



# Evaluation of Demographic Characteristics, Working Conditions, Depression, Anxiety and Insomnia Levels of Health Workers During the COVID-19 Pandemic Period

## COVID-19 Pandemisi Döneminde Sağlık Çalışanlarının Demografik Özellikleri, Çalışma Koşulları, Depresyon, Kaygı ve Uykusuzluk Düzeylerinin Değerlendirilmesi

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### Abstract

**Objective:** The coronavirus disease-2019 (COVID-19) pandemic has caused an increase in psychiatric disorders such as depression, anxiety, insomnia, and suicidality in the community. Therefore, we aimed to determine the frequency, severity, and factors affecting depression, anxiety, and sleep disorders in healthcare workers during the pandemic.

**Method:** In our study, 558 healthcare workers were surveyed online, and their occupation, their status as frontline workers, their chronic diseases, their COVID-19-related training, the presence of their personal protective equipment, the frequency and duration of their shifts in pandemic units, and their exposure to negative and positive discrimination were determined. The generalized anxiety disorder 7, insomnia severity index, and center for epidemiologic studies depression scale questionnaires were administered to all patients.

**Results:** It was determined that 28% of the participants had insignificant clinical insomnia, 43.5% had subthreshold insomnia, 22.4% had moderate clinical insomnia, and 6.1% had severe clinical insomnia. Of the

### Öz

**Amaç:** Koronavirüs hastalığı-2019 (COVID-19) pandemisi toplumda depresyon, anksiyete, uykusuzluk ve intihar eğilimi gibi psikiyatrik bozuklukların artmasına neden olmaktadır. Bu nedenle biz pandemi sürecinde sağlık çalışanlarında depresyon, anksiyete ve uyku bozukluklarının sıklığını, şiddetini ve etkileyen faktörleri belirlemeyi amaçladık.

**Yöntem:** Çalışmamızda 558 sağlık çalışanına çevrim içi anket uygulandı ve meslekleri, ön cephe çalışanı olma durumları, kronik hastalıkları, COVID-19 ile ilgili eğitimleri, kişisel koruyucu ekipman varlığı, pandemi birimlerinde vardiya sıklığı ve süresi, negatif ve pozitif ayrımcılığa maruz kalma durumları belirlendi. Tüm hastalara yaygın anksiyete bozukluğu 7, uykusuzluk şiddet indeksi ve epidemiyolojik araştırmalar merkezi depresyon ölçeği anketleri uygulandı.

**Bulgular:** Katılımcıların %28'inin klinik olarak önemsiz derecede uykusuzluk, %43,5'inin eşik altı uykusuzluk, %22,4'ünün orta derecede klinik uykusuzluk ve %6,1'inin ciddi klinik uykusuzluk yaşadığı belirlendi.



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## Abstract

subjects, 34.9% had mild anxiety, 21.3% had moderate anxiety, and 12.5% had severe anxiety. Of the participants, 11.8% were mildly depressed, 26% were moderately depressed, and 31.4% were severely depressed. Insomnia, anxiety, and depression were more severe in women, frontline workers, those who worked shifts in COVID-19 clinics, nurses, those without personal protective equipment, those subjected to negative discrimination, and those implied by family or friends to be carriers of the virus.

**Conclusion:** Depression and anxiety are more frequent and severe among frontline healthcare workers during pandemic periods. Therefore, necessary social and psychological support should be provided to these individuals.

**Keywords:** Anxiety, COVID-19 pandemic, depression, health care workers, insomnia

## Öz

Olguların %34,9'unda hafif, %21,3'ünde orta ve %12,5'inde şiddetli kaygı vardı. Katılımcıların %11,8'i hafif, %26'sı orta ve %31,4'ü şiddetli depresyondaydı. Kadınlarda, ön cephede çalışanlar, COVID-19 kliniklerinde nöbet tutanlar, hemşireler, kişisel koruyucu ekipmanı olmayanlar, negatif ayrımcılığa maruz kalanlar, aile veya arkadaşlar tarafından virüs taşıyıcısı olabileceği ima edilenlerde uykusuzluk, kaygı ve depresyon daha şiddetliydi.

**Sonuç:** Pandemi dönemlerinde ön saflarda çalışan sağlık çalışanlarında depresyon, anksiyete ve depresyon daha sık ve şiddetlidir. Bu nedenle bu bireylere gerekli sosyal ve psikolojik destek sağlanmalıdır.

