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Examination of Covid-19 Related Fear and Sleep Disorders in Healthcare Personnel

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Abstract

Background: Sleep is one of the physiologic needs and life activities and affects the quality of life of the person. Today, it is assumed that COVID-19, a life-threatening pandemic, has severe effects on sleep. This study aims to evaluate the changing sleep patterns of healthcare professionals during a pandemic, to measure sleep levels, and to analyze the relationship between fear of COVID-19 and sleep levels. We hypothesize that as the level of fear of COVID-19 increases, sleep problems will increase.

Methods: A cross-sectional relational design was used. The research was conducted between February 10 and July 10 2021. The data were collected with the sociodemographic characteristics inquiry form, Pittsburgh Sleep Quality Index (PSQI) and COVID-19 Fear Scale assessment tools prepared by the researchers via an online platform.

Results: 121 health workers (age 30.76±7.25) participated in the study. While the total PSQI score of the participants in the survey was 8.22±3.91, the total score for fear of COVID-19 was 17.57±6.79. A significant relationship was found between fear of COVID-19 and sleep quality ($p<0.001$, $r=0.400$).

Applying Research to Occupational Health Practice: The results of this study can help healthcare providers understand the fear of COVID-19 and associated sleep disturbance factors in healthcare professionals and thus take a step towards improving healthcare professionals' working conditions during the pandemic.

Keywords: COVID-19; Fear of COVID-19; Health Professionals; Sleep Quality

Abbreviation: SD: Standard Deviation

Introduction

Applications to Professional Practice

Fear of COVID-19 and decreased sleep quality are related to each other in healthcare professionals. A total of 80.2% of 121 healthcare workers had sleep disorders. The findings of the study are essential for hospital administrators to organize shifts and improve the working conditions of healthcare workers in cases such as pandemics. The results of this study can enhance the ability of healthcare providers to understand the factors associated with their sleep quality and COVID-19 fear. Understanding the effects of the COVID-19 pandemic will enable healthcare professionals to improve their quality of life and the quality of care they provide.

Severe and unknown cases of pneumonia were reported in Wuhan, China, in December 2019. The novel coronavirus disease, popularly known as COVID-19 or SARS-CoV-2,

continued to spread rapidly on a global scale Ye, et al. In January 2020, The World Health Organization (WHO) designated it as a Public Health Emergency and then declared it a 'pandemic' on March 11 2020. Since the first case was officially detected, 219 million COVID-19-positive cases have been reported worldwide as of September 10, 2021, while the virus caused the death of 4.55 million people [1].

Considering the rapid and global spread of the virus, the lack of definitive treatment, the severity of the disease differing from person to person, and thousands of deaths every day during clinical treatment, all countries took many measures to slow down and control the spread of the disease simsir, et al. This includes spatial and social distancing and the mandatory wearing of face masks in public places while encouraging countries to prepare for the worst, causing multiple local and national quarantine precautions, the closure of all educational institutions and non-essential workplaces, nationwide curfews and travel restrictions. As a result of all these, the COVID-19 pandemic has negatively affected the mental and/or physical health of individuals by causing economic burdens and deterioration in individual well-being Duong [2,3].

COVID-19 affects life emotionally and physically in many ways. According to the life model of Robert, Logan and Tierney, sleep has an important place in terms of the integrity of the individual. The COVID-19 pandemic also has led to an increase in the workload and the daily stress of healthcare workers. Looking at the pandemics in the past, it was revealed that healthcare professionals had shown symptoms of post-traumatic stress disorder (PTSD) one year after the pandemic, which had psychological effects, and this had negative consequences for organizations. The extreme pressures healthcare professionals are exposed to during the pandemic increase the risk of burnout and have negative consequences not only for individual health but also for patient care and the healthcare system [4].

Studies reveal that a quarter of healthcare professionals working in the COVID-19 pandemic experience stress. Causes for their stress are fear about their physical health, having close friends infected with COVID-19, and disruptions in family relationships due to COVID-19 [5].

