Original Article

Investigating the Relationship Between Spiritual Intelligence and Post-traumatic Stress Syndrome in COVID-19 Surviving Healthcare Workers

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Abstract

Background: Post-traumatic stress syndrome (PTSS) can have a devastating long-term impact on healthcare workers who have survived the profound crisis of COVID-19. The presence of spirituality during periods of stress has the potential to mitigate the psychological consequences of traumatic experiences. This study was undertaken to explore the relationship between spiritual intelligence and PTSS among healthcare workers who have survived COVID-19.

Methods: This descriptive-analytical study was conducted on 201 COVID-19-surviving healthcare workers in 2020 (Semnan, Iran). Eligible participants responded to the online Impact of Event Scale-Revised (IES-R) questionnaire for PTSS and the Spiritual Intelligence Questionnaire (SIQ). The data were analyzed using an independent sample t-test, the chi-square test, and Pearson's correlation coefficient.

Results: The mean score for PTSS and the mean of spiritual intelligence were 33.97 ± 17.57 and 124.90 ± 16.99, respectively. The Pearson correlation coefficient demonstrated a negative relationship between spiritual intelligence and PTSS subscales, namely, avoidance (-0.16), intrusion (-0.2), and hyperarousal (-0.3). In other words, less PTSS was experienced with increasing spiritual intelligence.

Conclusion: The findings emphasize the significance of incorporating spirituality into the clinical practice of healthcare workers who have survived COVID-19. Consequently, employing strategies such as spiritual intelligence training can be regarded as a means to enhance adaptation and mitigate PTSS-associated complications.

Keywords: COVID-19, PTSS, Spiritual intelligence, Healthcare workers

Introduction

On December 31, 2019, the World Health Organization (WHO) reported several unusual cases of pneumonia in Wuhan, China, caused by a new subtype of coronavirus called acute respiratory syndrome due to coronavirus type 2 (SARS-CoV-2) (1). The disease rapidly spread from China to other countries. On February 11, 2020, the WHO declared the 2019-nCoV epidemic a coronavirus (COVID-19). The International Committee for the Classification of Viruses later renamed it SARS-CoV-2 acute respiratory syndrome (2). On January 30, 2020, the WHO declared the outbreak of COVID-19 as the sixth public health emergency (3). According to the latest report of the WHO, as of January 1, 2021, more than 82 million cases of the disease have been reported in 218 countries, and the prevalence of new cases and associated deaths is increasing (4).

The high prevalence of this disease has not only caused a worldwide health concern but also has led to extraordinary mental and psychological problems that can be attributed to such things as depression, anxiety, insomnia, attention disorder, irritability, fatigue, and especially post-traumatic stress syndrome (PTSS). It has been noted that if not identified and treated, it can lead to chronic diseases (5).

During the pandemic, health professionals are among the most affected groups because they have to experience one of the paradoxes of this epidemic, while people in the community stay at home and maintain social distance. They are forced to stay at work and have a close relationship with patients. On the other hand, various deficiencies, such as a lack of personal protective equipment and unknown diseases, make them among the vulnerable groups. In addition to physical health, their mental health is affected as well (6,7).

Post-traumatic stress disorder (PTSD) is a mental disorder that can develop after exposure to extremely threatening or horrific events. Its main characteristics are disturbing memories, avoidant behaviors, and a feeling of constant threat to alertness or excessive alertness. PTSD is a stress-related psychological problem caused by someone who has experienced or witnessed a life-threatening traumatic event, which has placed a heavy burden on individuals and society (8). Exposure to traumatic events is the immediate cause of PTSD and is essential in diagnosing related symptoms (9,10).

PTSS is also an acute traumatic stress that can have lasting and chronic effects on mental health (11,12). Despite all the efforts of the WHO and senior public health officials around the world to contain the outbreak of COVID-19, the disease has caused stress in the entire population worldwide. According to the WHO Department of Mental Health, while providing standard solutions, appropriate and practical interventions for the mental health and well-being of all groups involved in this disease are considered a necessity (4). Research on the mental health of healthcare workers involved in the outbreak of SARS showed that about 10% of the samples have shown high symptoms of PTSD (13). In addition, a study of long-term psychological effects among SARS survivors revealed that PTSD was the most common long-term mental disorder (14). Another study reported that approximately 4.4% of healthcare workers in China demonstrated high levels of PTSD during the influenza A (H1N1) epidemic in 2019 (15). As a result, early detection and intervention for PTSD deserve special attention in the prevalence of life-threatening medical illnesses (14).

