Shiraz E-Med J. 2024 December; 25(12): e143731 https://doi.org/10.5812/semj-143731

Published Online: 2024 November 2 **Research Article**

Health Anxiety, Sleep Quality in Healthcare Workers Under Critical Conditions of Emerging Diseases

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Received: 9 December, 2023; **Revised:** 2 August, 2024; **Accepted:** 15 September, 2024

Abstract

Background: One of the crises recently affecting human society is an emerging pandemic that has had a significant psychological impact on healthcare workers. Studies have shown that staff experience psychological disorders such as anxiety, depression, and insomnia when exposed to crises.

Objectives: This study aimed to determine the association between health anxiety and the sleep quality of healthcare workers during crisis conditions.

Methods: This cross-sectional, correlational descriptive-analytical study was conducted from late February 2019 to late March 2020. Using convenient sampling, 382 healthcare workers from medical universities in Golestan province participated in the survey. Data were collected via an internet link shared with participants through WhatsApp working groups. The instruments used in this research included demographic information, sleep quality, and health anxiety inventories. The data were analyzed using SPSS-21 with descriptive and analytical statistics.

Results: Of the participants, 77.2% were women, 65.4% were single, 60.7% were nurses, and 64.4% had a bachelor's degree. The results revealed that 72.7% of the staff experienced moderate to high levels of anxiety. Regarding sleep quality, 28.3% (n = 108) of healthcare workers reported good sleep quality, while 71.7% (n = 274) reported poor sleep quality. Additionally, the results indicated a significant correlation between health anxiety scores and sleep quality scores (r = 0.129, P = 0.01).

Conclusions: The results of this study showed that the critical conditions caused by emerging diseases have led to health anxiety among healthcare workers, negatively affecting their sleep quality. Therefore, medical center officials must address such psychological issues and implement preventive measures to maintain the mental health of healthcare workers.

Keywords: Health Anxiety, Sleep Quality, Healthcare Workers, Critical Period, Emerging Infectious Disease

1. Background

Health holds a central place in sustainable development across all countries (1). Disasters and their consequences can quickly strain the resources available within a society's health system and have devastating effects on basic healthcare infrastructure (2). One of the crises recently afflicting human society is the disease caused by the coronavirus, first detected in December 2019 in Wuhan, China. In March 2020, the World Health Organization declared the outbreak of the disease caused by the coronavirus as a pandemic (3). Among various components, crisis management in such incidents undoubtedly plays the most important role for medical centers, which are the main organizations involved (4).

Generally speaking, emerging infections like COVID-19 and pandemic outbreaks have a critical psychological impact on healthcare workers and society. Studies have revealed that during the COVID-19 pandemic, healthcare workers are at a heightened risk of psychological distress (5-7). Maintaining the psychophysical health of healthcare workers during the COVID-19 pandemic is of great importance (8), especially because of reasons such

as their close contact with infected patients, the risk of becoming infected, and witnessing unexpected deaths of both patients and coworkers. These factors disproportionately affect workers in COVID-19 treatment centers (9, 10). As reported by various studies, staff working with COVID-19 patients are more exposed to psychological risks such as anxiety, depression, and insomnia (11-13). The fear and anxiety related to potential infection result in a devastating psychological burden on individuals, potentially weakening their immune systems and reducing their capacity to fight the disease if they become infected, particularly among nurses and doctors, the main members of the medical team (14, 15).

Health anxiety is characterized by persistent and intense worry about one's health. The prevalence of health anxiety in medical centers ranges from 17% to 24% (16). In cases of health anxiety, the level of concern is excessive and disproportionate. Such individuals tend to examine themselves repeatedly and constantly research the disease. Health-related worries become prominent in their lives, affecting their daily activities (17). The impact of disease outbreaks on healthcare workers' mental health reveals that many hospital staff are experiencing high levels of anxiety, frequent concerns about their health, as well as concerns about their ability to function and the fear of being labeled as sick (18). Healthcare workers' concerns and psychological distress during the outbreak of severe acute respiratory syndrome (SARS) were associated with job stress, social isolation, and health anxiety (19, 20).

A study conducted by Dai et al. on medical staff in China during the COVID-19 pandemic revealed that about 32% of the medical staff had direct contact with infected patients, among whom the prevalence of anxiety was around 12.5% (6). Similarly, a study by Abdelghani et al. in Egypt reported that 28% of healthcare workers experienced health anxiety related to the COVID-19 virus (21).