Looking at adverse circumstances, stress, anxiety and depression can be seen as normal emotional responses in the face of a pandemic. The influence of health in the world also brings psychological reflections. Studies on the psychological effects of COVID-19 are still in the early stages of development. Studies on the psychological effects of COVID-19 have shown increased anxiety, depression, and sleep disturbances. A study examining the psychological effects showed that healthcare workers in Wuhan, the first epicentre of COVID-19, experienced high levels of stress, fear, anxiety, depression and anger due to excessive work pressure, direct exposure to the disease, and risks [6].

The rapid change of this current situation and the perception of personally threatening situations, as in previous pandemics, created fear in some individuals during the COVID-19 pandemic [7]. It is essential to evaluate the fears that are the source of stress. Without knowing the level of fear about certain things among different groups according to certain sociodemographic variables (such as gender, age, education level, religiosity, ethnicity, etc.), it is difficult to know whether education and prevention programs are needed and which groups to target where [8].

Stress is known as the leading cause of sleep disorders in healthcare personnel. A study by Huang, et al. [9] reported a 23.6% increase in the prevalence of sleep disorders in healthcare personnel in COVID-19 clinics, which was higher than the prevalence of sleep disorders in other population groups [9].

Today, sleep disorders negatively affect the quality of life of many people, including health professionals around the world. Insomnia has significant adverse effects on a person's life. Sleep disorders are effective in increased mortality and morbidity [10]. On the other hand, quality sleep can improve the body's function and relieve fatigue. It maintains energy levels and ensures the continuity of psychological health. Due to the working conditions of nurses and health personnel, sleep disorders are frequently observed. Patients with sleep disorders are exposed to more anxiety and depression, which reduces productivity [6].

The aim of this study is to define the changing sleep quality of healthcare professionals during the pandemic, to measure their sleep levels, and to search for the relationship between fear of COVID-19 and sleep level, if any. Our hypothesis is that as the level of fear of COVID-19 increases, sleep problems will increase as well.

Methods

Work Design

- **Sample:** The research was conducted between February 10 and July 10 2021. The sample group consists of all (private or public) health workers who agreed to participate in the study.

Data Collection Tools

Demographic and Clinical Characteristics:

- **Data Collection Tools:** Data were collected with the sociodemographic characteristics inquiry form,

Pittsburgh Sleep Quality Index (PSQI) and COVID-19 Fear Scale assessment tools prepared by the researchers. In the sociodemographic characteristics inquiry form. The factors related to sleep and fatigue were included in addition to the age, gender, occupation, and type of work of the health worker.

COVID-19 Fear Scale: It was developed by Ahorsu, et al. to measure individuals' fear levels due to COVID-19. The items of the scale were created based on a comprehensive review of existing scales on fear, expert evaluations and participant interviews. The scale has a single-factor structure and consists of seven Likert-type (1 = Strongly disagree; 5 = Strongly agree) items. There is no reverse item in the scale. The internal consistency of the scale was 0.82, and the test-retest reliability was 0.72. The high score obtained from the scale indicates that the fear of COVID-19 is high [11].

Pittsburgh Sleep Quality Index=PSQI: PSQI (Pittsburgh Sleep Quality Index) is a scale that provides information on sleep quality and the type and severity of sleep disturbance in the past month. In the scale consisting of 24 questions in total, 19 questions are answered by the person, while five questions are answered by the person's bedmate. While the questions answered by the person are taken into consideration, the questions answered by the bedmate are not taken into consideration. With 19 questions answered by the individual, seven sub-dimensions are evaluated, including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping pills, and daytime dysfunction—each item in the scale scores between 0 (no distress) and 3 (severe distress). The sum of the scores of the seven sub-dimensions gives the total PSQI score. The score of each sub dimension varies between 0 and 3. The total PSQI score ranges from 0 to 21. Sleep quality of people with a total score of 5 or less is categorized as "good". The Turkish validity and reliability study of the scale was performed by Agargun et al. [12] and the internal consistency coefficient was reported as 0.80 [13]. Ağargün, et al. During the data collection phase, the healthcare professionals were informed by using the online Google form.

Statistical Analysis

Data were analyzed with SPSS, Version 26.0 for Windows (IBM Corp). Demographic characteristics were analyzed using descriptive statistics. Pearson correlation analysis was used to evaluate the relationship between groups. Kruskal Wallis test was used to determine the difference between occupation and age groups, and the Mann-Whitney U test was used to determine the difference between gender and shift groups. The statistical significance value was accepted as $p<0.05$.

