. Morse, and M. Monroe-DeVita, "Introduction to the special section: a call to action to address psychiatric rehabilitation workers' well-being," *Psychiatric Rehabilitation Journal*, vol. 44, no. 3, pp. 201–203, 2021.

[31] T. Gnambs and T. Staufenbiel, "The structure of the General Health Questionnaire (GHQ-12): two meta-analytic factor analyses," *Health Psychology Review*, vol. 12, no. 2, pp. 179–194, 2018.

[32] S. Namjoo, A. Shaghaghi, P. Sarbaksh, H. Allahverdipour, and A. H. Pakpour, "Psychometric properties of the General Health Questionnaire (GHQ-12) to be applied for the Iranian elder population," *Aging & Mental Health*, vol. 21, no. 10, pp. 1047–1051, 2017.

[33] C. D. Spielberger, R. L. Gorsuch, R. Lushene, P. R. Vagg, and G. A. Jacobs, *Manual for the State-Trait Anxiety Inventory*, Consulting Psychologists Press, Palo Alto, CA, 1983.

[34] B. Mahram, *Validity of Spielberger State-Trait Anxiety Inventory (STAI) in Mashhad city*, Allameh Tabatabaei University, Tehran, 1993.

[35] C. D. Spielberger and E. C. Reheiser, "Assessment of emotions: anxiety, anger, depression, and curiosity," *Applied Psychology: Health and Well-Being*, vol. 1, no. 3, pp. 271–302, 2009.

[36] M. Khodayari-Fard, M. Lavasani, S. E. Akbari Zardkhane, and S. Liaghat, "Psychomertic properties Spielberger's State-Trait Anger Expression Inventory-2 among of Iranian students," *Archives of Rehabilitation*, vol. 11, no. 1, pp. 47–56, 2010.

[37] M. Horowitz, N. Wilner, and W. Alvarez, "Impact of Event Scale: a measure of subjective stress," *Psychosomatic Medicine*, vol. 41, no. 3, pp. 209–218, 1979.

[38] D. S. Weiss, "The impact of event scale: revised," in *Cross-Cultural Assessment of Psychological Trauma and PTSD*, pp. 219–238, Springer, 2007.

[39] M. Creamer, R. Bell, and S. Failla, "Psychometric properties of the impact of event scale—revised," *Behaviour Research and Therapy*, vol. 41, no. 12, pp. 1489–1496, 2003.

[40] Z. Abbasi, B. Mahaki, and H. R. Saberi, "Prevalence of post-traumatic stress disorder (PTSD) among firefighters of Isfahan," *Occupational Medicine Quarterly Journal*, vol. 8, no. 2, pp. 24–36, 2016.

[41] M. Vizheh, M. Qorbani, S. M. Arzaghi, S. Muhidin, Z. Javanmard, and M. Esmaeili, "The mental health of healthcare workers in the COVID-19 pandemic: a systematic review," *Journal of Diabetes & Metabolic Disorders*, vol. 19, no. 2, pp. 1967–1978, 2020.

[42] A. Hajebi, S. A. Motevalian, A. Rahimi-Movaghar et al., "Major anxiety disorders in Iran: prevalence, sociodemographic correlates and service utilization," *BMC Psychiatry*, vol. 18, no. 1, pp. 1–8, 2018.

[43] C. Zhu, T. Zhang, Q. Li, X. Chen, and K. Wang, "Depression and anxiety during the COVID-19 pandemic: epidemiology, mechanism, and treatment," *Neuroscience Bulletin*, vol. 39, no. 4, pp. 675–684, 2023.

[44] C. Y. Liu, Y. Z. Yang, X. M. Zhang et al., "The prevalence and influencing factors in anxiety in medical workers fighting COVID-19 in China: a cross-sectional survey," *Epidemiology & Infection*, vol. 148, p. e98, 2020.

[45] R. M. Al-Amer, M. Z. Malak, G. Aburumman et al., "Prevalence and predictors of depression, anxiety, and stress among Jordanian nurses during the coronavirus disease 2019 pandemic," *International Journal of Mental Health*, vol. 51, no. 2, pp. 152–163, 2022.

[46] Z. Li, J. Ge, M. Yang et al., "Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control," *Brain, Behavior, and Immunity*, vol. 88, pp. 916–919, 2020.

[47] U. Wesemann, J. Vogel, G. D. Willmund et al., "Proximity to COVID-19 on mental health symptoms among hospital medical staff," *Psychiatria Danubina*, vol. 33, supplement 10, pp. 132–136, 2021.

[48] J. M. Stubbs, H. M. Achat, and S. Schindeler, "Detrimental changes to the health and well-being of healthcare workers in an Australian COVID-19 hospital," *BMC Health Services Research*, vol. 21, no. 1, pp. 1–12, 2021.

