

Research Paper

Psychological Effects of the Outbreak of COVID-19 on the Mental Health of Healthcare Workers in Iran



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ABSTRACT

Objectives: The COVID-19 pandemic exposed healthcare workers to heavy stress and made them vulnerable to various types of mental illnesses. This study aims to evaluate the psychological effects of the COVID-19 pandemic on the mental health of healthcare workers in the COVID-19 ward.

Methods: This study was performed during the first peak of the COVID-19 pandemic in 9-Dey Hospital of Torbat Heydarieh in Iran, in which a total of 178 healthcare workers in the COVID-19 ward participated via the census sampling method. In this study, we employed the Goldberg general health questionnaire along with a researcher-made questionnaire on the experience of exposure to COVID-19 disease. Following the completion of the questionnaires, the participants' data were analyzed by the SPSS software and statistical tests (the Spearman and Pearson correlations).

Results: Our results showed 91.1%, 77.57%, 87.55%, 87.07%, 56.75%, and 74.16% for the general health, physical symptoms, anxiety symptoms, sleep disorders, social dysfunction, and depression symptoms, respectively, during the COVID-19 pandemic conditions. The results showed a significant association between the experience of exposure to COVID-19, anxiety symptoms, and sleep disorders ($P < 0.05$).

Discussion: Access to counseling and psychotherapy systems, rehabilitation, and the improvement of working conditions can effectively enhance resilience and promote the mental health of healthcare workers and increase the quality of care and treatment services.

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Highlights

- The total general health score for all the participants during the COVID-19 condition was 44.07 ± 1.54 , indicating the mild general health of the study population, or in other words, the abnormal general health score.
- The Spearman correlation test showed a significant association between the work ward, the total general health score, physical symptoms, and symptoms of anxiety and depression ($P < 0.05$). Also, a significant association was observed between anxiety symptoms, sleep disorders, and the experience of exposure to COVID-19 ($P < 0.05$).
- The results of the Pearson correlation coefficient between physical health, its components, and the risk perception in the face of COVID-19 showed a significant association between all components of general health and the risk perception in the face of this disease ($P < 0.05$).

Plain Language Summary

Given the high prevalence of COVID-19 worldwide and the rate of deaths because of this disease, healthcare workers are more prone to psychological disorders and anxiety than others. This descriptive-analytical and cross-sectional study was performed on 178 healthcare workers of 9-Dey Hospital in Torbat-e Heydariyeh, Iran. The participants were selected by the census sampling method. Only one questionnaire could be completed by each participant. The questionnaire consisted of three parts, including demographic information, occupational exposure to COVID-19, and the general health questionnaire. We first analyzed the experience of exposure to COVID-19. Then, the variance test analysis was used to determine the association between age, work experience, and general health and its components. The Pearson correlation test was used to investigate the association between the perceived risk of exposure to COVID-19 and general health. The Spearman correlation test was also used to determine the correlation between marital status, organizational positions, gender, work wards, and general health and its components.

1. Introduction

In December 2019, a viral outbreak of a disease was reported in Wuhan, China. The cause of this disease was a new and genetically modified virus of the coronavirus family, named SARS-2-CoV or COVID-19. The virus rapidly spread across the world considering its high transmission power, and in a short time, it infected all countries [1]. The virus crisis has brought many consequences because of its unknown nature and rapid spread. Fear of the disease, fear of death, interference in daily activities, reduction in social interactions, occupational and financial problems, and other consequences threaten the mental health of society [2].

