



Post-Traumatic Stress Disorder in Iranian Healthcare Workers Dealing with COVID-19 Pandemic

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ABSTRACT

Aims Post-Traumatic Stress Disorder is a psychological disorder affecting a person directly or indirectly that may appear as a threat to physical security, death or death threat, natural disasters, war, etc. The purpose of this study was to assess post-traumatic stress disorder in Iranian healthcare workers dealing with COVID-19.

Instrument & Methods The present study was conducted cross-sectional and online, from 5 May to 23 August 2020, on 418 Iranian healthcare workers, including (physicians, nurse & laboratory technicians, health workers, administrative staff, and radiologists). Data were collected using an electronic questionnaire through the Porsline site by convenience sampling method. Data were analyzed using descriptive statistics, t-test, and ANOVA in SPSS 16 software.

Findings Most participants in the study (40.4%) were in the age group of 30 to 39 years. Out of 286 individuals who had reported post-traumatic stress disorder symptoms, the majority were women (73.1%) and married (71.3%). Among the healthcare workers with post-traumatic stress disorder, 16% had mild, 14.8% had moderate, 37.6% had severe symptoms, and 31.6% were asymptomatic. Post-traumatic stress disorder had a statistically significant relationship to gender, type of employment, smoking, a history of specific diseases, the probability of coronavirus exposure, and a history of contact with a COVID-19 patient ($p < 0.05$).

Conclusion Two-thirds of healthcare workers had some degree of post-traumatic stress disorder. Due to the professional and vital importance and role of this group in health systems and communities, providing appropriate psychological solutions and techniques and tailored interventions to promote the physical and mental health of healthcare workers must be considered in priority.

Keywords COVID-19; Healthcare Workers; Post-Traumatic Stress Disorder; Psychology

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Introduction

The new coronavirus (COVID-19) is an acute respiratory disease that, due to its rapid spread has been identified by the World Health Organization as a public health emergency and an international concern [1]. As the world struggles with the COVID-19 pandemic, Healthcare Workers (HCWs) at the forefront of fighting against coronavirus disease are among the most vulnerable groups who are exposed to psychological and social problems and consequences due to direct exposure to infection, long and stressful working hours, and a high probability of becoming infected and therefore the fear of transmitting the virus to their families, and the increased workload to save patients' lives [2, 3]. COVID-19 infected thousands of HCWs [4]. An epidemic outbreak of an unknown new infection, a persistent increase in infected cases, increased mortality, and the lack of specific medication or effective medical treatments such as COVID-19 medications can be defined as an acute or chronic traumatic experience. Also, the consequences of COVID-19 prevalence at the individual and social levels have a direct impact on HCWs. On the one hand, the fear of transmission and the risk of death is a direct threat to oneself and others, and on the other hand, the indirect consequences of the epidemic seem to be associated with a sense of instability, sleep disorders, mental and mood disorders, etc. [5]. Therefore, HCWs face the critical conditions of COVID-19 disease, which increases the risk of developing psychological disorders in these individuals due to such adverse conditions [6]. Minimizing the psychological effects of this disease on HCWs is a particular challenge for health care systems worldwide [7, 8]. Post-Traumatic Stress Disorder (PTSD) is a psychological disorder affecting a person directly or indirectly that may appear as a threat to physical security, death or death threat, natural disasters, war, etc. after being exposed to extreme threats or severely stressful events such as an accident or severe injury. According to the International Statistical Classification of Disease and Related Health Problems, 10th Revision (ICD-10), PTSD symptoms are divided into three general categories: Re-experience, avoidance, and arousal. Re-experience has characteristics such as having annoying memories of the accident, nightmares, acting as if the accident is happening at the moment again, and physiological and psychological reactions in confronting any signs of the accident. Avoidance symptoms include characteristics such as having avoidant thoughts and actions, i.e., the person who has experienced an accident avoids the accident situation or similar situations mentally or practically, which this avoidance can limit the individual's emotion and destroy his or her interests and attachments; finally, arousal symptoms include characteristics such as sleep disturbance, irritability,