Under the unfavorable conditions induced by the COVID-19 pandemic, in addition to mental health, people's sleep quality was also affected (22). Poor sleep quality and mental health disturbances can have interactive effects, with each aggravating the other (23). Healthcare workers, in particular, have experienced poor sleep quality due to the stressful nature of their work. A survey conducted in Wuhan, China, found that during the spread of COVID-19, 34% of healthcare workers experienced insomnia (15). The negative consequences of insomnia can lead to digestive disorders, nervous fatigue, lack of concentration, poor performance, and a decline in job responsibility. Therefore, maintaining the psychophysical health of this group is crucial in controlling the pandemic (24).

The study by Albougami and Manzar revealed a significant correlation between increased insomnia and factors such as age, gender, job, and workplace, with nurses showing the highest levels of insomnia (25). Health crises, including insomnia, are often linked to anxiety stemming from fears of infection and concerns about economic and financial stability, which can significantly impact sleep quality (26). As studies suggest, a positive and significant correlation was found between anxiety levels and sleep quality, with anxiety being higher in women, while men exhibited poorer sleep quality (27, 28).

2. Objectives

Few studies have specifically investigated healthcare workers' anxiety levels and their correlation with sleep quality during crises. Considering the performance of healthcare workers as a crucial factor in the recovery of COVID-19 patients, and recognizing the adverse effects of psychological health disorders and poor sleep quality on their performance, this study aimed to examine the correlation between health anxiety and sleep quality among healthcare staff.

3. Methods

The current study is a descriptive, analytical, cross-sectional study that examines the correlation between variables. The study was conducted from late February 2019 to late March 2020, and the participants included medical staff working in universities of medical sciences in Golestan province.

3.1. Sampling

The study participants were selected through convenient sampling. The inclusion criteria were healthcare workers with the ability to use WhatsApp, those working in medical centers, and healthcare workers without direct contact with COVID-19 patients. The exclusion criteria included failure to complete the questionnaire.

3.2. Data Collection

After obtaining permission from the university's ethics committee to conduct the research, the researcher contacted the hospital managers in Golestan province to explain the study's objectives. Emphasis was placed on the anonymity of the questionnaire and the confidentiality of the information gathered. Due to the conditions created by the COVID-19 crisis, the researcher

provided the informed consent form and the questionnaire link via WhatsApp working groups. With the hospital manager's permission, the researcher obtained a list of medical staff, including their phone numbers, from the hospital recruitment department and contacted the staff directly. The researcher explained the purpose of the study to the staff and reassured them about the anonymity and confidentiality of their information. If participants had not received the questionnaire link, the researcher sent it through virtual networks.

A total of 395 participants were included in the study, but after collecting the questionnaires and excluding 13 faulty responses, the data from 382 medical staff were analyzed.

3.3. Instruments

The study instruments included a demographic information questionnaire, as well as sleep quality and health anxiety inventories. The Short Health Anxiety Inventory (SHAI) was used to measure health anxiety. Its long form was first developed by Salkovskis and Warwick (1989), based on the cognitive model of health and self-concept. The short form, used in this study, was developed by Salkovskis and Warwick in 2002 (29).

The SHAI focuses on two factors: General health concerns and disease outcomes, consistent with the factors found in Salkovskis and Warwick's 2002 research. The inventory consists of 18 items, each presenting four options that describe the individual's health and disease-related components. Respondents choose the statement that best reflects their characteristics. The scoring for each statement ranges from 0 to 3, with option A scoring 0, option B scoring 1, option C scoring 2, and option D scoring 3. A higher score indicates greater health anxiety.

Statements 1, 2, 3, 4, 7, 10, and 14 assess general health concerns, while statements 5, 6, 8, 9, 11, 12, 13, 15, 16, 17, and 18 assess disease outcomes. To calculate the total score, the scores for all items are summed, with a maximum score of 54. A score between 0 and 18 indicates a low level of health anxiety, between 18 and 36 denotes a moderate level, and above 36 indicates a high level of health anxiety (30).

To assess the construct validity of the anxiety questionnaire, confirmatory factor analysis was performed using Lisrel 8.8. The appropriateness indices of the health anxiety questionnaire, including GFI: 0.97, AGFI: 0.93, and CFI: 0.98, were found to be acceptable. The reliability of the questionnaire was calculated using Cronbach's alpha coefficient, which was obtained as 0.75. Additionally, test-retest reliability was reported as 0.9, and the Cronbach's alpha coefficient for this inventory ranged from 0.7 to 0.82 (29). In the present study, the Cronbach's alpha coefficient was 0.83, indicating an appropriate level of reliability.