**Anahtar kelimeler:** Anksiyete, COVID-19 pandemisi, depresyon, sağlık çalışanları, uykusuzluk

## Introduction

On December 31, 2019, the first case of coronavirus disease-2019 (COVID-19) was reported in Wuhan city, Hubei province, China (1). This infection has affected most of the world's population and was declared a pandemic by the World Health Organization on 11 March 2020 (2). Since it was a newly emerging infection, there was uncertainty about the prevention, etiopathogenesis, clinical course, and treatment methods of COVID-19. In addition, social restrictions were implemented due to the increasing number of cases exceeding the health capacity in various countries (3). People started to spend most of their time isolated at home (3). Psychiatric disorders such as anxiety disorder and depression began to emerge in people due to the uncertainties surrounding the disease and its treatment on the one hand and the social and economic problems caused by restrictions on the other (4).

As in all pandemics, healthcare workers are on the front line of COVID-19. For long hours, they are in the same environment as patients who are known to have COVID-19. COVID-19 infection, which is known to be transmitted through droplets, is riskier for healthcare workers than for the general public due to increased viral transmission (5). The fact that infected healthcare workers accounted for 29% of all hospitalized COVID-19 patients in the early stages of the pandemic indicates this risk (6). The high number of healthcare workers who are infected and cannot continue their work due to the quarantine period or illness increases the workload of other healthcare workers. Long-term work, social loneliness, and inadequate protection measures negatively affect the mental health of healthcare workers (7).

During the pandemic period, healthcare workers, worried that they would carry the virus to their relatives and friends, tried to isolate themselves for a long time. As a result of this isolation, it started to cause psychological problems such as irritability, anger, insomnia, concentration disorder, loneliness, anxiety, depression, and suicide risk in healthcare workers (8-11). In this study, we investigated the demographic characteristics, working conditions, severity of depression, anxiety, and sleep disorders, and the factors associated with them, among healthcare workers during the COVID-19 pandemic.

## Materials and Methods

Ethics committee approval was obtained for this study from the Ethics Committee of Atatürk University, dated 28.05.2020, numbered B.30.2.ATA.0.01.00/33. This study was conducted in accordance with the Helsinki Declaration, revised in 2013, "Ethical Principles for Medical Research Involving Human Subjects". The study was designed as cross-sectional, and data were collected through an online questionnaire prepared on Google forms and applied to the participants. Informed consent was obtained from all participants online before filling out the form. A questionnaire consisting of 4 subgroups including descriptive characteristics, generalized anxiety disorder-7 (GAD-7), insomnia severity index (ISI), and the center for epidemiologic studies-depression (CES-D) questionnaire was applied to 558 study participants.

The sample size was first determined for the study. Since it was conducted during the pandemic, clear information about the study population size could not be obtained.

Therefore, the total sample size was determined using the G\*Power program with an effect size of 0.15, 95% power, and 5% margin of error.

Healthcare workers in wards, outpatient clinics, emergency, and intensive care units where patients diagnosed with COVID-19 were followed up were considered frontline workers. In the descriptive characteristics questionnaire, the age, gender, comorbid diseases, occupation, institution of employment, whether they received training about COVID-19 in the institution where they work, whether a frontline worker, whether they had personal protective equipment, whether shifts in the COVID-19 service, frequency and duration of shifts, whether exposed to negative or positive discrimination because of being a healthcare worker, and whether being told or implied that they might carry the virus by their family or environment were asked.

The GAD-7 questionnaire was developed by Spitzer et al. (12). Its Turkish validity and reliability were assessed by Konkan et al (13). It consists of 7 questions, with each scoring ranging from 0-3 points, and the total score is 0-21. A total score of 0-4 is considered normal, 5-9 is considered mild, 10-14 is considered moderate, and 15-21 is considered severe anxiety. A score of 10 is also the cut-off score for a possible diagnosis of generalized anxiety disorder. When the threshold for the total score of the scale is set as 10 points, the sensitivity and selectivity of the scale are 89% and 82%, respectively.

The ISI scale was developed by Bastien et al. (14). The Turkish version of the scale's validity and reliability were assessed by Boysan et al. (15). It consists of 7 questions scored between 0 to 4 and the total score is 0 to 28 points. A total score of 0-7 is clinically insignificant insomnia; 8-14 is subthreshold insomnia; 15-21 is moderate clinical insomnia; and 22-28 is severe clinical insomnia.

The Turkish validity and reliability of the CES-D scale were assessed by Tatar et al. (16). It consists of 20 questions scored 0-4; the total score is 0-60. Zero to fifteen points indicate no depression, sixteen to twenty points indicate mild depression, twenty-one to thirty points indicate moderate depression, and thirty-one or more points indicate severe depression.