anger, difficulty concentrating, excessive hypervigilance, and startling [9]. A set of evidence shows that the prevalence of past infectious diseases, including Severe Acute Respiratory Syndrome (SARS) in China and parts of Asia and Canada in 2003, Ebola in West Africa in 2014, and Middle East Respiratory Syndrome (MERS) in 2016, was related to mental health problems among HCWs [10], mostly with PTSD. According to a study [11], the evolving COVID-19 pandemic was more likely to cause stress disorders in HCWs, which would potentially turn into PTSD chronic disorders, as had occurred in previous outbreaks [6], so an unprecedented number of HCWs were infected during the Ebola outbreak [12]. Also, during the SARS outbreak, 18% to 57% of health professionals experienced serious emotional and psychological symptoms during and after the disease [13]. Therefore, given the high prevalence of COVID-19 and the high vulnerability of HCWs to this new phenomenon, the purpose of this study was to assess PTSD in Iranian Healthcare Workers dealing with COVID-19.

Instrument & Methods

The present cross-sectional and online study was conducted from May 5 to August 23, 2020, on 418 Iranian HCWs, including (physicians, nurse & laboratory technicians, health workers, administrative staff, and radiologists). Inclusion criteria included the staff working in all health system centers of Iran, willingness to participate in the research, and also having access to the Internet to answer the electronic questionnaire questions, and exclusion criteria included individuals' refusal to complete the questionnaire's questions and incomplete questionnaires. Based on a sample formula, the required sample size was determined 422 Individuals.

Data collection tools in this study included demographic characteristics containing 13 questions (age, gender, marital status, education status, work experience, etc.), and the Impact of Event Scale-Revised (IES-R) standard questionnaire containing 22 questions (8 questions related to avoidance symptoms, 8 questions related to annoying thoughts, and 6 questions related to arousal symptoms) regarding COVID-19. the properties of the tool (its validity and reliability) have been confirmed in other studies [14-17]. Also, the Persian version of this questionnaire was validated in Iran by Panaghi *et al.* and Cronbach's alpha coefficient was reported between (0.67-0.87) [17]. This questionnaire was completed by the individual, and the respondents were asked to complete the frequency of experience of each symptom during the last seven days as follows: 1- Re-Experience Symptoms: Painful, recurrent, and annoying reminders; seeing the event frequently in dreams;

acting and feeling as if the event is repeating; severe psychological pain and discomfort in confronting internal or external clues related to the event; and the emergence of physical reactions to internal or external clues ^[9] associated with COVID-19 (for example, the phrase: "Any reminder leads to returning my feelings about coronavirus disease."). 2- Avoidance Symptoms: Trying to avoid thoughts, feelings, or conversations related to the injury; trying to avoid activities, places, or individuals that remind the person of the injury; inability to recall an important aspect of injury; severe lack of interest in dealing with important matters; feelings of frustration or alienation among others; limiting the spectrum of emotional states; and the feeling that occurring pleasant events is farfetched ^[9] (for example, the phrase: "Even when I did not intend to think about coronavirus disease, it kept coming to my mind."). 3- Symptoms of Increased Arousal: Difficulty falling asleep or sleep continuation; irritability or outburst of anger; difficulty concentrating; excessive hypervigilance; and the strong reaction of startling ^[9] (for example, the phrase: "I felt hyper-vigilant and alert."). All expressions were measured on a five-point Likert scale, including never (0 points), rarely (1 point), sometimes (2 points), often (3 points), and always (4 points). The total score of the questionnaire ranged between 0 and 88, which the higher scores indicating higher PTSD in HCWs, and given the scores obtained from the domains, the staff was classified at four levels, including asymptomatic (0-23), mild (24-32), moderate (33-38), and severe (39-88).