In this research, the Pittsburgh Sleep Quality Index (PSQI) was used to assess the sleep quality of healthcare workers. This inventory evaluates individuals' perceptions of their sleep quality over the past four weeks. The PSQI includes seven components: (1) Overall sleep quality, (2) sleep latency, (3) sleep duration, (4) sleep efficiency (calculated as the ratio of time asleep to total time in bed), (5) sleep disturbances, such as night awakenings, (6) use of sleep medication, and (7) daytime dysfunction due to sleepiness. Each component is scored from 0 to 3 (31).

The scores of 0, 1, 2, and 3 for each component indicate normal status, mild, moderate, and severe problems, respectively. The sum of the seven component scores provides the total score, ranging from 0 to 21. A total score of 6 or more indicates poor sleep quality. The validity of this inventory was reported with a Cronbach's alpha coefficient of 0.83 (32). In the study by Alboghdadly et al., the internal consistency of the PSQI was reported with a Cronbach's alpha of 0.85 (28). The validity of the Persian version of the PSQI was evaluated based on internal consistency and factorial structure, yielding results of I-CVI=0.75 and S-CVI=0.90 (33). In the present study, the reliability of the PSQI was calculated using a Cronbach's alpha coefficient of 0.74, which is considered acceptable.

Data analysis was performed using SPSS 21, with descriptive statistical tests (frequency, mean, and standard deviation) and inferential tests, including Spearman's correlation coefficient.

3.4. Ethical Considerations

First, permission to enter the clinical setting was obtained from the Ethics Committee of Golestan University of Medical Sciences (IR.GOUMS.REC.1398.397). The research adhered to ethical principles, including informed consent, anonymity, confidentiality, and the participants' right to withdraw from the study at any time. Before conducting the interviews, the study's objective and the confidentiality of the participants' information were explained to them.

4. Results

The study reported that out of 382 participants, 77.2% were women, 65.4% were single, 60.7% were nurses, and 64.4% held a bachelor's degree (Table 1). The mean age of

the participants was 34.19 ± 9.01, with an average work experience of 8.53 ± 7.20 years.

Table 1. Demographic Characteristics of the Research Units

Variables	No. (%)
Gender	
Female	295 (295)
Male	87 (87)
Age	
Below 32 years	170 (170)
33 - 44	123 (123)
Above 45	89 (89)
Marital status	
Single	250 (250)
Married	132 (132)
Below 10 years	269 (269)
Work experience	
11 - 20 years	83 (83)
Above20 years	30 (30)
Education	
Bachelor degree	246 (246)
Master's degree	86 (22.5)
PhD degree	50 (13.1)
Profession	
Nurse	232 (60.7)
Physician	62 (16.2)
Paramedic	88 (23)

Analysis of the workers' health anxiety revealed a mean score of 15.62 ± 6.93. Overall, 28.8% of the workers experienced low levels of health anxiety, 69.9% had moderate levels, and 1.3% had high levels of health anxiety. In total, 72.7% of the healthcare workers experienced moderate to high levels of health anxiety.

In assessing the healthcare workers' sleep quality, the overall mean PSQI score across seven components was 7.93 ± 3.73. Additionally, 28.3% (n = 108) of the workers had good sleep quality, while 71.7% (n = 274) reported poor sleep quality.

The highest mean score among the sleep quality components was related to sleep efficiency (1.767 ± 1.113), and the lowest mean score was for sleep medication use (0.325 ± 0.794) (Table 2).

The results on sleep disorders indicated that 59.4% of participants reported moderate to severe sleep onset latency, 91.3% experienced mild to moderate night awakenings, and 62.1% had moderate to severe problems with sleep efficiency (Table 3).

The mean score for general health concern was 12.01 ± 4.06, the mean for disease infection was 8.58 ± 2.81, and the mean for disease outcome was 7.12 ± 3.66.

Furthermore, a significant correlation was found between sleep quality and demographic variables such as education level (r = 0.176, P = 0.001) and profession (r = 0.183, P = 0.0001) (Table 4).

Lastly, Spearman's correlation coefficient revealed a significant relationship between sleep quality and health anxiety (r = 0.129, P = 0.01).

5. Discussion

The widespread outbreak of COVID-19 across the globe resulted in numerous psychological outcomes. This research aimed to examine the correlation between health anxiety and the sleep quality of healthcare workers during the crisis.