Results

Demographic and Clinical Characteristics

Individuals (N=121) who accepted to participate in the study were grouped 5 years apart according to WHO standards [14]. Of the 121 participants, 21 were 20-24, 46 were 25-29, 22 were 30-34, 10 were 35-39, 16 were 40-44, 3 were 45-49, and 3 were 50-55 years old. The age range of the participants was 22-55, and the average age was 30.76 ± 7.25.

Ninety-four of the participants were female (77.7%) and 27 were male (22.3%). When the education level is examined, it is seen that 5 of them have High School (4.1%), 6 of them have College (5.0%), 68 of them have Undergraduate (56.2%), and 42 of them have Postgraduate level (34.7%) education. When the working shifts were questioned, it was determined that 48 (39.7%) worked at night and 73 (60.3%) worked during the day (Table 1).

	N (%)	Mean ± SD	Range
Age		30.76 ± 7.25	22-55
20-24	21 (17.4)		
25-29	46 (38)		
30-34	22 (18.2)		
35-39	10 (8.3)		
40-44	16 (13.2)		
45-49	3 (2.5)		
50-55	3 (2.5)		
Total	121		
Gender			
Female	94 (77.7)		
Male	27 (22.3)		
Education Level			
Highschool	5 (4.1)		
College	6 (5.0)		
Undergraduate	68 (56.2)		
Postgraduate	42 (34.7)		
Shift Work			
Night	48 (39.7)		
Day	73 60.3)		

Table 1: Demographic and clinical characteristics (N = 121).

Covid-19 Fear and Sleep Quality Levels (N=121)

A moderate positive correlation was found between the participants' COVI9-19 Fear Scale scores and their PSQI scores (p<0.001, r=0.400) (Table 2).

	Mean ± SD	1	2
COVID-19 Fear Scale Score	17.57±6.79	1	
PSQI Score	8.22±3.91	r: 0.400 p=.000**	1

Source: X = means; r = Pearson's correlation analysis; p = significance level.
Table 2: COVID-19 Fear and Sleep Quality Levels and Their Correlation.

Investigation of Covid-19 Fear and PSQI Score between Age and Occupational Groups

When the COVID-19 Fear Scale score and the PSQI score between age groups were examined, a significant difference was found between the groups for both scale scores (p<0.05). When the paired groups were concerned, it was determined that this difference was between the 20-24 age group and the 24-29 age group (p<0.006, Bonferonni correction).

When the COVID-19 Fear Scale score and PSQI score were examined among occupational groups, no significant difference was found between age groups for both scale scores (p>0.05) (Table 3).

	COVID-19 Fear Scale Score				PSQI Score	
	Group	n	X±SD	p	X±SD	p
Age	20-24	21	22.33±8.20	0.003*	11.14±5.01	0.004*
	25-29	46	16.3±5.52		7.69±3.33	
	30-55	54	16.81±6.49		7.53±3.4	
Occupation	Nurse	88	17±6.48	0.125	8.65±4.28	0.153
	Physician	23	18.27±6.95		7.26±2.41	
	Other	10	14.91±6		6.60±2.22	

Source: Kruskal Wallis Test, Bonferonni Correction, SD: Standard Deviation, X: Mean *: p<0.05.
Table 3: COVID-19 Fear and Sleep Quality Levels in Age and Occupation Groups.

Investigation of Covid-19 Fear and PSQI Score between Gender and Shift Groups

When the COVID-19 Fear Scale score and the PSQI score were examined between the genders, a significant difference was found for the COVID-19 Fear Scale score (p<0.05). There was no significant difference between the genders for the PSQI score (p>0.05).

When the type of shift was examined, a significant difference was found between night and day workers in terms of PSQI score (p<0.05). No significant difference was found for the COVID-19 Fear Scale score (p>0.05) (Table 4).