Healthcare workers are at the forefront of the fight against COVID-19 disease and are directly exposed to the virus [3]. They suffer from various psychological disorders, such as anxiety, fear, and so on, which can severely affect the quality of their activities and services [3]. Therefore, more attention should be paid to the mental health of healthcare workers in their workplaces during this global disaster [4]. A study by Kuh et al. (2005) during the COVID-19 pandemic in Singapore showed that more than half of the healthcare

workers reported a 56% increase in work stress levels [5]. A study on medical personnel in China during the prevalence of COVID-19 showed that 32.03% of the personnel were in direct contact with patients infected with this disease and the prevalence of anxiety was 12.5% while 0.78% of people experienced severe anxiety [6]. Therefore, based on the results of the above-mentioned studies, the care for and maintenance of healthcare workers' mental health during the treatment of infectious diseases, such as COVID-19 is crucially important. For this purpose, psychological rehabilitation is important for this group as this population is more exposed to psychological injuries because of high workloads and job stress; therefore, psychological rehabilitation can be effective and efficient [7].

Despite the importance of maintaining healthcare workers' mental health in the face of infectious diseases, such as COVID-19, no study has been conducted in Iran to examine the mental health of this population at the first peak of the COVID-19 pandemic. This study was performed in Torbat-e Heydarieh, Iran, with a population of about 210 000 people. This city has 2 hospitals where patients with COVID-19 disease are hospitalized, and one of them (9-Dey Hospital) was selected for this research. In the COVID-19 ward of this hospital, about

120 patients were hospitalized at the time of this study. In this research, the psychological effects of the coronavirus on healthcare workers' mental health were investigated in Torbat-e Heydarieh City, Iran.

2. Materials and Methods

This was a descriptive study conducted in the spring of 2020 (April to May) at the COVID-19 ward of 9-Dey Hospital in Torbat Heydarieh, Iran. Overall, 178 participants were selected via the convenience sampling method. The inclusion criteria comprised the following items: A) complete satisfaction to participate in the study, B) work experience of at least 1 year in the hospital, C) working in the COVID-19 ward of 9-Dey Hospital of Torbat Heydarieh, Iran, D) having at least 18 years of age from each sex (male or female), and e) having no obvious psychological symptoms according to the Diagnostic and Statistical Manual of Mental Disorders, fifth edition criteria.

The exclusion criteria were having psychiatric symptoms during the COVID-19 pandemic which cause a person's dysfunction in their work ward, and not completing the questionnaire. Both women and men participated in this study.

In this study, 190 healthcare workers (healthcare workers are all hospital staff who provide health services) were evaluated by the census sampling method; however, to satisfy the minimum sample size based on the sample volume formula, the required number of 188 samples was estimated. According to the inclusion criteria, all 190 health workers received the questionnaires through WhatsApp messenger, of whom 178 correctly and completely answered the questionnaires that were used for the statistical analysis. The questionnaires consisted of three main sections: demographic information, the experience of exposure to COVID-19, and general health questions.

Questionnaire of psychological factors

To design this questionnaire, first, the relevant questions were extracted according to the opinion of experts and studies on concerns about the disease. Meanwhile, to determine the content validity, both qualitative and quantitative methods were used. To assess the qualitative validity, questions were provided to 15 psychologists and psychiatrists from several medical universities to apply their corrective views on the grammar, sentence structure, and placement of phrases. To quantitatively evaluate the content validity, the content va-

lidity ratio and content validity index was used. Also, to evaluate the content validity ratio, the group of experts were asked to review each question and express their opinion by choosing one of the three options, namely "necessary", "useful but unnecessary", and "unnecessary." Finally, the content validity ratio was calculated based on the answers.

In this study, to determine the external reliability, the questionnaire was completed by 30 health workers and was assessed using the test-retest method and correlation at 10-day intervals. Also, the internal consistency coefficient (Cronbach α) was used to calculate the internal reliability of the questionnaire. Given that the validity coefficient of the questionnaire was 0.97 and it was significant at the level of 0.001, and its reliability was 0.85 by the Cronbach α , this tool could be used to assess the risk perception in the face of coronavirus.

