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Investigating the Covid-19 pandemic psychological effects on health professionals

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Authors

Amir Reza Shalili[1]
Omran Ahmadi[*2]
Rasoul Aliannejad[3]

1. MSc of occupational health and safety engineering, Department of occupational health and safety engineering, faculty of medical science, university of Tarbiat Modarres, Tehran, Iran

2. Assistant professor, Department of occupational health and safety engineering, faculty of medical science, university of Tarbiat Modarres, Tehran, Iran

3. Pulmonary Department, Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran

***Corresponding author:**

Omran Ahmadi
Faculty of Medical Sciences, Tarbiat Modares Faculty,
E-mail: o.ahmadi@modares.ac.ir

ABSTRACT

Background and purpose: The covid-19 has severely affected the health care system in various countries, and a review of other similar epidemics has shown that frontline health care workers are at risk of infection as well as adverse physical and mental health outcomes. The purpose of this study is to investigate the psychological effects of the Covid-19 pandemic on indicators including sleep quality, fatigue, and job stress in health professionals.

Materials and methods: This research was conducted in a hospital, which was one of the centers for the care of patients with covid-19 in Tehran. 90 nurses from the special respiratory care department and 93 people from other professions participated in the study with personal consent. Multidimensional fatigue (MFI), occupational stress (HSE), sleep quality (Pittsburgh sleep quality) questionnaires were used to investigate the studied indicators, and statistical analysis was performed on the data using SPSS26 software.

Results: The results of this study show that the quality of sleep and occupational stress among nurses has significantly($p<005$) changed, so that the decrease in sleep quality and the increase of occupational stress among nurses is evident, in this study, the correlation between the demographic information of the population and the studied indicators has been investigated.

Conclusion: findings show that the medical staff suffered psychological injuries during the covid-19 pandemic, including increased job stress and reduced sleep quality, which can lead to a wide range of other psychological and functional disorders.

Keywords: Covid 19, sleep quality, job stress, multidimensional fatigue

INTRODUCTION

In December 2019, the Chinese city of Wuhan witnessed the hospitalization of unusual cases of patients with lung disorders caused by a new virus (1), and the spread of the virus (Covid-19) quickly became a global health threat (2). In the past 20 years, several viral diseases have been observed in the world, including the acute respiratory syndrome (SARS) in 2003, the influenza virus of the H1N1 variant in 2009, the Middle East respiratory syndrome (MERS) in 2012 and the virus Ebola in 2014 (3-5). Symptoms of the new corona virus infection (Covid-19) include fever, chills, cough, sore throat, digestive problems including nausea, vomiting and diarrhea. The statistics of hospitalized people show that most people weakly experience the disease, but people who have a history of respiratory diseases are likely to experience worse conditions. (6) Severe cases of the disease in people with background disease. Patients with background diseases can experiences heart and respiratory failure, acute

respiratory syndrome or even death (7). The Covid-19 pandemic has put a lot of pressure on the health care system in different countries (8). The investigation of the spread of previous similar viruses has shown that the health care workers (HCWs) on the front line are at risk of adverse physical and mental consequences in addition to infection disease (9). During the pandemic, health professionals are faced with more workload and various risks related to their physical and mental health, the virus can have many psychological effects in a short period of time (10). Health crises, including the epidemic disease, lead to psychological effects, not only in the professionals related to medicine and treatment, but also in ordinary citizens, and such changes can be caused by fear, anxiety, depression. or insecurity (11).

Studies conducted in China, the first country to be affected by this recent virus, show that people's fear of the unknown nature of the virus can lead to mental disorders. Due to the pathogenicity of the virus, the rate of spread, the high rate of death caused by virus, the epidemic (Covid-19) may affect the mental health of people in several layers of society, from patients and patients' families and especially health care workers, to It affects families, students, children, patients with mental illness and even workers in other departments (12-14,6).

There are reports in the articles that show that specialists on the front line of fighting the disease (Covid-19) and involved in the diagnosis and treatment of patients suffering from it, compared to people who do not work directly with this disease, are much more sensitive and are more vulnerable (15). Studies have showed that stress is significantly related to the sleep quality of nurses (16). Also, studies revealed the relationship between stress and fatigue and other related problems (17).

The aim of the current study is to investigate the psychological effects of the Covid-19 pandemic on the frontline specialists of the fight against Pandemic of covid-19.