	COVID-19 Fear Scale Score				PSQI Score	
	Group	n	X±SD	p	X±SD	p
Gender	Female	94	17.60±6.04	0.02*	8.11±3.39	0.856
	Male	27	15.48±7.81		8.59±5.4	
Shift	Night	48	18.45±7.21	0.259	9.6±4.5	0.002*
	Day	73	17±6.48		7.31±3.18	

Source: Mann-Whitney U Test, SD: Standard Deviation, X: Mean *: p<0,05.
Table 4: COVID-19 Fear and Sleep Quality Levels in Gender and Shift Groups

Investigation of the Relationship between the COVID-19 Fear Scale and the Pittsburgh Sleep Quality Index Score

When the correlations were examined, a low level of positive correlation was found with the COVID-19 Fear Scale score and the PSQI Component 1, 4 and 7 scores (p<0.001). A moderate positive correlation was found between the COVID-19 Fear Scale score and the PSQI Component 2 and Component 5 scores (p<0.001) (Table 5).

	CFS Score	1	2	3	4	5	6	7
CFS Score	1							
PSQI Component 1	.260**	1						
Sleep Quality	0.004							
PSQI Component 2	.402**	.538**	1					
Sleep Latency	0	0						
PSQI Component 3	0.104	.382**	0.113	1				
Sleep Duration	0.258	0	0.216					
PSQI Component 4	.267**	.232*	0.167	.284**	1			
Habitual sleep efficiency	0.003	0.01	0.067	0.002				
PSQI Component 5	.435**	.452**	.491**	0.164	0.154	1		
Sleep Disturbance	0	0	0	0.071	0.092			
PSQI Component 6	0.085	.280**	.308**	.242**	0.161	0.172	1	
Use of Sleeping Pills	0.355	0.002	0.001	0.008	0.078	0.06		
PSQI Component 7	.250**	.496**	.345**	.356**	.183*	.183*	0.14	1
Daytime Dysfunction	0.006	0	0	0	0.044	0.044	0.14	

Source: Pearson Correlation Analysis, *: p<0.05 , **: p<0.001 , r: Correlation Coefficient.
Table 5: COVID-19 Fear and PSQI Subdomain Score Correlations.

Discussion

A healthy sleep has a significant impact on human performance. Sleep disturbance can cause fatigue, drowsiness and loss of appetite. On the other hand, this disorder reduces concentration and can cause workplace accidents and errors [15]. COVID-19 has negative effects on public and individual health in many different topics, such as anxiety, depression and unemployment and may lead to fear and sleep disorders. Health workers, who are at the forefront of the fight against the COVID-19 pandemic, are greatly affected by these problems [16]. It has been stated in various studies that healthcare professionals dealing with COVID-19 patients experience sleep disorders. As observed in studies, the effect of COVID-19 on sleep quality can be determined as a negative indicator on mental health. In our study, when we look at the sleep quality of 121 people, including nurses, physicians and other health workers, who are faced with COVID-19 patients, 70 of the nurses (79.5%) and 20 of physicians (87%) had bad sleep quality. The results of our analysis showed that the prevalence of sleep quality in physicians was worse than that of nurses and other healthcare professionals. This situation differs from some other studies. In the studies conducted by Zhang, et al. [17] and Lai JB, et al. [18], it was revealed that nurses have more sleep problems than physicians and other health workers [17,18].

On the other hand, some studies reveal that physicians have more sleep problems than nurses and other health workers. This difference could be that nurses constitute the majority of the samples [19]. During the prolonged COVID-19 pandemic, healthcare workers are exposed to factors such as longer shifts, high risk of infection and, in some cases, lack of medical supplies. These difficulties increase psychological trauma and anxiety. Previous studies have shown that exposure to additional work shifts and unusual work schedules causes sleep disorders [20].

In our study, a significant difference was found in the PSQI score according to the shift working system (p<0.05). While the sleep quality score average of the health workers who work at night was 9.60 (poor), the average of those who worked during the day was 7.28. Considering the sleep quality of health personnel working only at night, it was seen that 7 (14.6%) slept well and 41 (85.4%) slept poorly. Looking at the studies in line with the literature, it has been stated that working at night affects the sleep quality of health workers. In a study conducted by Dai, et al. [20] in which the effects of night shift and day shift groups on sleep quality and depression were compared, it was shown that night shift nurses had a lower sleep quality compared to day shift nurses [20]. In addition, night shift nurses showed more intense depressive symptoms because of poor sleep quality. In another study, when the relationship between poor sleep quality and psychomotor functions was examined, it was stated that nurses working in shifts were at risk of low sleep quality. Low sleep quality was observed in 54.6% of the shift nurses participating in the study [22]. The findings of this study are important especially in terms of raising awareness

of hospital administrators about arranging the shifts of health workers in disaster situations such as pandemics, improving working conditions and environments, and supporting employees.