Goldberg general health questionnaire (GHQ)

The Goldberg general health questionnaire (GHQ) is one of the most widely used tools among mental health tools in the field of psychometric quality assessment. It has 28 general health questions used to assess a person's mental state in the last month and includes symptoms, such as abnormal thoughts, feelings, and behavioral aspects. The questionnaire consists of four 7-question scales and is scored based on the Likert method. It includes the scales of physical symptoms, anxiety and sleep disorders, disorders in social function, and depression symptoms. The score obtained from this questionnaire is in two areas: healthy scores (total score= 0 to 22) or unhealthy scores (in one of the three areas of mild, moderate, or severe disorders with a total score of higher than 22) [8-11]. In this study, only a valid Persian version of the GHQ questionnaire was used. The validity of this questionnaire has been studied in various studies, including Taghavi's study [12] with Cronbach α of 0.9 and Rashidi's study with Cronbach α of 0.88 [13].

3. Results

The Mean \pm SD age of the participants was 29.31 \pm 6.41 years (age range: 23 to 49 years) and their Mean \pm SD work experience was 6.52 \pm 6.13 years; the work experience range: 1-26 years). The participants' demographic characteristics are provided in Table 1. This table examines the participants' marital status, organizational positions in the hospital (a paramedic, nurse, healthcare provider, and supervisor), and work wards (pediatrics, coronary care unit, administrative, internal, emergency, surgery, COVID-19, infectious, orthopedics, and gynecology).

According to the study results, the total general health Mean±SD for all participants during the COVID-19 pandemic was 44.07±1.54, which indicated that the study population was in the area of mild general health, or in other words, the unhealthy general health score. The general health score results showed that 16 people (8.90%) of the study population had a healthy score (0-22) and 163 (91.1%) obtained scores higher than 22. On the physical subscale, 40 participants (22.45%) had a healthy score (1-6), and 138 (77.55%) obtained scores of more than 6. In the subscale of anxiety symptoms and sleep disorders, 23 people (12.95%) had a healthy score (1-6) and 155 (87.07%) scored more than 6 points. On the scale of disorders in social function, 77 participants (43.25%) had a healthy score (1-6), and 101 (56.75%) obtained scores of more than 6. And, on the subscale of depression symptoms,

46 people (25.84%) had a healthy score (1-6) and 132 (74.16%) scored more than 6 points (Table 2).

The Spearman correlation test did not show a significant association between organizational positions, marital status, and gender with any of the general health components (P>0.05). However, a significant association was observed between the work ward, the total general health score, physical symptoms, and symptoms of anxiety and depression (P<0.05). In addition, a significant association was observed between anxiety symptoms, sleep disorders, and the experience of exposure to COVID-19 (P<0.05) (Table 3).

Also, according to the variance analysis results, there was no significant association between general health, its components, and the variables of age and work

Table 1. Demographic characteristics of the respondents

Variables		Mean±SD/No. (%)
		Work Experience
Age	29.31±6.41	6.52±6.13
Other Information		178
Gender	Female	98(55)
	Male	80(45)
Marital status	Single	62(35)
	Married	116(65)
Organizational position	Nurse	153(86)
	Head Nurse	6(3.4)
Working wards	Supervisor	6(3.4)
	Pediatrics	19(10.7)
	CCU	15(8.4)
	Administrative	7(3.9)
	Internal	20(11.2)
	Emergency department	17(9.6)
	Surgery	25(14.1)
	COVID-19	21(11.8)
	Infectious ward	16(9)
	Orthopedics	23(12.9)
	Women's ward	15(8.4)

Table 2. Frequency and percentage of public health components among employees

Variables	No. (%)	
	Normal Score	Abnormal Score
General health	16(8.90)	163(91.1)
Somatic symptoms	40(22.45)	138(77.55)
Anxiety symptoms and sleep disorders	23(12.95)	155(87.07)
Social dysfunction	77(43.25)	101(56.75)
Symptoms of depression	46(25.84)	132(74.16)

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Table 3. Correlation coefficients between general health, its components, organizational positions, marital status, gender, and work wards