MATERIALS AND METHODS

This research is an observational-cross-sectional case-control study. The research environment is a hospital in Tehran, and the research population consists of all nurses who have been in close contact with patients infected with COVID-19 during the pandemic period. Ultimately, 90 nurses were selected as the case group and 93 as the control group, adhering to the principles of the research ethics committee. The sampling method is simple random sampling (using a random number table) and continues until the desired sample size is reached. Informed consent was obtained from the nurses in the study group. Inclusion criteria for the study include a minimum of one year of work experience, no alcohol consumption, no use of psychotropic medications, and no psychological trauma in the past month.

Demographic characteristics of individuals were collected through questions including age, gender, educational level, marital status, employment status, duration of work experience, and average monthly income. The control group was also randomly selected under the same conditions as the case group, consisting of individuals who were not directly part of the frontline medical staff, and their demographic variables were also recorded.

In this study, three questionnaires were used to assess stress, sleep quality, and multidimensional fatigue in both case and control groups: the Health and Safety Executive (HSE) Job Stress Questionnaire, the Pittsburgh Sleep Quality Index (PSQI), and the Multidimensional Fatigue Inventory (MFI). In previous studies, all three questionnaires (HSE Job Stress Questionnaire, PSQI, and MFI) have demonstrated appropriate validity and reliability. In this study, efforts were made to better understand multidimensional fatigue by examining the scores of different fatigue dimensions separately and the total multidimensional fatigue scores separately.

The frequency statistics, mean, standard deviation, skewness, and kurtosis coefficients were applied in the data description analysis. In the inferential statistics section, independent t-tests, were conducted using SPSS26 statistical analysis software at significant level ($p< 0.05$) to discuss the findings based on the research data.

Pittsburgh Sleep Quality Index (PSQI):

This questionnaire was used to estimate the sleep quality of individuals and includes questions in seven domains: the individual's subjective estimation of sleep quality, duration of sleep, time taken to fall asleep, usual sleep efficiency, presence of sleep disturbances, use of sleeping pills, and level of dysfunction during the day. The research subjects rated these from 0 to 3, and the total score is from 0 to 21. The scores given are inverses of sleep quality; thus, higher scores represent poor sleep quality. The questionnaire designers explained that if the score is above 5, the person has poor sleep quality.

Health and Safety Executive (HSE) Job Stress Questionnaire:

This questionnaire comprises 35 questions in 7 domains, namely role, relationships, support from managers, peer support, control, demands and changes, with the respondents giving a 5-point Likert scale response. The scoring method is as follows: every statement should be rated on the Likert scale of 1 to 5, starting with never, rarely, sometimes, often, and always. Some questions are reverse-scored. A high score on this questionnaire means low and normal stress levels, while a low score means high stress. The grouping of individuals in terms of job stress is as follows: A total score of 50 to 99 is considered severe stress, 100 to 149 is moderate to severe, 150 to 199 is low to moderate, and 200 to 250 is low stress.

Multidimensional Fatigue Inventory (MFI):

This is a self-administered questionnaire on fatigue, and its validity and reliability are confirmed for English and other languages. This questionnaire is on the Likert scale. The responses given are quantized as 0, meaning "Yes, that is entirely true", to 5, meaning "No, that is not true at all", and the total score is determined. This questionnaire includes five different dimensions of fatigue: General Fatigue, Physical Fatigue, Mental Fatigue, Reduced motivation, Reduced activity. What should be noted is that there are four questions for each dimension, and the positive and negative forms of the orientation are included in the questions to avoid a respondent's bias. Therefore, each case can be assigned a score from 0 to 5 in each criterion of the model. Therefore, the magnitude of the score indicates the level of fatigue experienced by the subject. Thus, before moving on to the conclusion part of the work, there are some items that should be reversed. Each domain has an individual score that may vary from 4 to 20, and the total fatigue score, which depends on the sum of the scores in the domains, varies from 20 to 100.

RESULTS

90 nurses participated in this study as case group and 93 as control group. Their demographic information includes Age, Gender, Marital status, Education levels, Work experience and Average income, which is shown in Table 1.

Table1: Demoghraphic informations

Variable		Total Number	Percent
Gender	Female	123	67.2
	Male	60	32.8
Marital status	Single	120	65.6
	Married	63	34.4
Educational level	Diploma	12	6.6
	Bachlor	138	75.4
	Master	30	16.4
	Doctoral	3	1.6
Job	Other Job	93	50.8
	Nurses	90	49.2
Age (years)		30.08 ±7.39	
Work experience (years)		6.23 ± 6.63	
Salary (Millions of Toman per Month)		12.53 ± 9.21	

Due to the relationship between Job of the participants and study variables, there is significant ($p<005$) difference between nurses and participant with other job respondents in average variables of PSQI, Job stress, Physical Fatigue, General Fatigue and Act Reduced score, which is presented in Table 2.