Another category in which sleep quality varies is different age groups. Despite studies indicating that sleep quality changes significantly by ageing and young people have worse sleep quality than the elderly [23]; there are also studies showing that people have worse sleep quality as they get older [24].

Anxiety, stress and other mental health problems can reduce sleep quality in healthcare professionals. In a study by Abdulah, et al. [25], it was stated that the prevalence of sleep disorders in Iraqi physicians exposed to COVID-19 was 68.3%, while a similar study was conducted in the same region a year ago, in 2019, and the prevalence was reported as 45.5% [25].

Fear is evaluated as a reaction when we encounter an unknown situation, many unknown processes in the COVID-19 pandemic can cause a feeling of fear in many dimensions in healthcare workers. In our study, a significant difference was found between the genders in the ($p<0,05$). Women scored an average of 18.18 ± 6.38, while men scored 15.48 ± 7.81. The findings show that women have a higher fear score. The studies of Broche Pérez, et al. [26] also mentioned that the mothers who undertake the majority of the care of children, the closure of nurseries and schools and the increase in the care needs of children cause an increase in women's fear of COVID-19 [26], Alsharawy, et al. [27] states that female participants score high on the COVID-19 fear score because women process and express emotional experiences such as fear more intensely than men [27]. However, it may be thought that this gender difference in our study is due to the high number of female participants.

In our study, no significant difference was found between the shift work system and the fear of COVID-19, however, in the article of García Reyna, et al. [28], it was stated that nurses are the most frightened group among all healthcare workers, and it was found that the shift work system had no effect on the fear of COVID-19 [28]. In our study, this result may be due to the limited sample size.

In our study, no significant difference was found in the fear score between occupational groups. As stated in the study of García Reyna, et al. [28], the fear of COVID-19 was found to be higher in the nursing profession group than in other healthcare professionals [28]. In our study, nurses constituted the vast majority (n:88). Nurses are known as the largest group of health workers. It can be thought that this result is due to this heterogeneous distribution.

Anxiety, depression, aggression, burnout and substance use are the most common physical and mental problems in this group. When the data of the nurse group were analyzed separately in our study, the mean score of the COVID-19 Fear Scale was found to be 18.27±6.95. Considering the results of the analysis, it is seen that the prevalence of sleep disorders among nurses and physicians decreases as the sample size increases [6].

In our study, a moderate positive correlation was found between the Sleep Latency subcomponent score and the COVID-19 Fear Scale Score ($p<0.05$, $r=0.402$). As sleep latency is associated with the duration of falling asleep, it can be inferred from our research that individuals with high fear of COVID-19 have more difficulty falling asleep. Demir [29] states that fear of COVID-19 and thoughts about COVID-19 make it difficult to fall asleep [29]. Parallel to this finding, in our study, a significant relationship was found between the time to fall asleep and the fear of COVID-19, and it was revealed that the sleep disorder symptoms of individuals with high COVID-19 fear levels increased.

Looking at the whole study, it was revealed that there is a positive moderate relationship between the COVID-19 Fear Scale score and the PSQI score. Korkmaz, et al. [30] and Jahrami, et al. [31] also supported our findings, revealing that fear of COVID-19 causes low sleep quality and poor sleep [30,31].