Variable	General Health		Somatic Symptoms		Anxiety Symptoms and Sleep Disorders		Social Dysfunction		Symptoms of Depression	
	Spearman Correlation	P	Spearman Correlation	P	Spearman Correlation	P	Spearman Correlation	P	Spearman Correlation	P
Organizational Position	0.13	0.06	0.09	0.20	0.10	0.17	0.12	0.09	0.13	0.06

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Table 4. Correlation coefficients between general health, its components, and risk perception facing COVID-19

Variable	General Health		Somatic Symptoms		Anxiety Symptoms and Sleep Disorders		Social Dysfunction		Symptoms of Depression	
	Pearson correlation	P	Pearson Correlation	P	Pearson Correlation	P	Pearson Correlation	P	Pearson Correlation	P
Risk Perception in the Exposure to COVID-19	0.14	0.00	0.85	0.00	0.87	0.00	0.50	0.00	0.65	0.00

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experience ($P>0.05$). The Pearson correlation coefficients between physical health, its components, and the risk perception in the face of coronavirus showed a significant association between all components of general health and risk perception in the face of coronavirus ($P<0.05$). Table 4 shows the correlation coefficients of general health and its components with risk perception in the face of COVID-19.

4. Discussion

The study results showed 91.1%, 77.57%, 87.55%, 87.07%, 56.75%, and 74.16% for general health, physical symptoms, anxiety symptoms, sleep disorders, social dysfunction, and depression symptoms, respectively, in the COVID-19 pandemic conditions. The study by Shahyad and Mohammadi, which provided results consistent with the results of the present

study, found that the prevalence of COVID-19 caused public health concerns and psychological disorders in individuals. The results of this research were also in line with the findings of the study by Dai et al., which examined the psychological effects of COVID-19 on healthcare workers in China and showed that the main concerns of people were about infecting their family members (63.95) and inadequate protective measures (36.05) [14]. According to its findings, 39.1% of people were exposed to psychological distress. Stress is normal, especially in healthcare workers who have direct exposure to COVID-19 patients. Fear of developing the disease, pain, and the heavy costs of treatment are among the aggravating factors of stress in this population. In another study conducted during the COVID-19 pandemic in Honk Kong, it was reported that healthcare workers suffered from a higher degree of anxiety after direct contact with COVID-19 patients

[15]. This can be because of the health workers' awareness of the function and effects of the virus in the body. How the virus affects the body and impairs the function of the bodily organs causes healthcare workers to endure more stress during the disease than compared to other people in the community.

There was a significant association between the experience of exposure to the coronavirus, anxiety symptoms, and sleep disorders ($P < 0.05$). Concerns and fears of infection or re-infection of the disease, and the transmission of the virus to family members can increase anxiety symptoms and sleep disorders in health workers. The study conducted by Khastar et al. on the employees of companies as well as public and private offices showed that 39% of the employees were afraid of and anxious about the outbreak of the COVID-19 disease so that 16.47% of them had too much fear while 23.14% had high fear. According to the results of this study, the prevalence of the COVID-19 disease in Iran has caused psychological and behavioral changes in employees of public and private companies. Although these people were not healthcare workers, the prevalence of the disease has led to psychological effects, including sleep disorders [16]. These findings were consistent with the results of the present study.

The present study stated a significant association between age, gender, marital status, work experience, organizational positions, and mental health while the results of the study by Lee et al. (2020) indicated that married and divorced people experienced more stress compared to single individuals [17]. The difference between these findings can be due to the differences in living environments and concerns of each group in their community. Considering that according to the culture of the society, single people live with their families (parents), similar to married people, they suffer from disease transmission stress and there is no significant difference between single people and married individuals in this regard. The findings of this study are in line with the findings of Ghoncheh et al. (2015). They studied the psychological factors affecting the stress caused by the COVID-19 pandemic in health workers in Qazvin and the results of their research showed no significant association between age, sex, marital status, and work experience with the stress caused by COVID-19 [18]. The reason for this can be that the virus affects both men and women and affects everyone at any age. Accordingly, people of both sexes and all ages are exposed to this virus. Therefore, its stress is the same for all people and is regardless of age.