Due to the relationship between the gender of the participants and study variables, there is significant($p<005$) difference between male and female respondents in average variables of PSQI, MFI, Mental Fatigue, General Fatigue and Motivation Reduced score, which is presented in Table 3.

Table2: Study variable according to job

Variable	Job	Number	Mean	T-score	Sig.
PSQI	Other job	93	6.00(±3.34)	- 3.14	0.002
	Nurses	90	7.77(±4.20)		
Job Stress	Other job	93	128.29(±19.02)	4.28	0.000
	Nurses	90	116.43(±18.39)		
MFI	Other job	93	49.19(±7.03)	-1.36	0.176
	Nurses	90	51.17(±11.90)		
physical Fatigue.	Other job	93	9.61(±1.70)	-3.38	0.001
	Nurses	90	10.93(±3.30)		
Mental Fatigue.	Other job	93	10.32(±2.03)	-0.9	0.365
	Nurses	90	10.72(±3.40)		
General Fatigue.	Other job	93	10.61(±1.63)	-3.73	0.000
	Nurses	90	12.23(±3.79)		
Motivation Reduced	Other job	93	9.29(±2.12)	0.993	0.322
	Nurses	90	8.91(±3.09)		
Act Reduced	Other job	93	9.38(±1.84)	2.70	0.008
	Nurses	90	8.40(±2.97)		

Table3: Comparison of research variables accoerding to gender

Variable .	Gender	Number	Mean	T-score	Sig.
PSQI	Female	123	7.34(±4.2)	2.735	0.007
	Male	60	5.90(±2.81)		
Job Stress	Female	123	121.39(±20.23)	-1.098	0.274
	Male	60	124.65(±18.15)		
MFI	Female	123	51.63(±10.12)	2.983	0.003
	Male	60	47.15(±8.23)		
physical Fatigue.	Female	123	10.43(±2.91)	1.414	0.159
	Male	60	9.90(±2.14)		
Mental Fatigue.	Female	123	10.95(±2.95)	3.154	0.002
	Male	60	9.60(±2.17)		
General Fatigue.	Female	123	11.80(±3.1)	2.583	0.011
	Male	60	10.61(±2.66)		
Motivation Reduced	Female	123	9.56(±2.90)	4.168	0.000
	Male	60	8.15(±1.66)		
Act Reduced	Female	123	8.85(±2.54)	- 0.371	0.711
	Male	60	9.03(±2.43)		

Table 4: Comparation of study variable and Marital status

Variable	Marital status	Number	Mean	T-score	Sig.
PSQI	Single	120	6.65(±3.64)	-1.05	0.29
	Married	63	7.28(±4.29)		
Job Stress	Single	120	126.87(±18.45)	4.42	0.000
	Married	63	114.05(±19.06)		
MFI	Single	120	48.85(±9.70)	-2.55	0.011
	Married	63	52.67(±9.42)		
physical Fatigue.	Single	120	9.97(±2.66)	-2.01	0.046
	Married	63	10.81(±2.69)		
Mental Fatigue.	Single	120	10.02(±2.79)	-3.32	0.001
	Married	63	11.43(±2.56)		
General Fatigue.	Single	120	11.20(±2.91)	-1.30	0.194
	Married	63	11.81 (±3.167)		
Motivation Reduced	Single	120	8.82(±2.65)	-1.95	0.053
	Married	63	9.62(±2.57)		
Act Reduced	Single	120	8.85(±2.64)	- 0.406	0.685
	Married	63	9.03(±2.22)		

Due to the relationship between Marital status of the participants and study variables, there is significant($p<005$) difference between single and married respondents in average variables of job stress, MFI, Mental Fatigue, physical Fatigue score, which is presented in Table 4.

DISCUSSION

As the COVID-19 pandemic continues to claim lives around the world, the virus is constantly mutating to produce new strains that increase the rate of transmission and the severity of the disease in some patients. This factor may contribute to increased public concern about the disease. Nevertheless, the COVID-19 pandemic has exerted severe negative psychological effects on the population, and these adverse effects appear to be several times greater among HCWs who are directly involved with patients in COVID-19-affiliated hospitals (12, 21).

In the context of the COVID-19 pandemic, HCWs, especially those who are in close contact with infected patients, are working more, thus facing numerous physical and psychological challenges. The virus can have a severe psychological impact on HCWs in a short period of time. Previous research has shown that frontline healthcare workers are 1. 3 to 2. 3 times more likely to experience pandemic-related psychological distress than other people (22, 23).

The participants in this study were 183 people: 90 nurses working in the respiratory intensive care unit for COVID-19 patients in a hospital in Tehran. Iran, and 93 people from other professions as a control group.