COVID-19 is considered as a crisis; crisis management can be considered as part of the competencies of health personnel, but unfortunately it is not always possible to manage and avoid from the psychological effects of the disease. Failure to provide the necessary care equipment will result in a sense of 'lack of appropriate support' among healthcare workers. All of this can ultimately result in frustration and powerlessness among healthcare professionals. This results in fear and sleep disorders. Studies have shown that fear and sleep disorders cause fatigue and cognitive problems in healthcare workers, cause mood changes, low job performance and low motivation, increase safety risks and are associated with physiological changes. In addition, studies have shown that when health workers do not get enough sleep, they endanger both themselves and patient safety. Disorders of hand-eye coordination and decision-making have been observed in people with sleep disorders. In addition to all these, a separate risk arises for nurses who may have to drive drowsy [32]. The tension created by the negative mental state that COVID-19 causes anxiety, stress and fear in healthcare professionals, and the high amount of job performance expected from healthcare professionals during the pandemic causes dissatisfaction by patients and feeling inadequate by healthcare professionals [33-35].

Limitations

Research studies that did not specify the prevalence of sleep disorders (individually according to the personnel profession/role) in healthcare workers were also excluded from this study. Clinical examination of the samples was not possible due to the use of self-report tools, as well as online sampling and completion of questionnaires.

Conclusion

As a result of our study, it has been determined that nurses have more sleep problems than other healthcare professionals, the shift work system causes sleep disorders, and the sleep quality decreases as the age difference increases. Looking at the whole study, it was revealed that there is a positive moderate relationship between the COVID-19 Fear Scale score and the PUKI score.

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Conflict of Interest

There is no conflict of interest in this research.

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References

1. (2022) World Health Organisation: Geneva.
2. Amerio A, Bianchi D, Santi F, Costantini L, Odone A, et al. (2020) Covid-19 pandemic impact on mental health: A web-based cross-sectional survey on a sample of Italian general practitioners. Acta Biomed 91(2): 83-88.
3. Lipsitch M, Swerdlow DL, Finelli L (2020) Defining the Epidemiology of Covid-19. N Engl J Med Internet 382(13): 1194-1196.
4. Blake H, Bermingham F, Johnson G, Tabner A (2020) Mitigating the psychological impact of covid-19 on healthcare workers: A digital learning package. Int J Environ Res Public Health 17(9): 1-15.
5. Dong ZQ, Ma J, Hao YN, Shen XL, Liu F, et al. (2020) The social psychological impact of the COVID-19 pandemic on medical staff in China: A cross-sectional study. Eur Psychiatry 63(1): e65.
6. Salari N, Khazaie H, Hosseinian Far A, Ghasemi H, Mohammadi M, et al. (2020) The prevalence of sleep disturbances among physicians and nurses facing the COVID-19 patients: A systematic review and meta-analysis. Globalization and Health 16: 92.
7. Rodríguez Hidalgo AJ, Pantaleon Y, Dios I, Falla D (2020) Fear of COVID-19, stress, and anxiety in university undergraduate students: a predictive model for depression. Frontiers in Psychology 11(591797): 1-9.
8. Pakpour AH, Griffiths MD (2020) The fear of COVID-19 and its role in preventive behaviors. J Concurr Disord 2(1): 58-63.
9. Huang Y, Zhao N (2020) Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. Psychiatry Res 288(112954).
10. Kousloglou SA, Mouzas OD, Bonotis K, Roupa Z, Vasilopoulos A, et al. (2014) Insomnia and burnout in Greek Nurses. Hippokratia 18(2): 150-155.
11. Ladikli N, Bahadır E, Yumuşak FN, Akkuzu H, Karaman G, et al. (2020) Turkish reliability and validity study of the Covid-19 Fear Scale. Int J Soc Sci 3(2): 71-80.
12. Agargun MY, Kara H, Anlar O The validity and reliability of the Pittsburgh Sleep Quality Index.
13. Saygılı S, Cil Akıncı A, Arıkan H, Dereli E (2011) Sleep quality and fatigue in university students. Ejovoc Electronic J Vocat Coll 1(1): 88-94.
14. Ahmad OB, Boschi Pinto C, Lopez AD, Murray CJL, Lozano R, et al. (2001) Age standardization of rates: a new WHO standard. Geneva World Heal Organ 9(10): 1-14.
15. Zdanowicz T, Turowski K, Celej Szuster J, Lorencowicz R, Przychodzka E (2020) Insomnia, Sleepiness, and Fatigue Among Polish Nurses. Work Heal Saf 68(6): 272-278.
16. Stewart NH, Koza A, Dhaon S, Shoushtari C, Martinez M, et al. (2021) Sleep Disturbances in Frontline Health Care Workers during the COVID-19 Pandemic: Social Media Survey Study. J Med Internet Res Internet 23(5): e27331.
17. Zhang C, Yang L, Liu S, Ma S, Wang Y, et al. (2020) Survey of Insomnia and Related Social Psychological Factors Among Medical Staff Involved in the 2019 Novel Coronavirus Disease Outbreak. Front Psychiatry 11: 306.
18. Lai J, Ma S, Wang Y, Cai Z, Hu J, et al. (2020) Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Netw Open 3(3): e203976.
19. Wang S, Xie L, Xu Y, Yu S, Yao B, et al. (2020) Sleep