Data were collected using an electronic questionnaire through the Porsline site by convenience sampling method. For this purpose, public announcements were sent on commonly used social media in Iran such as Telegram, WhatsApp, and Instagram to invite cooperation; messages were also sent to several influential individuals, such as some managers of hospitals and health centers, who had access to HCWs to share the questionnaire link. The data were analyzed using SPSS 16 software and statistical tests (descriptive statistical tests, the Kolmogorov-Smirnov test to check the normality of the data, the independent t-test to compare the mean data, and ANOVA).

Findings

Overall, 418 respondents were included in the final analysis. The results showed that most participants in the study (40.4%) were in the age group of 30-39 years old. Of 286 individuals reporting PTSD symptoms, the majority were women (73.1%) and married (71.3%). Also, 49.5% had a bachelor's degree, and 53.6% had more than 10 years of work experience (Table 1).

The results of descriptive statistical analysis on PTSD among HCWs showed that out of 418 subjects

in the study, the frequencies of mild, moderate, and severe PTSD were 67 (16%), 62 (14.8%), and 157 (37.6%) respectively (Diagram 1).

Table 1) Demographic characteristics and PTSD of Healthcare Workers involved in the study (Numbers in parentheses are in percent)

Characteristics	PTSD	
	Yes	No
Age (Year)		
20-29	54 (18.9)	33 (25.0)
30-39	121 (42.3)	48 (36.4)
40 & More	96 (33.6)	46 (34.8)
Total	271 (94.8)	127 (96.2)
Gender		
Male	77 (26.9)	46 (34.8)
Female	209 (73.1)	86 (65.2)
Total	286 (100)	132 (100)
Marital Status		
Single	82 (28.7)	35 (26.5)
Married	204 (71.3)	79 (73.5)
Total	286 (100)	132 (100)
Number of Children		
No	108 (37.8)	46 (34.8)
One	67 (23.4)	33 (25.0)
Two & More	102 (35.7)	48 (36.4)
Total	277 (96.9)	127 (96.2)
Education Status		
Associate	43 (15.0)	29 (22.0)
Bachelor	145 (50.7)	62 (47.0)
Master and Higher	92 (32.2)	40 (30.3)
Total	280 (97.9)	131 (99.2)
Economic Status		
Weak	33 (11.5)	9 (6.8)
Moderate	185 (64.7)	93 (70.5)
Good	68 (23.8)	30 (22.7)
Total	286 (100)	132 (100)
Smoke		
Yes	14 (4.9)	6 (4.5)
No	272 (95.1)	126 (95.5)
Total	286 (100)	132 (100)
Alcohol & Drug		
Yes	30 (10.5)	8 (6.1)
No	256 (89.5)	124 (93.9)
Total	286 (100)	132 (100)
Employment Status		
Nurse	104 (36.4)	29 (22.0)
Health Worker	103 (36.0)	68 (51.5)
Physician	18 (6.3)	11 (8.3)
Laboratory Technician & Radiologist	24 (8.4)	8 (6.1)
Administrative Staff	36 (12.6)	16 (12.1)
Total	285 (99.7)	132 (100)
Work Experience		
1-5 Years	69 (24.1)	37 (28.0)
6-10 Years	53 (18.5)	27 (20.5)
10 & More	159 (55.6)	65 (49.2)
Total	281 (98.3)	129 (97.7)
Previous Disease		
No	187 (65.4)	108 (81.8)
Yes	99 (34.6)	24 (18.2)
Total	286 (100)	132 (100)
History of contact with a COVID-19 case		
Yes	118 (41.3)	41 (31.1)
No	101 (35.3)	59 (44.7)
I Don't Know	67 (23.4)	32 (24.2)
Total	286 (100)	132 (100)
Probability of exposure to coronavirus		
Yes	151 (52.8)	56 (42.4)
No	54 (18.9)	37 (28.0)
I Don't Know	81 (28.3)	39 (29.5)
Total	286 (100)	132 (100)

