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The effect of Covid-19 on sleep quality, anxiety and depression on healthcare staff at a tertiary hospital in Turkey

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ABSTRACT

Background: The Covid-19 pandemic has forced healthcare staff into an unprecedented situation, such as making tough decisions and practising under enormous pressure.
Aim: This study was designed to investigate the effect of Covid-19 on sleep quality, anxiety and depression in healthcare staff at a tertiary hospital.
Methods: This descriptive and cross-sectional study recruited healthcare staff working at a tertiary hospital. Those who had given their informed consent participated in this study between April 17 and May 17, 2020. Data were collected using the introductory information form, the Pittsburg Sleep Quality Index (PSQI), and the Hospital Anxiety Depression Scale (HADS). The data were then analyzed on the Statistical Package for the Social Sciences (SPSS) v.24.
Results: The mean scores of the respondents derived from the HADS-Anxiety (HADS-A) and HADS-Depression (HADS-D) scales were 7.89 ± 4.60 and 7.22 ± 4.13, respectively. Their depression levels were established to be at risk, though their anxiety levels were not. The mean PSQI score turned out to be 8.42 ± 2.30 for the participants, most of whom (92.9%) experienced poor sleep quality. Total sleep quality of the respondents exhibited a moderate positive correlation with HADS-A scores and a weak positive correlation with HADS-D scores ($p < 0.05$).
Conclusion: Our major conclusion from the collected data is that healthcare staff suffered from poor sleep quality, and that their depression levels, but not anxiety levels, were at risk. Providing appropriate information about the health care of patients diagnosed with Covid-19 as well as offering regular psychoeducation-psychological support services and resting areas can reduce the susceptibility of healthcare staff to anxiety and depression and improve their overall sleep quality.

Introduction

The first Covid-19 case in Turkey was detected on March 11, 2020. From the beginning of the outbreak until May 19, 2021, the total number of cases in Turkey reached 5,151,038, and the aggregate number of Covid-19-induced deaths corresponded to 45,419 (T.C. Sağlık Bakanlığı Covid-19 Bilgilendirme Platformu, 2021). As of March 17, all the activities of schools, theaters, cinemas, restaurants, coffee shops, internet cafes, indoor children's playgrounds, barbers, and hairdressers have been suspended in Turkey (Enli Tuncay, Koyuncu, & Özel, 2020). This extraordinary situation emerging in Turkey and across the world has adversely affected people from all walks of life. During the Covid-19 outbreak, the healthcare staff has assumed the biggest task in combating the disease in Turkey, as in the whole world, since the disease broke out and the first case was detected (Şenol Çelik et al., 2021).

During the Covid-19 pandemic, although the effects primarily addressed and controlled are physical problems (i.e. shortness of breath, impaired taste-smell, cough), its psychosocial strain (i.e. fear of death, intolerance to uncertainty, helplessness, despair, depression, post-traumatic stress disorder) on individuals is also undeniable (Huang, Han, Luo, Ren, & Zhou, 2020; Lai et al., 2020). This global outbreak has ultimately grown into a trauma that is distressing and life-threatening

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for large segments of the world population. These traumatic effects may vary based on persons' cultural and individual characteristics, socio-economic status, and psychological background. Uncertainty and fear of transmission as well as negative considerations regarding infection of themselves or family members, and unsanitary surroundings may be sources of intense anxiety (Türkiye Psikiyatri Derneği Ruhsal Travma ve Afet Çalışma Birimi, 2020). Anxiety refers to a disturbing emotion that may be experienced in certain periods of life, accompanied by physiological symptoms, and perceived as life-threatening or simply threatening (Öztürk & Uluşahin, 2018; Zigmond & Snaith, 1983). During this outbreak, not only society and infected individuals but also healthcare staff are physically and psychosocially affected by this process, both because they are members of the society and work in the frontline at grave risk (Puradollah & Ghasempour, 2020; Santarone, McKenney, & Elkbuli, 2020).

In the face of such a critical situation, frontline healthcare staff who directly deal with the diagnosis, treatment, and care of patients with Covid-19 are in jeopardy with respect to severe anxiety and mental health problems. The escalating number of suspected and confirmed cases, workload, exhaustion of personal protective equipment, absence of particular drugs, discrimination, and fear of infecting family members may be accompanied by psychosocial problems among healthcare staff in Turkey (Kang et al., 2020). Some published research reveals that healthcare staff developed negative psychological reactions to 2003 SARS pandemic (Chua et al., 2004; Maunder et al., 2003). For instance, healthcare staff dealing with these patients are anxious about transmitting the disease to their family members, acquaintances, and co-workers (Bai et al., 2004; Maunder et al., 2003). In addition, caring for Covid-19 patients may evoke feelings of uncertainty and stigmatization on them, leading them to work unwillingly, think about resignation, and suffer from considerable degree of stress, insomnia, anxiety and depression which might create long-run psychological impacts (Lai et al., 2020).