The results of this study showed that the mean PSQI score of the nurse's group was greater than that of the control group. This means that the psychological pressure exerted on healthcare workers during the COVID-19 pandemic caused sleep disorders in nurses, as supported by other researchers (21, 24-26). According to previous studies, the COVID-19 pandemic has had a negative impact on nurses' health, and one of the

identified consequences is the problem of sleep disorders, especially among the workers in intensive care units (26). Some of the factors that have been found to impact the quality of sleep that a nurse gets include the number of patients under their care (25), the work environment (21), and the level of trust between the nurse and the patient, and family support (25).Moreover, comparing the demographic data of the study participants and the scores obtained through the PSQI test also suggests that the probability of having a poor quality of sleep increase when one is female compared to being male. The findings also establish a highly significant difference in occupational stress between the nurse and control groups, where the nurses' occupational stress was evidently higher than that of the control group. These findings are in concordance with the previous studies done by other authors (23, 27, 28). Looking at the demographic data and the scores obtained in the HSE test, it can be concluded that marital status may be a factor that contributes to higher levels of occupational stress among married people compared to single people. This finding is in contrast to the study done by (29), in which the authors noted mixed effects. This difference could be due to the differences in the study sample, cultural and social differences. Some other studies have also shown that workload, lack of support and interpersonal conflict are some of the most important determinants of occupational stress (27). The Lazarus model defines stress as a state in which the demands placed on an individual exceed the physical and psychological resources available to the person. Nurses experienced significant limitations in personal protective equipment, high workloads, and no prior experience with a disease of the magnitude of the COVID-19 pandemic, which could lead to an imbalance between the demands and capacities of the work environment and stress (23, 28). Stress affects worker productivity and patient safety (23).

Based on the results of this study, it can be concluded that there is no statistically significant difference between the level of multidimensional fatigue in the sample of nurses and the control group. However, the results of the MFI test in terms of general fatigue, physical fatigue, and level of act reduced are quite different between the nurse group and the control group. Accordingly, the present study is consistent with the previous studies (23, 27, 30) but different from the later study (31). The difference can be attributed to the difference in the approach used to measure fatigue and the characteristics of the participating subjects. The current study shows that there is a difference in three of the five domains of the MFI test, such as physical fatigue, mental fatigue, and decreased activity, so further research is needed to determine the factors that cause stress in nurses. The results of the demographic data and MFI test scores indicate that marital status and gender can be considered potential factors influencing fatigue, as married people and females had higher mental and total fatigue levels than single people and males, respectively.

Some of the effects of stress include physical and mental fatigue, anxiety, and depression (32, 33). Inadequate rest (34) and especially shift work are also considered to be sources of fatigue, while exercise schedules are helpful in combating fatigue (35). Continuity of physical and mental fatigue can reduce the physical strength and concentration of HCWs in performing duties (36).

Study Limitations

This study was cross-sectional and conducted in only one central hospital in Tehran, Iran, during the COVID-19 outbreak; thus, participants were restricted. The research could be more suitable if it is conducted with a large number of participants.

The study was cross-sectional; hence, the sampling was done only at a given time without repeating the same. Still, a more extensive investigation could be made if the research was done longer and showed even more drastic impacts on the HCWs. The research instrument applied in this study was a questionnaire. Other approaches, such as interviews and other data collection methods, could help gather more expanded information.

CONCLUSION

The present study was designed and conducted to investigate some of the symptoms of

psychological effects of COVID-19 on the HCWs. The results of the present study indicate that job stress, sleep quality, physical and general fatigue and reduced act of HCWs working in hospitals are significantly changed to the general population; the HCWs experienced a decrease in sleep quality and an increase in job stress as well as increase general and physical fatigue. This indicates that the healthcare workers (HCWs) exposed to the workload of the COVID-19 pandemic are psychologically much more sensitive than ordinary people, The results of the statistical analysis within the present study regarding gender, work experience, education level, and average income on job stress, sleep quality, and multidimensional fatigue can be helpful for proper management of the psychological effects of COVID-19 on HCWs. Understanding which demographic factors are associated with the indicators studied will enable effective management of healthcare workers in relation to other pandemics and epidemics in addition to COVID-19, thus alleviating the psychological impact on healthcare workers.

DECLARATIONS

The authors would like to express their sincere gratitude to all participants of the present study. Ethics Committee of Tarbiat Modares University approved the study

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CONFLICT oF INTERESTS

The authors declare that there is no conflict of interest for this study.

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This study was approved by Student Research Committee of TMU.

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