Spiritual intelligence is one of the new concepts of human intelligence and includes a kind of compromise and problem-solving behavior (16). It can be defined as paying attention to spirituality in solving problems and problems of life and valuing human life (17). Spiritual intelligence can be classified into four categories, including critical ontology thinking, creation of meaning in life, transcendent consciousness, and expansion of the state of consciousness (18,19). This intelligence gives the person an overview of all life events and experiences and enables the person to reinterpret their events. According to many studies, spiritual intelligence and attention to spirituality can be effective in reducing stress and anxiety, improving well-being, and increasing quality and meaning in life, so that the level of stress and anxiety is lower when

the spiritual intelligence is higher, and individuals will experience a better quality of life (16,20). Considering that the fear of change is due to the mind of people rather than the environment around them, spiritual intelligence helps people to fight the fear of change while controlling the unpleasant feelings in their being (20).

During the outbreak of life-threatening physical illnesses, it is crucial to prioritize early detection of PTSS and implement methods and strategies to prevent and mitigate its impact. With hundreds of thousands of healthcare workers serving on the frontlines of the COVID-19 pandemic, their mental well-being plays a pivotal role in controlling the spread of the virus. As a result, policymakers within the health system should acknowledge the significance of healthcare workers' mental health. Therefore, this study seeks to explore the relationship between spiritual intelligence and PTSS among healthcare workers who have survived COVID-19.

Methods
Participants and Procedures
This descriptive-analytical study was performed on 201 healthcare workers working in COVID-19 treatment centers in Shahroud and Mayamey in Semnan province (Iran) in 2020. After obtaining the code of ethics from the Ethics Committee of Shahroud University of Medical Sciences, the required data were collected in the hospitals of COVID-19 centers.

The inclusion criteria included willingness to participate in the study and employment in the hospital during the COVID-19 pandemic. On the other hand, a self-reported history of mental illness and incomplete completion of questionnaires were the exclusion criteria.

The sample size required for this study was calculated using the sample size estimation formula to compare proportions in a community, considering the prevalence of 50% stress disorder in hospital employees (21), a 95% confidence interval, and an error rate of 7%. The stratified sampling method was used for this purpose. First, the characteristics of the employees working in the hospitals were obtained. Then, the number of samples was determined based on occupational groups, and simple random sampling was performed among them. Initially, due to the COVID-19 epidemic, questionnaires were electronically prepared, and the relevant link was sent to the contact numbers of people eligible to participate in the project. In the electronic questionnaire, after stating the purpose of the project, the first question was related to satisfaction. If they were not satisfied with participating in the project and chose the no option, the questionnaire questions were not shown to them, and they were excluded from the study. One week after sending the questionnaire link, the questionnaires were first checked for the ratio of participation of the target groups; if this ratio was less than the percentage set, the questionnaire was sent to alternative employees.

Features of the Questionnaire

The questionnaires used in this study included a demographic information questionnaire, the Impact of Event Scale-Revised (IES-R) questionnaire, and the Spiritual Intelligence Questionnaire (SIQ).

The IES-R scale, which was designed by Christianson et al, has 22 questions with a 5-point Likert-type scale ranging from 0 (never) to 4 (very much) (22). This scale includes 3 subscales of avoidance (8 items), intrusion (n = 8), and hyperarousal (n = 6). The minimum and maximum scores that can be obtained from this questionnaire are 0 and 88, respectively. The higher the score, the greater the concern for PTSS and related health outcomes. Thus, scores of 24 or higher may be a clinical concern for PTSS; scores of 33 or higher represent the best threshold for a possible diagnosis of PTSS, and scores of 39 or higher indicate that PTSS could be severe enough to suppress the immune system (23-25). This questionnaire has a high correlation (r = 0.84) with the PTSD Checklist (PCL) questionnaire, which is used to diagnose PTSD, with a score of 33 and above (25). The reliability of this scale in Iran was confirmed by Askari Hosseini et al, with the method of determining internal consistency by estimating Cronbach's alpha as 0.82 (26).

The SIQ has 29 questions consisting of two factors. The first and second factors included 12 (understanding and connection with the source of existence) and 17 (spiritual life with an inner core) questions, respectively. The minimum and maximum scores are 29 and 145, respectively. Scores of 29–58, 58–87, and > 87 represent low, average, and high spiritual intelligence, respectively. The reliability of the questionnaire was confirmed to be 0.89 through internal consistency using Cronbach's alpha estimation method (27).