A systematic review which documents pooled prevalence rates of insomnia, anxiety, and depression among health care staff by synthesizing 13 reports published since April 17, 2020 reveals that more than one in five health care staff experienced anxiety and depression, while almost two in five suffered from insomnia (Pappa et al., 2020). One report issued by World Health Organization (WHO) advises healthcare staff against feeling under pressure and stress (WHO, Mental health and psychosocial considerations during the COVID-19 outbreak, 2020a). Another WHO report likewise warns authorities against the likely escalation of depression among health care staff (WHO, Mental health and COVID-19, 2020b). Depression denotes a state of feeling unhappy, dreary, and hopeless, having thoughts of inadequacy and worthlessness, exhibiting self-harming behaviors, isolating oneself from society, withdrawing into oneself, and being unable to enjoy anything as well as deterioration of appetite, sleep patterns, and sleep quality (Öztürk & Uluşahin, 2018; Zigmond & Snaith, 1983). Sleep quality refers to a feeling of being fit, energetic, and ready for the new day after waking up. Sleep quality includes not only quantitative aspects of sleep such as sleep latency, sleep duration and number of awakenings per night but also subjective aspects, such as the depth and refreshing state of sleep. In addition, anxiety and depressive mood may also act on the sleep quality of individuals (Buysse et al., 1989).

The Covid-19 pandemic has forced healthcare staff into an unprecedented situation, such as making tough decisions and practising under enormous pressure. These difficult decisions may include scenarios, such as how to allocate insufficient resources to patients, how to strike a balance between their own psychological as well as physical health and the needs of the patient, and how to arrange their responsibilities to their patients and their families. The process of taking these decisions might adversely affect their psychological well-being (Greenberg, Docherty, Gnanapragasam, & Wessely, 2020).

Our report tries to provide an insight into the impact of Covid-19 outbreak upon depression, anxiety, and sleep quality of the frontline healthcare staff. We believe that the obtained results will be guiding in assessing the burden of mental health of healthcare staff based at a tertiary hospital located in a Turkey city and thus seeking appropriate ways to assist the staff psychologically. Moreover, this study can shed light on improving the current working conditions of healthcare staff and make concrete contributions to the relevant literature. Within this framework, this study seeks to obtain data which will help to address the effect of Covid-19 on sleep quality, anxiety and depression in healthcare staff at a tertiary hospital in Turkey.

Research questions

1. What are the sleep quality, anxiety and depression states of healthcare staff in a tertiary hospital?
2. What are the sleep quality, anxiety and depression states of healthcare staff in a tertiary hospital in relation to their descriptive characteristics?
3. Is there an association between depression, anxiety states and sleep quality of healthcare staff in a tertiary hospital?

Methods

Study design

This descriptive and cross-sectional study was carried out on 1729 healthcare staff members based at XXXXXX University Health Research and Application Center, XXXXX, XXXX. No specific sample selection was performed in the study, instead the eligible $n = 435$ (25%) participants who agreed to enroll in the study for 1 month were included after the approval was granted by the ethics committee. The inclusion criteria encompassed working as a member of the healthcare staff (staff-cleaning staff, nurse, doctor, office staff, paramedic, medical secretary) at the above-mentioned healthcare facility and volunteering to participate in the research. On the other hand, our exclusion criteria included the healthcare staff who were on a leave of absence, took sick leave, and did not agree to participate in the study during the period (1 month) of the study. At the time of the research, 110 individuals were on a leave of absence, and 125 took sick leave. 257 individuals could not be included in the analysis due to missing data in the data collection forms, while 802 members of the healthcare staff refused to participate in the study. The research was conducted between April 17 and May 17, 2020 at the above-mentioned tertiary hospital which also served as a pandemic hospital. In terms of working routine of the hospital, the regular clinics continued their daily working order, while a pandemic clinic was also constructed and healthcare staff worked there in rotation. The working schedule of the hospital in question was arranged as two shifts (8 a.m. to 4 p.m. and 4 p.m. to 8 a.m.) in all outpatient clinics, including the pandemic clinic. The average number of patients in the outpatient clinics ranges between 23 and 25. Besides, 5 nurses, 3 doctors, 1 medical secretary, 2 cleaning and care staff members, on average, work at the outpatient clinics during the day shift, yet each of these numbers is halved during the night shift.

Data collection

The introductory information form developed by the researchers, the Pittsburg Sleep Quality Index (PSQI) aimed at determining the level of sleep quality, and the Hospital Anxiety Depression Scale (HADS) were utilized to collect the research data. The respondents provided their answers to all of the data collection tools at the same time. The administration of the data collection forms took approximately 15 min.

Introductory information form

Designed specifically for this study by the researchers, this form consists of questions featuring the descriptive characteristics of the

healthcare staff (age, gender, marital status, parenthood status, profession, education, department, years of work experience, health status, and status of directly engaging in examination or caring for Covid-19 patients). The administration time of the form was around 5 min.

Pittsburgh Sleep Quality Index (PSQI)

The original Cronbach alpha value of PSQI, developed by Buysse, Reynolds III, Monk, Berman, and Kupfer (1989), is 0.83. Its validity and reliability was investigated in Turkey by Ağargün, Kara, and Anlar (1996), who conducted their study on healthy individuals ($n = 30$), depressed patients ($n = 33$), and patients with sleep disorders over a 12-month period. The researchers reported the Cronbach alpha value of PSQI as 0.80. In this study, the Cronbach's Alpha value for this scale was calculated as 0.87. The clinical and clinimetric properties of PSQI reveal that it can be utilized in both clinical practice and psychiatric research. PSQI is a scale that provides information on sleep quality and the type and severity of sleep disturbances in the last month. Out of 24 questions in total, 19 are rated by the respondents themselves, while the last 5 questions aimed at clinical information only and not included in scoring are rated by their spouses or roommates. In self-report questions, the 19th item, which questions whether a roommate or spouse is present, is excluded while calculating the component scores in the scale. Each item in the scale is weighted between 0 (no trouble) and 3 (serious distress) points. The sum of the scores for the seven sub-dimensions yields the global PSQI score which varies between 0 and 21. Sleep quality of those with a global score of 5 or less is considered good, while >5 signifies poor sleep quality (Ağargün et al., 1996). The administration time of the scale was about 5 min.