### Statistical Analysis

Statistical analyses were performed with NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA). Descriptive statistical methods (mean, standard deviation, median, frequency, percentage, minimum, maximum)

were used to evaluate the study data. The conformity of quantitative data to normal distribution was evaluated by the Shapiro-Wilk test and graphical analysis. An Independent samples t-test was used for comparisons of quantitative variables with normal distribution between two groups, and the Mann-Whitney U test for those without normal distribution. Comparisons of quantitative variables with normal distribution between more than two groups were performed with One-Way Analysis of Variance, and Bonferroni-corrected pairwise evaluations. The Kruskal-Wallis test and Dunn-Bonferroni test were used for comparisons of quantitative variables, that did not show normal distribution, across more than two groups. Qualitative data were compared using the Pearson chi-square test, Fisher's exact test, and Fisher-Freeman-Halton exact test. Pearson correlation analysis and Spearman correlation analysis were used to evaluate the relationships between quantitative variables. Statistical significance was accepted as  $p < 0.05$ .

## Results

In our study, 558 healthcare workers, including 186 males (33.3%), and 372 females (66.7%), were evaluated. The ages of the subjects ranged between 21 and 70 years, with a mean age of  $39.88 \pm 9.23$  years. The participants included 55.7% physicians ( $n=311$ ) 19% nurses ( $n=106$ ) 6.3% midwives ( $n=35$ ) 6.3% secretaries ( $n=35$ ) 3.4% emergency medical technicians (EMT) ( $n=19$ ) 1.1% dentists ( $n=6$ ) 1.1% cleaning personnel ( $n=6$ ) and 7.2% other healthcare workers ( $n=40$ ). Of the participants, 16.1% ( $n=90$ ) were working in family health centers (FHC), 28.9% ( $n=161$ ) in public hospitals, 5.2% ( $n=29$ ) in private hospitals, 0.9% ( $n=5$ ) in community health centers, 41.4% ( $n=231$ ) in university hospitals, and 7.5% ( $n=42$ ) in other health institutions.

The answers to the descriptive survey questions asked of the participants are shown in Table 1. It was found that 27.2% ( $n=125$ ) of the participants had chronic diseases. When the distribution of chronic diseases was analyzed: 46.4% ( $n=58$ ) hypertension, 12% ( $n=15$ ) chronic lung disease, 20% ( $n=25$ ) diabetes mellitus, 12.8% ( $n=16$ ) chronic heart disease, 6.4% ( $n=8$ ) hypothyroidism, 2.4% ( $n=3$ ) migraine. Participants had an average of  $4.61 \pm 4.26$  shifts per month in the units where COVID-19 patients were followed up. The duration of shifts was determined to be  $10.84 \pm 4.06$  hours per day.

The ISI scale scores of the subjects who participated in the study ranged between 0 and 28; the mean score was  $11.17 \pm 6.13$ . When the ISI scale scores of the subjects were analyzed, it was determined that 28% ( $n=156$ ) were clinically

**Table 1. Answers to the descriptive survey questions**

Question	Answers	n (%)
Do you have a chronic disease?	No	406 (72.8)
	Yes	152 (27.2)
Have you received training on COVID-19 at your institution?	No	185 (33.2)
	Yes	373 (66.8)
Do you work in services, outpatient clinics, emergency and intensive care units related to COVID-19?	No	320 (57.3)
	Yes	238 (42.7)
Do you work shifts in the COVID-19 ward?	No	419 (75.1)
	Yes	139 (24.9)
Do you have personal protective equipment?	No	21 (3.8)
	Yes	325 (58.2)
	Partially	212 (38.0)
Have you been subjected to negative discrimination because you are a healthcare worker during the pandemic?	No	384 (68.8)
	Yes	174 (31.2)
Have you been subjected to positive discrimination because you are a healthcare worker during the pandemic?	No	298 (53.5)
	Yes	259 (46.5)
Have you been told or implied by your family or others that you might carry the virus?	No	217 (38.9)
	Yes	341 (61.1)

Descriptive statistical methods were used. COVID-19: Coronavirus disease-2019

insignificant insomniacs, 43.5% (n=243) had subthreshold insomnia, 22.4% (n=125) had moderate clinical insomnia, and 6.1% (n=34) had severe clinical insomnia. Table 2 shows the relationship between the participants' descriptive characteristics and insomnia severity. A very weak negative correlation was found between the age of the participants and the total score of the ISI scale ( $r=-0.183$ ;  $p=0.001$ ) and between the number of seizures per month and the total score of the ISI scale ( $r=-0.183$ ;  $p=0.001$ ) and  $p=0.001$ , respectively). There was no statistically significant correlation between the duration of shifts and the ISI scores of the participants ( $p=0.29$ ).