The results of the relationship between total PTSD scores and its dimensions with demographic characteristics are shown in Table 2. According to the findings, PTSD was significantly associated with gender, previous diseases, and alcohol and drug ($p < 0.05$) but it had no statistically significant association with the demographic characteristics of

marital status and smoking ($p>0.05$). There was a relationship between total PTSD scores as well as its dimensions with some demographic characteristics. Based on the results, PTSD scores had statistically significant associations with employment status, a history of contact with a COVID-19 patient, and the probability of exposure with coronavirus ($p<0.05$) but had no statistically significant associations with age, number of children, economic status, employment status, and work experience ($p>0.05$).

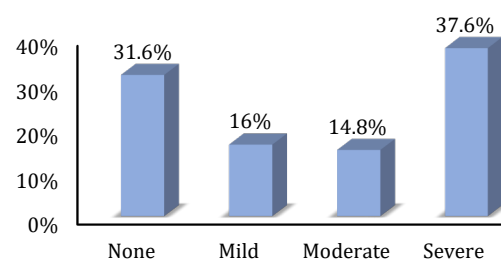


Diagram 1) Frequency of post-traumatic stress disorder levels in healthcare workers

Table 2) The relationship between PTSD and its dimensions with demographic characteristics (Mean \pm SD)

Characteristics	Intrusion	Avoidance	Arousal understood	PTSD
Gender				
Male	34.55 \pm 21.37	36.86 \pm 19.19	30.35 \pm 24.86	34.24 \pm 18.73
Female	41.77 \pm 24.72	36.77 \pm 18.63	37.48 \pm 24.98	38.79 \pm 19.53
p-value	0.005	0.966	0.008	0.029
Marital Status				
Single	39.47 \pm 24.69	36.61 \pm 17.89	36.71 \pm 25.99	37.68 \pm 19.33
Married	39.72 \pm 23.74	36.87 \pm 19.14	34.86 \pm 24.81	37.36 \pm 19.44
p-value	0.927	0.900	0.510	0.880
Smoke Use				
Yes	37.96 \pm 25.53	38.90 \pm 18.79	36.66 \pm 28.37	37.95 \pm 21.78
No	39.73 \pm 23.93	36.69 \pm 18.79	35.32 \pm 24.99	37.42 \pm 19.29
p-value	0.748	0.614	0.816	0.906
Previous Disease				
No	36.89 \pm 23.06	36.15 \pm 19.08	32.06 \pm 24.04	35.30 \pm 18.80
Yes	46.26 \pm 24.95	38.36 \pm 18.01	43.36 \pm 25.97	42.59 \pm 19.87
p-value	0.0001	0.274	0.0001	0.001
Alcohol & Drug Use				
No	38.99 \pm 24.02	36.00 \pm 18.71	34.87 \pm 24.85	36.78 \pm 19.32
Yes	46.01 \pm 22.89	44.81 \pm 17.75	40.46 \pm 27.56	44.13 \pm 19.02
p-value	0.07	0.006	0.192	0.028
Age (Years)				
20-29	39.43 \pm 27.20	35.52 \pm 18.79	38.17 \pm 27.51	37.66 \pm 21.73
30-39	40.69 \pm 23.21	37.64 \pm 19.16	36.31 \pm 25.37	38.39 \pm 18.94