Hospital Anxiety and Depression Scale (HADS)

HADS is a four-point Likert-type scale developed by Zigmond and Snaith (1983) to determine the magnitude of anxiety and depression for patients and to gauge their anxiety levels. The validity and reliability of the scale adapted to Turkish was tested by Aydemir, Güvenir, Küey, and Kültür (1997). After HADS was translated from its original language into Turkish, its translation equivalence was performed. In the second stage, its validity and reliability were tested on the university students. In the third stage, the scale was administered on 136 in-patients hospitalized in the Internal Disease department of a hospital. Its Cronbach's alpha coefficient was found as 0.85 for the anxiety sub-dimension and 0.78 for its depression counterpart (Aydemir et al., 1997). In our study, the Cronbach's alpha coefficient of HADS was established as 0.90 for the anxiety sub-dimension and 0.91 for its depression counterpart. The scale is not employed to diagnose, but rather to define anxiety and depression in a short time and to identify the risk group. Despite the word "hospital" in its title, this scale can also be used in studies conducted in the pertaining field or in primary care research. In that regard, it is administered on individuals not afflicted with any physical disorders. In this scale with 14 items in total, odd numbers are designed to elicit the level of anxiety, while even numbers are intended to identify depression levels. This scale is also made up of two subscales, called HADS-A (for anxiety) and HADS-D (for depression). The cut-off point is specified as 10 for the anxiety subscale, and 7 for depression. A score of 10 or more received in the anxiety sub-dimension imply that respondents are at risk for anxiety, while a score of 7 or more obtained from the depression sub-dimension indicates a risk for depression (Aydemir et al., 1997). The administration of the scale took approximately 5 min.

Data analysis

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) v.24. Mean scores, standard deviation, numbers and percentages, Mann–Whitney *U* test, Kruskal Wallis Variance Analysis, and Spearman Correlation Analysis were utilized for the statistical analysis. The statistical significance value was set at $p < 0.05$.

Ethical considerations

The study was carried out in compliance with the principles of the Declaration of Helsinki. Ethical approval was granted by the Non-interventional Studies Ethics Board of the XXXXXX University (dated April 14, 2020 and numbered 60116787-020/26605). The institution and scale permissions were secured prior to the study. Written and verbal informed consent was obtained from the healthcare staff enrolled in the study.

Results

Table 1 presents the descriptive characteristics of the participants surveyed. Their mean age turned out to be 36.76 ± 7.58. Slightly more than half of the participants were women (56.1%, $n = 244$), whereas 67.8% ($n = 295$) were married and 66.9% ($n = 291$) were parents. 44.4% ($n = 193$) stated that they directly engaged in examining or providing care for patients with confirmed Covid-19 diagnosis.

Their mean HADS-A and HADS-D subscale scores were found as 7.89 ± 4.60 and 7.22 ± 4.13, respectively. On the other hand, their mean PSQI score was 8.42 ± 2.30, and poor sleep quality was identified in an overwhelming majority of the healthcare staff (92.9%, $n = 404$).

The mean HADS-A scores did not yield a significant difference within the categories, including age, gender, profession, history of mental disorders, and job satisfaction. By contrast, the mean HADS-D scores varied significantly within the categories of gender, history of mental disorders, and job satisfaction ($p < 0.05$). As for the sleep quality scores derived from the PSQI data, strong evidence was found for the within-group differences in terms of gender, parenthood, years of experience in the current department, health-related problems, history of mental disorders, and job satisfaction ($p < 0.05$) (Table 2). Total sleep quality of the respondents exhibited a moderate positive correlation with HADS-A ($r = 0.424$, $p = 0.001$) scores and a weak positive correlation with HADS-D ($r = 0.293$, $p = 0.001$) scores.

Discussion

This study, carried out to investigate the effect of Covid-19 on psychological well-being of healthcare staff at a tertiary hospital, revealed that their sleep quality was poor, and that their depression levels, but not anxiety levels, were at risk. Prolonged sleep deprivation may be an underlying risk factor for both psychological and physiological disorders for healthcare staff (Inter-Agency Standing Committee, 2020). This personnel might be afflicted with some psychological disorders, including anxiety, depression and insomnia (Li et al., 2020). Indeed, there is mounting clinical evidence suggesting that these workers tend to experience mental health burden in this process, which might have adverse psychological implications in the long run (Kang et al., 2020; Lai et al., 2020; Liu et al., 2020; Xiao, Zhang, Kong, Li, & Yang, 2020). In that regard, our results seem to confirm earlier findings in the literature. However, in contrast to previous reports, our participants' anxiety levels were not found at risk. This discrepancy could be partly attributed to the fact that workers (260 respondents), such as cleaning staff and office personnel, who were in short-term contact with patients outnumbered those (175 respondents) in prolonged contact with patients, such as doctors, nurses, paramedics, and medical secretaries.