A study conducted in Qom City, Iran, also examined the effects of mental turmoil and negative emotions, as well as work hardship and pressure on mental health professionals and health workers. The results of this study referred to the stress imposed on individuals [19].

COVID-19 has a high ability to be transmitted from human to human [20]. Published reports on the first deaths of physicians who became infected while caring for COVID-19 patients indicated that the virus transmission to healthcare providers in healthcare facilities is a risky issue [19]. The Center for Disease Control and Prevention of China, at the time of the COVID-19 outbreak, reported that as of February 11, 2020, out of 44 672 confirmed cases of COVID-19, 1716 were healthcare workers [21], indicating a high risk of infection among healthcare workers [22]. During the outbreak, healthcare workers are expected to work long hours under high pressure with inadequate resources and facilities, as well as accept the inherent dangers of closely interacting with patients [23]. Healthcare workers, similar to other people in the community, face various problems, such as vulnerability to the disease and dealing with rumors of misinformation, which lead to increased levels of anxiety. This anxiety sharply increases when they see the infection or death of their colleagues because of the disease [24].

Healthcare workers who are exposed to COVID-19 are psychologically severely stressed, which impairs their mental health [25, 26]. Healthcare workers are more exposed to this disease compared to the rest of the population, and their work environment is full of harmful biological agents, such as COVID-19 [27]. Similar research should be conducted on healthcare workers in Iran to reduce mental pressure and promote psychological well-being.

Sami et al. referred to the low level of general health and showed the intervention's effectiveness to achieve a higher level of health [28]. In the present study, there was also a decrease in public health among health care providers. Effatpanah's study also pointed to the effectiveness of various methods on public health [29]. The more people are exposed to the virus, the more likely they are to become infected. Therefore, health system workers become more stressed and more exposed to psychological trauma because of infection.

5. Conclusion

According to the findings of the present study, mental health in the entire study population was in the unhealthy range based on the defined classification, and

the psychological effects of the COVID-19 pandemic were high, undeniable, and irreversible. Access to counseling and psychotherapy systems can be an effective help to improve the mental condition of health system employees. Healthcare workers are impacted by public health and are acting as one of the most important sectors of sustainable development of community health; therefore their rehabilitation and resilience are of great importance. High workloads, long work shifts, and job stress lead to psychological traumas in these people, hence, mental rehabilitation can be effective and efficient for health care and treatment providers and enhance their resilience, which leads to greater productivity of the health system. The main goal of the healthcare system is to provide health services to individuals. These activities include caring for personal health and provision of health, treatment, and rehabilitation services. Today, rehabilitation services are considered one of the main pillars of the health field and the need for mental rehabilitation and mental health of the health system staff in hospitals during such critical periods should be considered more than before as they can reduce the spread of psychological problems in the community and increase the resilience and readiness of the health system staff to deal with such crises.

Limitations

This study had some limitations. Conducting face-to-face interviews was not feasible given the pandemic nature of COVID-19. Also, because of time constraints, the scale we used was simple. Therefore, it could only provide an initial screening and further investigation is needed. Another limitation was the lack of basic information about the mental health of the studied healthcare workers before the prevalence of COVID-19.

Suggestions for future studies

In future research, the psychological effects of the COVID-19 disease on all healthcare workers in other wards of the hospital should be evaluated and compared. It is also better to collect information about the mental health of the general public during and after COVID-19 to compare the results and implement control strategies.

Ethical Considerations

Compliance with ethical guidelines

The Ethics Committee of [Torbat Heydariyeh University of Medical Sciences](#) approved this study (Code: IR.THUMS.REC.1398.056).

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declare no conflict of interest.

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