40 & More	37.96 \pm 22.89	35.82 \pm 18.16	32.10 \pm 22.83	35.85 \pm 18.25
p-value	0.607	0.591	0.155	0.433
Number of Children				
No	40.84 \pm 24.21	36.26 \pm 18.51	37.60 \pm 25.01	38.29 \pm 19.19
One	4.62 \pm 23.90	38.56 \pm 18.84	36.29 \pm 25.72	38.69 \pm 19.60
Two & More	38.08 \pm 23.78	36.37 \pm 19.24	32.83 \pm 24.43	36.03 \pm 19.30
p-value	0.555	0.587	0.235	0.472
Education Status				
Associate	32.98 \pm 25.61	38.58 \pm 22.14	29.34 \pm 25.31	34.02 \pm 20.02
Bachelor	40.62 \pm 22.82	36.86 \pm 17.37	36.47 \pm 24.69	38.12 \pm 18.81
Master and Higher	41.05 \pm 24.06	35.06 \pm 18.88	36.58 \pm 25.16	37.65 \pm 19.54
p-value	0.041	0.421	0.087	0.288
Economic Status				
Weak	44.19 \pm 25.30	41.51 \pm 20.18	42.26 \pm 26.66	42.69 \pm 19.47
Moderate	38.46 \pm 23.27	35.98 \pm 18.18	33.88 \pm 24.27	36.31 \pm 18.86
Good	41.07 \pm 25.32	37.11 \pm 19.68	36.69 \pm 26.53	38.43 \pm 20.56
p-value	0.283	0.202	0.111	0.118
Employment Status				
Nurse	46.49 \pm 23.43	40.86 \pm 17.97	42.26 \pm 25.81	43.29 \pm 19.44
Health Worker	36.54 \pm 24.63	33.22 \pm 18.24	32.21 \pm 24.13	34.15 \pm 19.33
Physician	42.02 \pm 26.39	33.51 \pm 17.61	38.36 \pm 28.87	37.93 \pm 20.61
Laboratory Technician & Radiologist	36.81 \pm 20.75	36.42 \pm 18.94	31.25 \pm 23.06	35.15 \pm 16.24
Administrative Staff	32.99 \pm 20.17	39.66 \pm 20.71	29.48 \pm 22.39	34.46 \pm 17.83
p-value	0.001	0.005	0.002	0.001
Work Experience (Years)				
1-5	39.53 \pm 25.61	34.78 \pm 19.46	37.69 \pm 26.24	37.30 \pm 20.77
6-10	37.18 \pm 25.51	36.25 \pm 19.47	33.69 \pm 26.84	35.89 \pm 20.81
10 & More	41.15 \pm 22.54	37.58 \pm 18.23	35.36 \pm 23.88	38.27 \pm 18.28
p-value	0.436	0.444	0.544	0.636
History of contact with a COVID-19 case				
Yes	45.59 \pm 23.47	37.79 \pm 17.41	40.85 \pm 25.20	41.46 \pm 19.07
No	34.16 \pm 23.38	36.87 \pm 20.04	29.79 \pm 23.31	33.95 \pm 19.02
I Don't Know	38.98 \pm 23.78	35.10 \pm 18.84	35.64 \pm 26.12	36.66 \pm 19.48
p-value	0.0001	0.534	0.0001	0.002
Probability of exposure to coronavirus				
Yes	44.44 \pm 23.86	37.71 \pm 18.70	40.25 \pm 25.93	40.85 \pm 19.38
No	30.21 \pm 21.95	34.10 \pm 20.64	27.65 \pm 21.84	30.93 \pm 18.45
I Don't Know	38.54 \pm 23.59	37.29 \pm 17.33	32.84 \pm 24.39	36.53 \pm 18.87
p-value	0.0001	0.294	0.0001	0.0001