The anxiety scores of the recruited healthcare staff differed significantly across age bands, with the 21–32 age group reporting the highest anxiety scores. Contrary to this study, published clinical research indicates that individuals tend to be at more increased risk for mental health problems as the age progresses. Several reasons can account for this association. For instance, as they get older, individuals are burdened with further family responsibilities, which might impair their psychological well-being (Ennis & Bunting, 2013). Moreover, higher risk of

Table 1
Descriptives for healthcare staff ($n = 435$).

Descriptive characteristics	*n* (%)
Mean age	36.76 ± 7.58
Age bands	
21–32 age	139 (32.0)
33–44 age	219 (50.3)
45–56 age	77 (17.7)
Gender	
Female	244 (56.1)
Male	191 (43.9)
Marital status	
Married	295 (67.8)
Single	140 (32.2)
Parenthood status	
Yes	291 (66.9)
No	144 (33.1)
Profession	
Staff-cleaning staff	228 (52.4)
Nurse	75 (17.2)
Doctor	52 (12.0)
Office staff	32 (7.4)
Paramedic	27 (6.2)
Medical secretary	21 (4.8)
Educational status	
Primary school	82 (18.9)
Secondary school	46 (10.6)
High school	121 (27.8)
University	123 (28.3)
Post-graduate	63 (14.5)
Current department	
Ward	144 (33.1)
Pandemic outpatient clinic + ED	141 (32.4)
Pandemic outpatient clinic	49 (11.3)
Outpatient clinic	45 (10.3)
Intensive care unit	37 (8.5)
Pandemic intensive care unit	19 (4.4)
Years of experience	
1–5 years	119 (27.4)
6–11 years	174 (40.0)
12–17 years	90 (20.7)
18–23+ years	52 (12.0)
Years of experience in current department	
1–5 years	307 (70.6)
6–11 years	81 (18.6)
12–17 years	34 (7.8)
18–23+ years	13 (3.0)
Health status	
I have no health problems	357 (82.1)
I have a medical diagnosis and condition for which I am being treated	78 (17.9)
History of mental health	
I have had no mental problems	332 (76.3)
I had a mental problem but didn't get support	46 (10.6)
I am receiving or have received medication	44 (10.1)
I am receiving or have received medication and psychotherapy	13 (3.0)
Job satisfaction	
Satisfied	246 (56.6)
Partly satisfied	163 (37.5)
Dissatisfied	26 (6.0)
Pre-Covid-19 department	
Ward	167 (38.4)
Emergency department	100 (23.0)
Outpatient clinic	52 (12.0)
Intensive care unit	46 (10.6)
Others (Administrative units, technical services, operating room)	70 (16.1)
Providing examination or care for Covid-19 patients	
No	242 (55.6)
Yes	193 (44.4)
Covid-19 test result	
Positive	366 (84.1)
Waiting for the result	64 (14.7)
Negative	5 (1.1)

infection and illness with the advancement of age may enhance their anxiety levels (Umberson & Karas Montez, 2010). As a counter-evidence for this information, previous research reports that anxiety levels decrease as the age of healthcare staff increase (Huang & Zhao, 2020). When it comes to our study, higher anxiety levels in 21–32 age band may be because the younger group is mostly based at active units (emergency, intensive care, Covid-19 service), while the older group is charged in outpatient clinics and wards as part of the hospital policy. In addition, it can be assumed that gaining more experience along with the advancement of age can help experienced healthcare staff to address problematic issues more calmly, and hence anxiety levels may be higher among younger healthcare staff, who might not have sufficient experience to come up with effective solutions in the face of challenging conditions.

As far as gender is concerned, it is well-established by many lines of evidence that female healthcare staff suffer from higher anxiety and depression states and poorer sleep quality (Gao, Ping, & Liu, 2020; Kang et al., 2020; Lai et al., 2020; Schmidt, Dantas, & Marziale, 2011; Theeke, Carpenter, Mallow, & Theeke, 2019; Wang et al., 2020; Zhang et al., 2020). Given the impact of gender on sleep quality, females tend to be affected more by changes in their sleep rhythms and mood shifts. Therefore, women may be more prone to sleep problems due to increased anxiety levels and depressive affect (Gökoğlu Güler, 2018). They may also take on further domestic responsibilities besides working life, severely limiting their resting time and emotional refreshment. In addition, their emotional nature relative to males might contribute to increased anxiety and depression levels, thus degrading their sleep quality.

Another notable finding in our study is the observed poor sleep quality in the enrolled healthcare staff with children, but being a parent alone was not a significant factor in anxiety and depression scores. Considering that most of our participants were young, middle-aged and married, their children may have required additional care and attention, and thus we assume that these parenthood responsibilities might have impaired their sleep quality.

Anxiety levels could differ based on the tasks performed during the pandemic period. There has been extensive work reporting that healthcare staff, such as doctors and nurses, who are in close contact with suspected or confirmed cases are more susceptible to anxiety and insomnia (Bohlken, Schömig, Lemke, Pumberger, & Riedel-Heller, 2020; Lai et al., 2020; Zhang et al., 2020). Considering anxiety levels by profession, anxiety levels of nurses turned out to be higher in this study, which is also supported by the literature (Brooks, Dunn, Amlôt, Rubin, & Greenberg, 2018; Lai et al., 2020). However, no marked difference was noted in depression levels and sleep quality in terms of profession. Increased levels of anxiety observed in nurses might be caused by their longer interaction with patients than other healthcare staff.