Statistical Analysis

The obtained data were statistically analyzed using descriptive statistical tests, including the estimation of means and frequencies, and chi-square, independent sample t-test, and Pearson correlation coefficient tests were used to examine the relationship between variables by SPSS software, version 22. The significance level was considered at 0.05.

Results

Participants included 201 personnel from various groups working in the hospital, and their mean age was 34.02 ± 7.6 years. In addition, 57.6%, 76.1%, and 45.8% were female, married, and nurses, respectively. Further, 40.3%, 6.5%, and 13% had a bachelor's degree, underlying diseases, and a history of COVID-19 disease, respectively (Table 1).

The mean score of PTSS was 33.97 ± 17.57. The avoidance, intrusion, and hyperarousal subscales were also examined separately. As regards the subscales of avoidance, intrusion, and hyperarousal, the mean score was 13.39 ± 6.39, 10.27 ± 6.27, and 10.04 ± 27, respectively.

The results revealed that there was no significant

Table 1. Demographic Characteristics of Participants

Variable		No. (%)
Gender	Male	85 (42.4)
	Female	116 (57.6)
Marital status	Married	153 (76.1)
	Single	45 (22.4)
	Divorced	3 (1.5)
Work	Physician	1 (0.5)
	Official	65 (36.3)
	Nurse	99 (45.8)
	EMS	3 (1.5)
	Security	33 (15.9)
Level of education	Associate degree	51 (25.4)
	Bachelor's	81 (40.3)
	Master's	63 (31.3)
	Physician or PhD	6 (2.5)
Number of children	1	87 (43)
	2	58 (29)
	>2	56 (28)
Work experience (year)	<5	105 (52.3)
	5-10	22 (10.1)
	11-20	63 (31.4)
	>20	11 (5.5)
Underlying diseases	Yes	14 (6.5)
	No	187 (93.5)
Underlying diseases in first-degree relatives	Yes	78 (38.7)
	No	123 (61.3)
History of COVID-19 disease	Yes	25 (13)
	No	176 (87)
Access to personal protective equipment	Weak	17 (8.3)
	Moderate	64 (31.9)
	Mild	69 (34.4)
	High	39 (19.4)
	Very high	12 (6)

Note. EMS: Emergency medical services.

relationship between the PTSS score and age, gender, work experience, previous medical history (e.g., diabetes mellitus, hypertension, or cardiovascular disorder), and access to personal protective equipment ($P > 0.05$).

The mean score of spiritual intelligence was 124.90 ± 16.99 based on the cut-points. Furthermore, 3.6% and 96.4% had moderate and high spiritual intelligence, respectively. To investigate the relationship between spiritual intelligence and demographic characteristics, the results showed that there was no significant relationship between the spiritual intelligence score and age, gender, work experience, underlying disease, and access to personal protective equipment ($P > 0.05$). Moreover, no significant relationship was found between PTSS and demographic characteristics ($P > 0.05$, Table 2).

Based on Pearson's coefficient of correlation to

Table 2. Relationship Between Spiritual Intelligence and PTSS With Demographic Characteristics