The study findings revealed that more than half of the healthcare workers experienced poor sleep quality. Consistent with these results, reports on sleep disorders have been increasing among healthcare workers (34-36). Most participants had unfavorable sleep quality, including issues with sleep latency, inefficient sleep, and frequent night awakenings. In line with this, Franceschini et al. reported that more than 50% of their study population had poor sleep quality (23). Similarly, the research by Dai et al. indicated that over 70% of personnel suffered from insomnia during the COVID-19 pandemic (6).

Additionally, the present study found that most healthcare workers experienced moderate to high levels of health anxiety. These findings are consistent with the study by Mirzabeigi et al., which also reported high levels of anxiety and health anxiety among personnel working with COVID-19 patients (37). Furthermore, research conducted by Bagheri Sheykhangafshe et al. showed that the unknown emerging disease of COVID-19 led to health anxiety even in non-clinical students (38).

Sleep disorders, particularly insomnia, are often triggered by exposure to various stressors (39). In this study, a positive and significant correlation was found between sleep quality and health anxiety scores among healthcare workers. Many similar studies have reported a clear correlation between health anxiety and sleep disorders, indicating that health anxiety negatively impacts sleep quality. For example, the research conducted by Herrero San Martin et al. showed that healthcare staff were susceptible to various conditions, including sleep disorders, due to anxiety induced by COVID-19 (40). Kalmbach et al. also found that sleep disorders were linked to worsened anxiety symptoms (41).

A study involving 628 healthcare workers identified anxiety as one of the factors contributing to poor sleep

Table 2. Mean and Standard Deviation of the Seven Components of the Sleep Quality Questionnaire

No.	Component	Mean ± SD
1	The overall sleep quality	1.099 ± 0.829
2	Sleep latency	1.71 ± 1.057
3	Good sleep duration	0.98 ± 0.94
4	Sleep efficiency (calculated as the ratio of the time you are asleep to the total time in bed)	1.767 ± 1.113
5	Sleep disturbances, measured in case you suffer from night awakenings	1.225 ± 0.590
6	Sleep medication use	0.325 ± 0.794
7	Daytime dysfunction due to sleepiness	0.833 ± 0.511

Table 3. Frequency Distribution of the Seven Components Based on the Severity of Sleep Problems [a]

No.	Components	Poor Sleep Problem	Mild Sleep Problem	Moderate Sleep Problem	Severe Sleep Problem
1	The overall sleep quality	89 (23.3)	191 (50)	77 (20)	25 (6.5)
2	Sleep latency	64 (16.8)	98 (23.8)	117 (30.6)	110 (28.8)
3	Good sleep duration	146 (38.2)	131 (34.3)	96 (18)	36 (9.4)
4	Sleep efficiency (calculated as the ratio of the time you are asleep to the total time in bed)	73 (19.1)	72 (18.8)	108 (28.3)	129 (33.8)
5	Sleep disturbances, measured in case you suffer from night awakenings	27 (7.1)	248 (64.9)	101 (26.4)	6 (1.6)
6	Sleep medication use	316 (82.7)	25 (6.5)	22 (5.8)	19 (5)
7	Daytime dysfunction due to sleepiness	163 (42.7)	14 (36.6)	67 (17.5)	12 (3.1)

[a] Values are expressed as No. (%).

quality (27). The findings from Alboghdadly et al. also supported the results of the present study, noting a significant increase in anxiety and poor sleep quality among medical staff caring for COVID-19 patients (28).

In the current study, no correlation was found between gender or marital status and sleep quality or health anxiety scores. However, a study conducted by Lv et al. reported a significant correlation between sleep disorders and demographic factors such as age, gender, and marital status, indicating that young, single women experienced more sleep disorders due to a lack of support systems and limited experience (39). Patel et al.'s research also found a significant correlation between age and the severity of insomnia, noting that insomnia symptoms increase with age (42).

The results of a study by Krupa et al. similarly found a correlation between healthcare workers' age and insomnia (8). However, Alboghdadly et al. reported higher anxiety levels among women compared to men, while men exhibited poorer sleep quality than women (28).

In the present study, a clear association was observed between healthcare workers' age and their health anxiety scores, indicating that older individuals had lower health anxiety. In contrast, Talebi's research reported that older workers experienced more health anxiety (43). The findings of Alboghdadly et al. also differed from those of the current study, showing no difference in anxiety scores across different age groups (28).