In the pairwise comparisons made to determine the reason for the difference in insomnia severity between professions, physicians' total ISI scale score was significantly lower than the total scores of nurses, midwives, and EMTs ( $p=0.001$ ). In the analysis of differences according to institutions of employment, the ISI scale total scores of those working in public hospitals were significantly higher than those working in FHCs and university hospitals ( $p=0.001$ ,  $p=0.002$ , respectively).

The scores of the participants in the GAD-7 questionnaire ranged between 0 and 18 points; the mean score was  $7.58 \pm 5.16$ . When the GAD-7 scale scores of the participants were analyzed, 31.2% (n=174) had normal anxiety, 34.9% (n=195) had mild anxiety, 21.3% (n=119) had moderate anxiety, and 12.5% (n=70) had severe anxiety. When a total score of 10 was accepted as the cut-off score for generalized anxiety disorder, 33.9% (n=189) of the participants were found to have generalized anxiety disorder. The relationship between the answers given to the GAD-7 questionnaire and the descriptive characteristics questionnaire is shown in Table 3. There was a very weak negative correlation between the age of the participants and their total score on the GAD-7 scale ( $r=-0.128$ ;  $p=0.002$ ), as well as between their shift duration and the GAD-7 score ( $r=0.174$ ;  $p=0.045$ ). There was no statistically significant correlation between the number of days the participants were on call and their total score on the GAD-7 scale ( $p=0.76$ ).

In the pair group comparisons made to explain the difference in total scores among professions in the GAD-7 questionnaire, the total score of physicians was significantly lower than that of nurses ( $p=0.001$ ). When the source of the difference in the GAD-7 score according to the institution of employment was examined, employees at public hospitals had significantly higher GAD-7 scores than those working in university hospitals and FHCs ( $p=0.001$ ,  $p=0.007$ ; respectively).

The total score of the participants on the CES-D scale ranged between 1 and 60 points. The mean score was  $24.15 \pm 12.97$ . When the total score obtained from the CES-D scale was analyzed, it was determined that 30.8% (n=172) had no depression, 11.8% (n=66) were mildly depressed, 26% (n=145) were moderately depressed, and 31.4% (n=175) were severely depressed. The relationship between the responses of the subjects to the descriptive questionnaire questions and the CES-D scale is shown in Table 4. There was a weak negative correlation between the age of the participants and their total score on the CES-D scale ( $r=-0.136$ ;  $p=0.001$ ), and a similar negative correlation between seizure duration and their total score on the CES-D scale ( $r=0.189$ ;  $p=0.029$ ). There was no statistical correlation between the number of days of shifts and the score obtained from the CES-D scale ( $p=0.34$ ).

In pairwise comparisons made to investigate the reason for the difference in the total score of the CES-D scale across different occupations, the total score of nurses was significantly higher than that of physicians and those with other duties ( $p=0.015$ ,  $p=0.009$ , respectively).

**Table 2. The relationship between participants' descriptive characteristics and insomnia severity index scale**

Factor		Insomnia severity index total score	p-value
Gender	Male	9.34±5.77	0.001 <sup>a</sup>
	Female	12.09±6.11	
Chronic disease	No	10.96±6.17	0.180 <sup>b</sup>
	Yes	11.74±6.02	
Occupation	Doctor	9.62±5.47	0.001 <sup>c</sup>
	Nurse	13.92±6.40	
	Midwife	14.43±6.64	
	Secretary	12.14±5.70	
	Emergency medical technician	15.26±6.79	
	Dentist	12.67±7.34	
	Cleaning staff	13.0±3.16	
	Others	9.83±5.61	
	Family health center	9.48±5.44	
	Public hospital	12.97±5.93	
Institution of employment	Private hospital	11.76±6.03	0.001 <sup>d</sup>
	Community health center	11.80±8.70	
	University hospital	10.58±6.25	
	Others	10.71±6.03	
Status of receiving training on COVID-19 in the organization	No	11.89±6.10	0.053 <sup>a</sup>
	Yes	10.82±6.12	
Status of being a frontline worker	No	10.39±5.98	0.001 <sup>a</sup>
	Yes	12.22±6.19	
Status of being on call in COVID-19 service	No	10.41±5.84	0.001 <sup>a</sup>
	Yes	13.47±6.43	
Ownership of personal protective equipment	No	12.24±6.21	0.004 <sup>a</sup>
	Yes	10.46±6.05	
	Some	11.48±5.11	
Exposure to negative discrimination due to being a healthcare worker in the pandemic	No	10.12±5.80	0.001 <sup>b</sup>
	Yes	13.49±6.21	
Exposure to positive discrimination because of being a healthcare worker during the pandemic	No	11.61±6.22	0.066 <sup>a</sup>
	Yes	10.66±6.01	
Being told or implied by family or environment that they may carry the virus	No	9.95±5.82	0.001 <sup>b</sup>
	Yes	11.95±6.21	