Variable		PTSS (Score)			Spiritual Intelligence (Score)		
		<24 n (%)	≥24 n (%)	P Value	Mild (58-87) n (%)	High (>87) n (%)	P Value
Gender	Male	28 (45)	57 (40)	0.84	3 (42.9)	82 (42.2)	0.52
	Female	34 (55)	82 (60)		4 (57.1)	112 (57.8)	
Age	30>	19 (30)	46 (31)	0.21	3 (42.9)	62 (31.8)	0.16
	30<	41 (70)	96 (69)		4 (57.1)	133 (68.2)	
Education level	Associate degree	18 (28.5)	33 (24)	0.27	3 (37.5)	48 (24.9)	0.56
	Bachelor's	20 (31.5)	61 (45)		1 (12.5)	80 (41.5)	
	Master's	23 (37)	40 (29)		4 (50)	59 (30.6)	
	Physician or PhD	2 (3)	4 (2)		0 (0)	6 (3)	
Marital status	Married	50 (79)	103 (75)	0.25	8 (100)	145 (75.1)	0.05
	Single	12 (20)	33 (23)		0 (0)	45 (23.3)	
	Divorced	1 (1)	2 (2)		0 (0)	3 (1.6)	
Job	Physician	0 (0)	1 (0.5)	0.4	0 (0)	1 (0.5)	0.1
	Official	22 (35.5)	43 (31)		4 (50)	61 (31.6)	
	Nurse	26 (42)	73 (52.5)		4 (50)	95 (49.2)	
	EMS	1 (1.5)	2 (1.5)		0 (0)	3 (1.5)	
	Security	13 (21)	20 (14.5)		0 (0)	33 (17.2)	
Number of children	1	25 (38.5)	62 (45.6)	0.29	3 (43)	84 (43.3)	0.19
	2	22 (33.8)	36 (26.5)		0 (0)	58 (29.9)	
	2<	18 (27.7)	38 (27.9)		4 (57)	52 (26.8)	
Work experience (year)	5>	32 (51)	73 (53)	0.32	5 (71.5)	100 (51.5)	0.001
	5-10	8 (13)	14 (10)		0 (0)	22 (11.3)	
	11-20	20 (32)	43 (32)		2 (28.5)	61 (31.5)	
	20<	3 (4)	8 (5)		0 (0)	11 (5.7)	
Underlying disease	Yes	6 (9)	8 (5)	0.71	0 (0)	14 (7.6)	0.6
	No	57 (91)	130 (95)		18 (100)	169 (92.4)	
Underlying disease in first-degree relatives	Yes	27 (43)	51 (37)	0.5	0 (0)	78 (40.4)	0.04
	No	36 (57)	87 (63)		8 (100)	115 (59.6)	
History of COVID-19 disease	Yes	7 (12)	18 (13)	0.24	0 (0)	25 (12.8)	0.56
	No	57 (88)	119 (87)		6 (100)	170 (87.2)	
Access to personal protective equipment	Weak	4 (6.3)	13 (9.5)	0.1	0 (0)	17 (8.8)	0.1
	Moderate	16 (25.5)	48 (34.8)		5 (71.4)	59 (30.5)	
	Mild	25 (39.7)	44 (31.9)		0 (0)	69 (35.6)	
	High	13 (20.6)	26 (18.8)		1 (14.3)	38 (19.6)	
	Very high	5 (7.9)	7 (5)		1 (14.3)	11 (5.5)	

Note. PTSS: Post-traumatic stress syndrome; EMS: Emergency medical services.

examine the relationship between spiritual intelligence and perceived stress, there was an inverse correlation between the total spiritual score and PTSS (-0.25), so that with increasing spiritual intelligence, people perceived less stress, and this relationship was statistically significant (P=0.003). According to the results of the Pearson correlation coefficient test (Table 3), a significant relationship was observed between the total spiritual intelligence of the meaning of the components of PTSS, namely, avoidance (P=0.05), intrusion (P=0.014), and hyperarousal (P=0.001).

Table 3. Correlation Between Spiritual Intelligence and Post-traumatic Stress Syndrome and its Subscales in Healthcare Workers

Variable	Spiritual Intelligence	
	Coefficient	P Value
Total PTSS score	-0.25	0.003
Avoidance	-0.16	0.050
Intrusion	-0.2	0.014
Hyperarousal	-0.3	0.001

Note. PTSS: Post-traumatic stress syndrome.

Discussion

This study investigated the relationship between spiritual intelligence and PTSS among healthcare workers who have survived COVID-19. Based on the results of the present study, 70.6% of employees with scores above 24 experienced symptoms of stress. Of this number, 49.8% of individuals with a score above 33 on the IES-R score had worries about developing PTSS. According to the results of the study by Wang et al, the prevalence of stress symptoms among Chinese citizens during the COVID-19 pandemic was 8.1% (28). In the study of Huang et al, the prevalence of PTSD symptoms was 27.39% among the staff of COVID-19 centers in China (29). In other studies performed by Li et al in Wuhan, China, and Zheng et al, PTSD was reported at 16% and 18%, respectively (30,31). Nonetheless, the rate of mental disorders and PTSD during the prevalence of SARS was 10%-11% (31,32), and during the prevalence of H1N1 flu, the prevalence of PTSD among students in China was only 2% (33). However, in the study of Sun et al, the prevalence of PTSD among the medical staff was reported to be 4.4%. The low percentage of the disorder can be due to a different questionnaire and a different statistical population. The PCL-C questionnaire was used, and the study was performed on people from different community groups. Additionally, the treatment staff were part of the people under study. On the other hand, the researchers in this study attributed the low prevalence to the experience of two waves of infectious disease by the Chinese mentioned in the twentieth century, so they seem to have experienced such crises. It also seems that in a study performed a month later, the outbreak was a factor in this difference because the researchers themselves acknowledged that the prevalence of PTSS was different at different times in the same study (15).