[49] V. Aslanidis, V. Tsolaki, M. E. Papadonta et al., "The impact of the COVID-19 pandemic on mental health and quality of life in COVID-19 department healthcare workers in Central Greece," *Journal of Personalized Medicine*, vol. 13, no. 2, p. 250, 2023.

[50] A. Dastyar, Islamic Azad University,Shahrekord, Karimiankakolaki, and Islamic Azad University,Shahrekord, "Association of medication error occurrence with general health and anxiety caused by Covid-19 disease in nurses of Imam Reza Hospital of Ahvaz in 2020: a descriptive study," *Journal of Rafsanjan University of Medical Sciences*, vol. 20, no. 10, pp. 1129–1143, 2022.

[51] F. Evcili and G. Demirel, "The effects of workload on the styles of anger expression and "trait anger" of healthcare professionals working in a COVID-19 pandemic hospital," *Perspectives in Psychiatric Care*, vol. 58, no. 4, pp. 1932–1939, 2022.

[52] N. Turan, "An investigation of the effects of an anger management psychoeducation programme on psychological resilience and affect of intensive care nurses," *Intensive and Critical Care Nursing*, vol. 62, p. 102915, 2021.

[53] M. Baby, C. Gale, and N. Swain, "Communication skills training in the management of patient aggression and violence in healthcare," *Aggression and Violent Behavior*, vol. 39, pp. 67–82, 2018.

[54] C. Carmassi, V. Pedrinelli, V. Dell'Oste et al., "Work and social functioning in frontline healthcare workers during the Covid-19 pandemic in Italy: role of acute post-traumatic stress, depressive and anxiety symptoms," *Rivista di Psichiatria*, vol. 56, no. 4, pp. 189–197, 2021.

[55] K. P. Young, D. L. Kolcz, D. M. O'Sullivan, J. Ferrand, J. Fried, and K. Robinson, "Health care workers' mental health and quality of life during COVID-19: results from a mid-pandemic, national survey," *Psychiatric Services*, vol. 72, no. 2, pp. 122–128, 2021.

[56] H. Jung, S. Y. Jung, M. H. Lee, and M. S. Kim, "Assessing the presence of post-traumatic stress and turnover intention among nurses post–Middle East respiratory syndrome outbreak: the importance of supervisor support," *Workplace Health & Safety*, vol. 68, no. 7, pp. 337–345, 2020.

[57] J. Z. Huang, M. Han, T. Luo, A. Ren, and X. Zhou, "Mental health survey of medical staff in a tertiary infectious disease hospital for COVID-19," *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi*, vol. 38, no. 3, pp. 192–195, 2020.

[58] S. Esmaeili Dolabinejad, M. Safa, F. Ghasem Boroujerdi, F. Hajizadeh, and A. B. Mirabzadeh, "Incidence of posttraumatic stress disorder after COVID-19 among medical staff of Masih Daneshvari Hospital," *Journal of Iranian Medical Council*, vol. 38, no. 1, pp. 27–33, 2020.

[59] E. Preti, V. Di Mattei, G. Perego et al., "The psychological impact of epidemic and pandemic outbreaks on healthcare workers: rapid review of the evidence," *Current Psychiatry Reports*, vol. 22, no. 8, pp. 1–22, 2020.

[60] National Institute of Mental Health, "Post-traumatic stress disorder (NIH Publication No. 23-MH-8124)," 2023 https://www.nimh.nih.gov/sites/default/files/documents/health/publications/post-traumatic-stress-disorder-ptsd/post-traumatic-stress-disorder_1.pdf.

[61] E. Azoulay, F. Pochard, J. Reignier et al., "Symptoms of mental health disorders in critical care physicians facing the second COVID-19 wave: a cross-sectional study," *Chest*, vol. 160, no. 3, pp. 944–955, 2021.

[62] M. Nesic, J. Vogel, A. Sahebi, T. Rassaf, and U. Wesemann, "Association between different dimensions of anger and symptoms of post-traumatic stress disorder in at-risk cardiovascular patients during the COVID-19 pandemic," *Frontiers in Psychiatry*, vol. 14, article 1228192, 2023.

[63] H. Shahed Hagh Ghadam, A. Fathi Ashtiani, A. M. Rahnejat et al., "Psychological consequences and interventions during the COVID-19 pandemic: narrative review," *Journal of Marine Medicine*, vol. 2, no. 1, pp. 1–11, 2020.

[64] J. Gilleen, A. Santaolalla, L. Valdearenas, C. Salice, and M. Fusté, "Impact of the COVID-19 pandemic on the mental health and well-being of UK healthcare workers," *BJPsych Open*, vol. 7, no. 3, p. e88, 2021.

[65] E. Alnazly, O. M. Khraisat, A. M. Al-Bashaireh, and C. L. Bryant, "Anxiety, depression, stress, fear and social support during COVID-19 pandemic among Jordanian healthcare workers," *PLoS One*, vol. 16, no. 3, article e0247679, 2021.