Irregular sleep patterns might arise as a result of physiological and psychological effects of diseases. While some diseases lead to larger amount of sleep, painful diseases accompanied by physical distress, frequent urination during the night, and respiratory distress experienced by people whose nasal passages are not fully open may degrade sleep quality. Psychological disorders also reduce both sleep duration and sleep quality (Kozier & Erb, 2016). In this study, we observed that those who rated their health status as poor ended up with poor sleep quality overall. Indeed, poor health status accompanied by poor sleep quality is an expected result because knowing that the presence of a chronic disease may cause more severe progression in Covid-19 is likely to induce distress in individuals and thus deterioration of sleep quality. In our

Table 2
Anxiety, depression and PSQI score averages of healthcare staff by their descriptives ($n = 435$).

Descriptive characteristics	*n*	HADS-A $\overline{X} \pm S.S$	HADS-D $\overline{X} \pm S.S$	PSQI $\overline{X} \pm S.S$
Age bands				
21–32 age	139	8.29 ± 4.63	7.68 ± 3.91	8.31 ± 2.41
33–44 age	219	8.05 ± 4.56	7.16 ± 4.2	8.51 ± 2.15
45–56 age	77	6.71 ± 4.50	6.56 ± 4.23	8.36 ± 2.52
		$KW = 6.408$	$KW = 4.853$	$KW = 0.671$
		0.041	0.088	0.715
Gender				
Female	244	8.97 ± 4.77	7.72 ± 4.36	8.76 ± 2.38
Male	191	6.51 ± 3.97	6.58 ± 3.72	7.98 ± 2.12
		$Z = -5.33$	$Z = 2.51$	$Z = -3.637$
		0.0001	**0.012**	**0.0001**
Parenthood status				
Yes	144	7.66 ± 4.48	7.46 ± 4.02	8.06 ± 2.29
No	291	8 ± 4.66	7.1 ± 4.18	8.59 ± 2.29
		$Z = -0.518$	$Z = -1.137$	$Z = -2.121$
		0.604	0.256	**0.034**
Profession				
Staff-cleaning staff	52	8.25 ± 4.18	8.02 ± 3.63	8.56 ± 2.41
Nurse	75	9.49 ± 4.98	7.93 ± 4.15	8.55 ± 2.56
Doctor	27	7.63 ± 4.15	7.00 ± 3.51	8.52 ± 2.24
Office staff	21	7.33 ± 4.94	5.95 ± 4.07	8.38 ± 1.99
Paramedic	228	7.32 ± 4.29	6.90 ± 4.05	8.43 ± 2.27
Medical secretary	32	8.19 ± 5.79	7.53 ± 5.52	7.75 ± 1.92
		$KW =$	$KW = 7.865$	$KW = 3.097$
		11.877	0.164	0.685
		0.037		
Health status				
I have no health problems	357	7.73 ± 4.50	7.07 ± 4.02	8.25 ± 2.25
I have a medical diagnosis and condition for which I am being treated	78	8.64 ± 4.99	7.91 ± 4.57	9.19 ± 2.39
		$Z = -1.172$	$Z = -1.318$	$Z = -3.343$
		0.241	0.188	**0.001**
History of mental health				
I have had no mental problems	332	7.05 ± 4.15	6.55 ± 3.79	8.07 ± 2.09
I had a mental problem but didn't get support	46	10.74 ± 5.24	9.28 ± 4.17	8.70 ± 1.80
I am receiving or have received medication	44	10.45 ± 4.57	9.43 ± 4.49	9.95 ± 3.03
I am receiving or have received medication and psychotherapy	13	10.62 ± 5.30	9.46 ± 5.56	11.15 ± 2.30
		$KW =$	$KW =$	$KW =$
		41.025	33.084	36.346
		0.0001	**0.0001**	**0.0001**
Job satisfaction				
Satisfied	246	6.83 ± 4.23	6.28 ± 3.88	8.05 ± 2.14
Partly satisfied	163	8.76 ± 4.60	8.20 ± 4.19	8.81 ± 2.44
Dissatisfied	26	12.50 ± 4.01	9.96 ± 3.40	9.42 ± 2.25
		$KW =$	$KW =$	$KW =$
		42.616	32.816	15.821
		0.0001	**0.0001**	**0.0001**
Years of experience in current department				
1–5 years	307	8.21 ± 4.67	7.39 ± 4.17	8.57 ± 2.26
6–11 years	81	7.20 ± 4.27	6.99 ± 3.93	8.26 ± 2.54
12–17 years	34	7.15 ± 4.02	6.71 ± 4.17	7.85 ± 2.09
18–23+ years	13	6.69 ± 5.78	6.00 ± 4.26	7.38 ± 1.85
		$KW = 5.803$	$KW = 2.593$	$KW = 8.596$
		0.122	0.459	**0.035**

PSQI: Pittsburgh Sleep Quality Index.
HADS-A: Hospital Anxiety and Depression Scale – Anxiety Subscale.
HADS-D: Hospital Anxiety and Depression Scale – Depression Subscale.

study, the anxiety and depression scores of the respondents who rated their health status as poor turned out to be high, but this did not yield a statistically significant result.