Perhaps the high prevalence of PTSS in our study convinced us to investigate this issue in healthcare workers working in COVID-19 settings. Accordingly, one of the most important reasons for the higher prevalence of PTSS and PTSD has been raised based on the reports of personnel working in high-risk wards and their high level of contact with patients (34). Another reason can be the young age of medical and hospital staff and less work experience, so that according to studies, less work experience was one of the reasons for the higher prevalence of PTSS among healthcare workers (35). The high prevalence of PTSD in employees can be attributed to their presence at the frontline of treatment and the fight against the disease, the unknowingness of the virus and the lack of definitive treatment for it, high incidence and daily mortality, and fear of infecting themselves or family members.

In this study, there was no significant relationship between any of the demographic characteristics (e.g., age, gender, education, place of work and occupation, work experience, and underlying illness in individuals or their families) and the amount of stress experienced and PTSS

symptoms. Although women showed more symptoms of PTSS in this study, these changes were not significant. In other studies, PTSD symptoms were higher in women, and this could be due to the higher prevalence of risk factors such as depression and loneliness (15,31,34,36,37).

In this study, no significant relationship was found between the presence of underlying diseases such as hypertension, diabetes, obesity, cardiovascular disease, and autoimmune disorder that put people at higher risk for mortality with PTSS symptoms; nonetheless, this relationship was significant. In other studies, a significant relationship was observed between the prevalence of symptoms and the risk of disease. The reason for this difference could be the fact that a smaller proportion of subjects, due to younger age, had underlying diseases. Another reason was that the statistical population was different, so that their statistical population included different groups of society (15,38,39). Although our findings revealed no significant relationship between work experience and stress symptoms, the results of other studies confirmed an association between work experience and perceived stress, so that studies with people with a history of more than 10 years showed more symptoms of stress. According to the researchers, this was due to the use of more experienced personnel in the pediatric ward of that hospital (31).

The average spiritual intelligence of the subjects was 124.90, and the subjects had high spiritual intelligence. There was no significant relationship between the spiritual intelligence score and any of the demographic variables. In other studies conducted on nurses in Iran and using the King SIQ to measure spiritual intelligence, the average spiritual intelligence score was reported to be 53 (40), 61.148 (41), and 48.57 (42). In the study by Beiranvand et al, more than 61% reported a good spiritual intelligence score (41). This score was also reported to be moderate among nurses in Malaysia (43), but the spiritual intelligence score of 82% of nurses in China was reported to be low (44). It can be due to cultural and religious differences or different measuring instruments. In our study, this score was high, probably because of different instruments or measurements at different times.

In a study by Ramezanli et al on patients with cancer, the average spiritual intelligence based on the King's spiritual intelligence scale was 97.22%, and 44.5% of people had high spiritual intelligence (45). In the evaluation of spiritual intelligence in emergency response volunteers, high spiritual intelligence scores were reported (46), and COVID-19, due to the prevalence and unknowingness of the disease and high mortality, may have increased the sense of spirituality in individuals. According to the study, there was a negative relationship between spiritual intelligence and PTSS, implying that those with higher spiritual intelligence experienced less stress. Further, a relationship was found between spiritual intelligence and the components of PTSS, including avoidance, intrusion, and hyperarousal, and higher spiritual intelligence had

a higher score in each of these components. In line with this study, other studies reported that religious beliefs and spiritual support could reduce depression (47) and increase the quality of life and good feelings (48).

In the current study, due to the limitation of the number of employees working in the departments related to COVID-19 in the hospitals of the mentioned cities, there was a limitation in selecting employees with similar work experience during the period of COVID-19. It is suggested that in future studies, the participants should be homogeneous in terms of individual characteristics in order to avoid this problem.

Conclusion

According to the findings, PTSS was high in healthcare workers working in COVID-19 wards and hospitals. It was revealed that the prevalence of PTSS can be reduced or brought to the desired state by increasing spiritual intelligence. As a result, by performing interventions in the field of spiritual intelligence, it is possible to control PTSS in the personnel of hospitals. It is recommended that multicenter studies be conducted, along with follow-up assessments, to evaluate the mental well-being of personnel involved in COVID-19 centers. Additionally, interventions should be implemented to mitigate psychological stress and alleviate symptoms of PTSS in the future.

Authors' Contribution
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Competing Interests
None to declare.

Data Availability Statement
The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Ethical Approval
This study was approved by the Ethics Committee of Shahroud University of Medical Sciences (ethics code No.: IR.SHMU.REC.1399.059).

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