disturbances among medical workers during the outbreak of COVID-2019. Occup Med (Lond) 70(5): 364-369.

20. Yayla A, Eskici İlgin V (2021) The relationship of nurses' psychological well-being with their coronaphobia and work–life balance during the COVID-19 pandemic: A cross-sectional study. J Clin Nurs 30(21–22): 3153–3162.

21. Dai C, Qiu H, Huang Q, Hu P, Hong X, et al. (2019) The effect of night shift on sleep quality and depressive symptoms among Chinese nurses. Neuropsychiatr Dis Treat 15: 435-440.

22. Di Muzio M, Diella G, Di Simone E, Novelli L, Alfonsi V, et al. (2020) Nurses and Night Shifts: Poor Sleep Quality Exacerbates Psychomotor Performance. Front Neurosci 14: 579938.

23. Gadie A, Shafto M, Leng Y, Kievit RA, Cam CAN (2017) How are age-related differences in sleep quality associated with health outcomes? An epidemiological investigation in a UK cohort of 2406 adults. BMJ Open 7(7): e014920.

24. Madrid Valero JJ, Martínez Selva JM, Ribeiro do Couto B, Sanchez Romera JF, Ordonana JR (2017) Age and gender effects on the prevalence of poor sleep quality in the adult population. Gac Sanit 31(1): 18-22.

25. Abdulah DM, Musa DH (2020) Insomnia and stress of physicians during COVID-19 outbreak. Sleep Med X Internet 2: 100017.

26. Broche Perez Y, Fernandez Fleites Z, Jimenez Puig E, Fernandez Castillo E, Rodriguez Martin BC (2022) Gender and Fear of COVID-19 in a Cuban Population Sample. Int J Ment Health Addict 20(1): 83-91.

27. Alsharawy A, Spoon R, Smith A, Ball S (2021) Gender Differences in Fear and Risk Perception During the COVID-19 Pandemic. Front Psychol 12: 689467.

28. Garcia Reyna B, Castillo Garcia GD, Barbosa Camacho FJ, Cervantes Cardona GA, Cervantes Perez E, et al. (2022) Fear of COVID-19 Scale for Hospital Staff in Regional Hospitals in Mexico: a Brief Report. Int J Ment Health Addict 20(2): 895-906.

29. Demir UF (2020) The effect of COVID-19 pandemic on sleeping status. J Surg Med 4(5): 334-339.

30. Korkmaz S, Kazgan A, Cekic S, Tartar AS, Balcı HN, et al. (2020) The anxiety levels, quality of sleep and life and problem-solving skills in healthcare workers employed in COVID-19 services. J Clin Neurosci 80: 131-136.

31. Jahrami H, BaHammam AS, AlGahtani H, Ebrahim A, Faris MAI, et al. (2021) The examination of sleep quality for frontline healthcare workers during the outbreak of COVID-19. Sleep Breath 25(1): 503-511.

32. Rogers AE (2008) The Effects of Fatigue and Sleepiness on Nurse Performance and Patient Safety. Patient Saf Qual An Evidence-Based Handb Nurses Internet.

33. Alnazly E, Khraisat OM, Al Bashaireh AM, Bryant CL (2021) Anxiety, depression, stress, fear and social support during COVID-19 pandemic among Jordanian healthcare workers. PLoS One Internet 16(3): e0247679.

34. (2019) World Health Organization: Geneva.

35. (2020) World Health Organisation: Geneva.