A restless body and mind can be a considerable factor in sleeping and duration of staying asleep. Anxiety and depressive affect induced by job pressure, familial duties, and other stressors end up with difficulty in falling asleep or maintaining sleep. Those with underlying chronic diseases reportedly have higher levels of anxiety vulnerability, depression and sleep irregularities (Dong et al., 2020; Ozamiz-Etxebarria, Dosil-Santamaria, Picaza-Gorrochategui, & Idoiaga-Mondragon, 2020). Consistent with the literature, our participants reporting a history of mental problems had anxiety and depression scores at risk levels as well as poor sleep quality.

A broad spectrum of factors, ranging from job satisfaction, workload, and years of work experience affect anxiety, depression and sleep quality of healthcare staff (Enli Tuncay et al., 2020; Miró, Solanes, Martínez, & Sánchez, 2007). Likewise, our respondents reporting job dissatisfaction had very poor sleep quality as well as anxiety and depression scores at the risk level, confirming previous research. In addition, though sleep quality remained low in those with work experience of 1 to 5 years, no significant difference was identified in anxiety and depression scores in relation to years of work experience.

A regular night's sleep is considered as an integral component of good health and quality of life across all ages (Alvaro, Roberts, & Harris, 2013). Sleep quality can be described as feeling fit, refreshed and ready for the new day after waking up. Anxiety and sleep quality interact with each other within a vicious circle. On the one hand, working in rotational shifts and under harsh conditions can impair sleep cycle and quality of healthcare staff, increasing their vulnerability to anxiety and depression. On the other hand, it is well-documented that anxious state can also affect their sleep quality because anxious individuals experience frequent sleep interruptions and often have difficulty falling asleep (Alvaro et al., 2013; Chou, Chang, & Chung, 2015; Johnson, Roth, & Breslau, 2006; Öztürk & Uluşahin, 2018; Xiao et al., 2020). We noted a positive correlation between anxiety and depression levels of healthcare staff and their sleep quality, which also accords with earlier studies reporting similar observations.

Limitations

Our study remained limited in several ways. The major limitation lies in the fact that the obtained information was bound by the dates specified, so the mood of healthcare staff may manifest a change as this pandemic process persists. In addition, given that our findings come from a cross-sectional study and are based on a limited number of participants, the results from our analyses need to be treated with some caution. Since the present study is cross-sectional and descriptive in terms of design, we did not perform a sample size calculation. Finally, the surveys and scales that we drew on in this study are based on self-reports of the respondents, and hence the reported results reflect a subjective evaluation.

Conclusion

This study set out to reveal the impact of Covid-19 process on sleep quality, anxiety and depression state of frontline healthcare staff at a tertiary-level hospital. Taken together, the evidence from our findings implies that their sleep quality remains poor, and their depression levels, but not their anxiety levels, are in jeopardy. Besides, some descriptive characteristics exert a noticeable influence on their anxiety state, risk of depression and sleep quality. Another major finding emerging from our study is the presence of a positive relationship between anxiety and depression levels and sleep quality. All these findings might have important implications for unraveling the current psychological and psychosocial state of first-line healthcare staff during the pandemic process, and based on these results, we suggest several courses of action to minimize this problem. For instance, regular online meetings can be held on a weekly basis during the pandemic process in order to take heed of their emotions and thoughts in addition to providing the necessary medical information. Online psychoeducation programs can also be

organized weekly to offer psychological support. The healthcare staff based at active units and those working in less active units could be included in the rotation at fixed intervals. They should be screened regularly to identify their anxiety and depression levels and sleep disorders. Furthermore, it is of great importance to establish multidisciplinary mental health teams (psychiatrists, psychiatric nurses, clinical psychologists) in hospitals in terms of assisting this personnel. Finally, providing required information about the health care of patients diagnosed with Covid-19, assigning sufficient number of personnel, catering for basic needs (food and fluid intake), supplying adequate personal protective equipment, and establishing resting areas can reduce the susceptibility of first-line healthcare staff to anxiety and depression and improve their overall sleep quality.

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CRediT authorship contribution statement

1-Study concept and design: A.Y. and G.T.Y. 2-Acquisition of data: A.Y., G.T.Y., and H.Y. 3-Analysis and interpretation of data: A.Y., G.T.Y., and H.Y. 4-Drafting of the manuscript: A.Y. and G.T.Y. 5-Critical revision of the manuscript for important intellectual content: A.Y. and G.T.Y. 6-Statistical analysis: G.T.Y. and H.Y. 7-Administrative, technical and material support: A.Y., G.T.Y., and H.Y. 8-Study supervision: G.T.Y. and A.Y.

Declaration of competing interest

The authors declare that they have no conflicts of interests.

References

Ağargün, M. Y., Kara, H., & Anlar, O. (1996). Pittsburgh uyku kalitesi indeksinin geçerliği ve güvenirliği. *Türk Psikiyatri Dergisi, 7*(2), 107–115.

Alvaro, P. K., Roberts, R. M., & Harris, J. K. (2013). A systematic review assessing bidirectionality between sleep disturbances, anxiety, and depression. *Sleep, 36*(7), 1059–1068. https://doi.org/10.5665/sleep.2810.

Aydemir, Ö., Güvenir, T., Küey, L., & Kültür, S. (1997). Hastane anksiyete depresyon ölçeği Türkçe formunun geçerlik ve güvenirlik çalışması. *Türk Psikiyatri Dergisi, 8*, 280–287.

Bai, Y., Lin, C. C., Lin, C. Y., Chen, J. Y., Chue, C. M., & Chou, P. (2004). Survey of stress reactions among health care workers involved with the SARS outbreak. *Psychiatric Services, 55*(9), 1055–1057. https://doi.org/10.1176/appi.ps.55.9.1055.