The current study revealed an inverse correlation between higher levels of education and both sleep quality and health anxiety scores, possibly due to greater self-confidence among staff with higher education. Supporting this, Hui-ren et al. found that healthcare workers with more prestigious professional titles exhibited better sleep quality than those with lower job titles, which was attributed to their ability to maintain positive emotions under challenging working conditions, self-awareness, and higher professional expectations in the workplace (44).

The current research findings reported a significant correlation between nursing, health anxiety, and poor sleep quality. In line with our results, Babaei Nadinluei et al. also demonstrated that healthcare staff experienced more anxiety in health anxiety dimensions, including disease threshold and negative outcomes, compared to the general population (45). Regarding the sleep quality of healthcare workers, Kamkar et al.'s study revealed that those working in special and emergency

Table 4. Spearman's Correlation Coefficient and the Significance Level of Sleep Quality and Health Anxiety with Demographic Characteristics

Variables	Sleep Quality	Health Anxiety
Gender	r = -0.067; (P = 0.19)	r = -0.08; (P = 0.108)
Age	r = 0.075; (P = 0.143)	r = -0.159; (P = 0.002)
Marital status	r = 0.04; (P = 0.437)	r = 0.005; (P = 0.915)
Work experience	r = 0.078; (P = 0.127)	r = -0.153; (P = 0.003)
Education	r = 0.176; (P = 0.001)	r = -0.123; (P = 0.017)
Profession	r = 0.183; (P = 0.0001)	r = -0.122; (P = 0.017)

departments had unfavorable sleep quality (46). This finding suggests that critical and anxiety-inducing conditions, such as the COVID-19 pandemic, disturb the sleep quality of medical staff (39).

In the present study, no significant association was found between work history and sleep quality; however, a significant correlation was observed between health anxiety scores and the staff's work history. In contrast, Wang et al.'s study found that healthcare workers' sleep disorders were closely associated with work history and being on the front line during the COVID-19 pandemic (47). This indicates the potential for sleep disorders in new employees due to their limited preparation for coping with crises (47, 48).

This research had some limitations. Employing a cross-sectional design limits the ability to draw definitive conclusions about the causal relationships between the variables. It is suggested that future studies collect data over various time periods to minimize this limitation. Additionally, in this study, to prevent the spread of COVID-19, data collection was done electronically. Since the healthcare workers were evaluated remotely, individual differences among respondents may have affected their answers, and the electronic format limited the researcher's ability to monitor questionnaire completion. It is recommended that future studies use methods such as interviews to collect data. Moreover, factors such as laboratory results (e.g., cortisone levels), which can be affected by sleep disorders and health anxiety, were not investigated in this study. Future research should include laboratory analyses to explore these variables more comprehensively.

5.1. Conclusions

The current study aimed to explore the association between healthcare workers' health anxiety and sleep quality. The findings revealed that half of the medical staff experienced moderate to high levels of health anxiety, with a significant percentage suffering from poor sleep quality. The most prevalent sleep disorders were related to sleep onset latency, night awakenings, and overall disturbances in sleep quality. Moreover, the data analysis indicated a significant association between health anxiety and sleep quality, suggesting that medical workers, particularly those directly caring for patients during emerging disease crises, feel anxious about contracting such diseases, which negatively impacts their sleep. Therefore, healthcare managers and authorities must focus on addressing these psychological concerns and implement preventive measures to safeguard the mental well-being of healthcare workers.

Acknowledgements

The researchers would like to thank the Research Deputy of Golestan University of Medical Sciences, for cooperating in the process of registering the research project and for all the study participants in the study sincerely assisting the researchers in completing the questionnaires.

Footnotes

Authors' Contribution: Study concept and design: A. M., A. S., A. Z., and K. F.; Analysis and interpretation of data: A. Z. and A. M.; Drafting of the manuscript: A. Z. and A. M.; Critical revision of the manuscript for important intellectual content: A. Z., A. M., R. G., and A. S.; Statistical analysis: A. Z.

Conflict of Interests Statement: The authors declared no conflict of interests.

Data Availability: The dataset presented in the study is available on request from the corresponding author during submission or after publication.

Ethical Approval: Ethics Committee of Golestan University of Medical Sciences (IR.GOUMS.REC.1398.397).

Funding/Support: Research Deputy of Golestan University of Medical Sciences, cooperating in the process of registering the research project.

Informed Consent: Written informed consent was obtained from the participant.

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