Discussion

The findings of the present study showed that the extent of PTSD in the Iranian HCWs was not favorable, because 68.42% of the subjects reported mild to severe PTSD degrees. In line with this finding, Bardsiri *et al.*'s study also showed that 3% of emergency medical personnel in Iran had moderate PTSD [18]. The prevalence of PTSD was reported at 42.2% in a study [19] and 16.83% in another study [20]. Primary research conducted in China during the COVID-19 epidemic also showed that a significant proportion of HCWs had symptoms of depression (50.4%), anxiety (44.6%), insomnia (34%), and distress (71.5%) [21]. According to previous studies, in the months after the critical period in epidemics or other previous medical emergencies, PTSD has also been reported [5, 22, 23]. In addition, a high risk of PTSD prevalence among health care workers working with restricted safety equipment was reported in the primary COVID-19 emergency studies in China and Italy [24, 25]. This evidence points HCWs are at the forefront of fighting against COVID-19 disease and are not in a good state of mental health, and because PTSD occurs in a person following a severely threatening event, it is not far-fetched that HCWs will be in the very critical condition of the COVID-19 pandemic due to facing a threat to the lives of their colleagues, the continuous increase in the coronavirus-infected cases, increased mortality, lack of specific drugs or effective vaccines, extensive media coverage, high workload, lack of personal protective equipment, lack of insufficient social support, and emotional and moral participation in resource allocation decisions, all of which increase mental disorders in this group [1]. Which can greatly affect the quality of their activities and services. On the other hand, health care workers should wear heavy protective clothing and mask N 95, which causes limitation of movement and difficulty in performing medical procedures and practices compared to normal conditions. As a result, they create feelings of severe helplessness, isolation, frustration, stress, and anxiety in HCWs. However, the difference in the prevalence of this disorder in different societies can be attributed to the differences in the number of subjects in the studies, the extent of access to personal protective equipment, culture, and COVID-19 prevalence in different countries. Therefore, reducing work shifts and subsequently relieving the physical and mental fatigue of HCWs, recruiting new auxiliary labor in the health medical system, training to use relaxation techniques, as well as the use of incentives, and combined strategies are among the effective interventions that can be used to improve employees' self-efficacy in dealing with psychological problems. The results of the study showed that women develop PTSD more than men.

The findings of this study are consistent with several other studies, reporting that women who are exposed to traumatic events are more likely to develop PTSD than men [26-28]. However, some existing studies have reported the opposite [29, 30]. This discrepancy can be explained by three reasons: First, men show higher basal cortisol levels (in the reproductive years), being associated with a lower prevalence of psychiatric pathology [21]; second, the number of women (295 people) was more than men (123 people) in the present study; and third, these differences can be due to the role of culture, religion, and customs governing the society, the differences between men and women, and even the amount of stress expressed by both genders in Iranian society. Also, in this study, married participants had PTSD more than single participants. This can be explained by the fact that married participants are more likely to be concerned about the transmission of the virus to their families, and also, the population of married individuals is more than single individuals in the present study (117 to 283). Based on the results, employment status was significantly associated with the total PTSD score, as well as the dimensions of intrusion, arousal understood, and avoidance. In line with this finding and according to previous studies, the medical staff exposed to H1N9 patients also had the highest scores in the three dimensions of PTSD [25]. The reason may be the sensitive occupational nature of this group and exposure to various occupational and psychological pressures. If this psychological disorder is not controlled, it may lead to permanent undesirable consequences in patients such as intrusive memories, avoidance behaviors, irritability, and numbing emotional behaviors. Also, the relationships between a history of contact with a COVID-19 patient and the probability of exposure to coronavirus to PTSD, intrusion, and arousal understood were statistically significant. Thus, it can be said that although some post-traumatic complications such as arousal and annoying thoughts or irritability, when experiencing personal injury or observing the traumatic events of others can also lead to negative cognitions about an individual's emotional and cognitive reactions to that event, can expose the vulnerable individual to the development of post-traumatic complications. The strength of this study was using the online sampling method through the Porsline website to complete data which provides the possibility of the well-timed gathering of a wide spectrum of health system staff in Iran. Since other methods of data gathering were insecure and difficult for researchers and participants in acute conditions of COVID-19 disease. One limitation of the study was self-the reported measurement of behavior -that is unavoidable in such research- which can produce bias and present false information.

Conclusion

Based on the findings of the present research, most of HCWs (two-thirds) had some degree of PTSD. Due to the professional and vital importance and role of this group in health systems and communities, providing appropriate psychological solutions and techniques and tailored interventions to promote the physical and mental health of Healthcare Workers must be considered in priority.

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Conflicts of Interests: None declared.

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