Bohlken, J., Schömig, F., Lemke, M. R., Pumberger, M., & Riedel-Heller, S. G. (2020). COVID-19 pandemic: Stress experience of healthcare workers-a short current review. *Psychiatrische Praxis, 47*(4), 190–197. https://doi.org/10.1055/a-1159-5551.

Brooks, S. K., Dunn, R., Amlôt, R., Rubin, G. J., & Greenberg, N. (2018). A systematic, thematic review of social and occupational factors associated with psychological outcomes in healthcare employees during an infectious disease outbreak. *Journal of Occupational and Environmental Medicine, 60*(3), 248–257. https://doi.org/10.1097/JOM.0000000000001235.

Buysse, D. J., Reynolds, C. F., III, Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research, 28*(2), 193–213. https://doi.org/10.1016/0165-1781(89)90047-4.

Chou, T. L., Chang, L. I., & Chung, M. H. (2015). The mediating and moderating effects of sleep hygiene practice on anxiety and insomnia in hospital nurses. *International Journal of Nursing Practice, 21*(Suppl. 2), 9–18. https://doi.org/10.1111/ijn.12164.

Chua, S. E., Cheung, V., Cheung, C., McAlonan, G. M., Wong, J. W., Cheung, E. P., … Tsang, K. W. (2004). Psychological effects of the SARS outbreak in Hong Kong on high-risk health care workers. *The Canadian Journal of Psychiatry, 49*(6), 391–393. https://doi.org/10.1177/070674370404900609.

Dong, X. C., Li, J. M., Bai, J. Y., Liu, Z. Q., Zhou, P. H., Gao, L., … Zhang, Y. (2020). Epidemiological characteristics of confirmed COVID-19 cases in Tianjin. *Zhonghua liu xing bing xue za zhi = Zhonghua liuxingbingxue zazhi, 41*(5), 638–642. https://doi.org/10.3760/cma.j.cn112338-20200221-00146.

Enli Tuncay, F., Koyuncu, E., & Özel, Ş. (2020). A review of protective and risk factors affecting psychosocial health of healthcare workers in pandemics. *Ankara Medical Journal, 20*(2), 488–504. https://doi.org/10.5505/amj.2020.02418.

Ennis, E., & Bunting, B. P. (2013). Family burden, family health and personal mental health. *BMC Public Health, 13*(1), 1–9. https://doi.org/10.1186/1471-2458-13-255.

Gao, W., Ping, S., & Liu, X. (2020). Gender differences in depression, anxiety, and stress among college students: A longitudinal study from China. *Journal of Affective Disorders, 263*, 292–300. https://doi.org/10.1016/j.jad.2019.11.121.

Gökoğlu Güler, P. (2018). *Adölesanlarda uyku kalitesi ve öfke kontrolü arasındaki ilişki ve etkileyen faktörlerin belirlenmesi.* Retrieved from file:///C:/Users/atakany/Downloads/513833.pdf (Accessed 29 April 2020).

Greenberg, N., Docherty, M., Gnanapragasam, S., & Wessely, S. (2020). Managing mental health challenges faced by healthcare workers during covid-19 pandemic. *The BMJ, 368*, m1211. https://doi.org/10.1136/bmj.m1211.

Huang, J. Z., Han, M. F., Luo, T. D., Ren, A. K., & Zhou, X. P. (2020). Mental health survey of medical staff in a tertiary infectious disease hospital for COVID-19. *Zhonghua lao dong wei sheng zhi ye bing za zhi = Zhonghua laodong weisheng zhiyebing zazhi= Chinese Journal of Industrial Hygiene and Occupational Diseases, 38*(3), 192–195. https://doi.org/10.3760/cma.j.cn121094-20200219-00063.

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 Research, 288*, 112954.

Inter-Agency Standing Committee. (2020). Briefing note on addressing mental health and psychosocial aspects of COVID-19 Outbreak Version 1.1. Retrieved from https://interagencystanding committee.org/system/files/2020-03/MHPSS%20COVID19%20Briefing%20Note% 202%20March%202020-English.pdf (Accessed 29April 2020).

Johnson, E. O., Roth, T., & Breslau, N. (2006). The association of insomnia with anxiety disorders and depression: Exploration of the direction of risk. *Journal of Psychiatric Research, 40*(8), 700–708. https://doi.org/10.1016/j.jpsychires.2006.07.008.

Kang, L., Li, Y., Hu, S., Chen, M., Yang, C., Yang, B. X., … Liu, Z. (2020). The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *The Lancet Psychiatry, 7*(3), Article E14. https://doi.org/10.1016/S2215-0366(20)30047-X.

Kozier, B., & Erb, G. (2016). *Fundamentals of nursing concepts, process and practice* (10th ed.). California: Addison-Wesley Publishing Company.

Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., … Hu, S. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Network Open, 3*(3), Article e203976. https://doi.org/10.1001/jamanetworkopen.2020.3976.

Li, W., Yang, Y., Liu, Z. H., Zhao, Y. J., Zhang, Q., Zhang, L., … Xiang, Y. T. (2020). Progression of mental health services during the COVID-19 outbreak in China. *International Journal of Biological Sciences, 16*(10), 1732–1738. https://doi.org/10.7150/ijbs.45120.

Liu, S., Yang, L., Zhang, C., Xiang, Y. T., Liu, Z., Hu, S., & Zhang, B. (2020). Online mental health services in China during the COVID-19 outbreak. *The Lancet Psychiatry, 7*(4), e17. https://doi.org/10.1016/S2215-0366(20)30077-8.

Maunder, R., Hunter, J., Vincent, L., Bennett, J., Peladeau, N., Leszcz, M., … Mazzulli, T. (2003). The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *Cmaj, 168*(10), 1245–1251.

Miró, E., Solanes, A., Martínez, P., & Sánchez, A. I. (2007). Relationship between burnout, job strain, and sleep characteristics. *Psicothema, 19*(3), 388–394.

Ozamiz-Etxebarria, N., Dosil-Santamaria, M., Picaza-Gorrochategui, M., & Idoiaga-Mondragon, N. (2020). Stress, anxiety, and depression levels in the initial stage of the COVID-19 outbreak in a population sample in the northern Spain. *Cadernos De Saude Publica, 36*, Article e00054020. https://doi.org/10.1590/0102-311X00054020.

Öztürk, O., & Uluşahin, A. (2018). *Ruh sağlığı ve bozuklukları.* Ankara: Nobel Tıp Kitabevleri.

Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V. G., Papoutsi, E., & Katsaounou, P. (2020). Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain, Behavior, and Immunity, 88*, 901–907. https://doi.org/10.1016/j.bbi.2020.05.026.

Puradollah, M., & Ghasempour, M. (2020). Necessity of attention to mental health of the front line nurses against COVID-19: A forgotten requirement. *International Journal of Community Based Nursing and Midwifery, 8*(3), 280–281. https://doi.org/10.30476/IJCBNM.2020.85889.1301.

Santarone, K., McKenney, M., & Elkbuli, A. (2020). Preserving mental health and resilience in frontline healthcare workers during COVID-19. *The American Journal of Emergency Medicine, 38*(7), 1530–1531. https://doi.org/10.1016/j.ajem.2020.04.030.

Schmidt, D. R. C., Dantas, R. A. S., & Marziale, M. H. P. (2011). Anxiety and depression among nursing professionals who work in surgical units. *Revista da Escola de Enfermagem da USP, 45*(2), 487–493. https://doi.org/10.1590/s0080-62342011000200026.

Şenol Çelik, S., Koç, G., Özbaş, A. A., Bulut, H., Karahan, A., Aydın, F.Ç., … Çelik, B. (2021). Uluslararası hemşireler yılında covid-19 pandemisi: Türk hemşireler derneği çalışmaları. *İzmir Katip Çelebi Üniversitesi Sağlık Bilimleri Fakültesi Dergisi, 6*(1), 23–27.

T.C. Sağlık Bakanlığı Covid-19 Bilgilendirme Platformu. (2021). Retrieved from https://covid19.saglik.gov.tr/TR-66935/genel-koronavirus-tablosu.html. Accessed 19 May 2021.

Theeke, L., Carpenter, R. D., Mallow, J., & Theeke, E. (2019). Gender differences in loneliness, anger, depression, self-management ability and biomarkers of chronic illness in chronically ill mid-life adults in Appalachia. *Applied Nursing Research, 45*, 55–62. https://doi.org/10.1016/j.apnr.2018.12.001.

Türkiye Psikiyatri Derneği Ruhsal Travma ve Afet Çalışma Birimi. (2020). Karantinanın ruhsal etkileri ve koruyucu önlemler. Retrieved from https://www.psikiyatri.org.tr/TPDData/Uploads/files/KarantinaCOVID.pdf. Accessed 19 April 2020.

Umberson, D., & Karas Montez, J. (2010). Social relationships and health: A flashpoint for health policy. *Journal of Health and Social Behavior, 51*(1_suppl), 54–66. https://doi.org/10.1177/0022146510383501.

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health, 17*(5), 1729. https://doi.org/10.3390/ijerph17051729.

World Health Organization. (2020a). Mental health and psychosocial considerations during the COVID-19 outbreak. Retrieved from https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf. (Accessed 23 March 2020).

World Health Organization. (2020b). Mental health and COVID-19. Retrieved from http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/novel-coronavirus-2019-ncov-technical-guidance/coronavirus-disease-covid-19-outbreak-technical-guidance-europe/mental-health-and-covid-19. (Accessed 29 April 2020).

Xiao, H., Zhang, Y., Kong, D., Li, S., & Yang, N. (2020). The effects of social support on sleep quality of medical staff treating patients with coronavirus disease 2019 (COVID-19) in January and February 2020 in China. *Medical Science Monitor, 26*, Article e923549-1. https://doi.org/10.12659/MSM.923549.

Zhang, C., Yang, L., Liu, S., Ma, S., Wang, Y., Cai, Z., … Zhang, B. (2020). Survey of insomnia and related social psychological factors among medical staff involved in the 2019 novel coronavirus disease outbreak. *Frontiers in Psychiatry, 11*, 306. https://doi.org/10.3389/fpsyt.2020.00306.

Zhang, W. R., Wang, K., Yin, L., Zhao, W. F., Xue, Q., Peng, M., … Wang, H. X. (2020). Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China. *Psychotherapy and Psychosomatics, 89*(4), 242–250. https://doi.org/10.1159/000507639.

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica, 67*(6), 361–370. https://doi.org/10.1111/j.1600-0447.1983.tb09716.x.