<sup>a</sup>: Independent samples t-test, <sup>b</sup>: Mann-Whitney U test, <sup>c</sup>: One-Way Analysis of Variance, <sup>d</sup>: Kruskal-Wallis test, COVID-19: Coronavirus disease-2019

In pairwise group comparisons made to examine the effect of the institutions of employment on the CES-D scale, the CES-D scale scores of those working in public hospitals were significantly higher than those working in university hospitals and FHCs, respectively (p=0.007, p=0.040).

## Discussion

The COVID-19 pandemic has negatively affected individuals psychological, social, economic, and physical

health. In our study, we evaluated the anxiety, insomnia, and depression status of 558 healthcare workers during the COVID-19 pandemic. We found that insomnia, anxiety, and depression were more severe in women, frontline workers (including nurses), those who did not have personal protective equipment, those who were exposed to negative discrimination, and those who were suggested by their family or environment to carry the virus.



**Table 3. The relationship between participants' descriptive characteristics and GAD-7 scale**

Factor		GAD-7 scale total score	p-value
Gender	Man	5.77±4.79	0.001 <sup>a</sup>
	Female	8.49±5.12	
Chronic disease	No	7.41±5.29	0.188 <sup>b</sup>
	Yes	8.06±4.81	
Occupation	Doctor	6.96±4.87	0.001 <sup>c</sup>
	Nurse	9.40±5.33	
	Midwife	9.49±5.44	
	Secretary	7.63±4.98	
	Emergency medical technician	9.58±5.31	
	Dentist	7.00±2.97	
	Cleaning staff	8.83±6.94	
	Others	4.90±4.90	
	Family health center	6.81±4.60	
	Public hospital	9.16±5.11	
Institution of employment	Private hospital	9.17±5.46	0.001 <sup>d</sup>
	Community health center	8.40±6.88	
	University hospital	6.50±4.96	
	Others	8.05±5.73	
Status of receiving training on COVID-19 in the organization	No	7.92±4.95	0.279 <sup>a</sup>
	Yes	7.42±5.27	
Status of being a frontline worker	No	6.90±4.91	0.001 <sup>a</sup>
	Yes	8.51±5.37	
Status of being on call in COVID-19 service	No	7.03±4.99	0.001 <sup>a</sup>
	Yes	9.27±5.35	
Ownership of personal protective equipment	No	8.40±5.23	0.011 <sup>a</sup>
	Yes	7.04±5.11	
	Partially	7.81±4.47	
Exposure to negative discrimination due to being a healthcare worker in the pandemic	No	6.76±5.00	0.001 <sup>b</sup>
	Yes	9.41±5.07	
Exposure to positive discrimination because of being a healthcare worker in the pandemic	No	7.55±5.02	0.891 <sup>a</sup>
	Yes	7.61±5.35	
Being told or implied by family or environment that they may carry the virus	No	6.53±5.06	0.001 <sup>b</sup>
	Yes	8.26±5.13	

<sup>a</sup>: Independent samples t-test, <sup>b</sup>: Mann-Whitney U test, <sup>c</sup>: One-Way Analysis of Variance, <sup>d</sup>: Kruskal-Wallis test, COVID-19: Coronavirus disease-2019, GAD-7: Generalized anxiety disorder-7

During the previous H1N1 and SARS pandemics, it was reported that anxiety increased in the community (17). COVID-19 has also been reported to increase anxiety and stress (4,8). Fear of being infected, quarantine, newly emerging strains, an increase in COVID-19-related deaths, and not knowing when the pandemic will end are the main causes of stress and anxiety (3). Sun et al. (18) examined 44 studies evaluating anxiety in healthcare workers during the COVID-19 pandemic and reported the prevalence of

anxiety as 37%. In our study, the prevalence of anxiety was found to be 68.7%. The reason for this is that our study was conducted approximately 1 year after the pandemic started in our country. Therefore, the prevalence of anxiety may have been higher in our study due to long-term social loneliness, loss of family and friends from the disease, ongoing uncertainties about the pandemic even after 1 year, and burnout caused by intense working conditions.

**Table 4. The relationship between participants' descriptive characteristics and CES-D scale**

Factor		CES-D scale total score	p-value
Gender	Man	19.61±11.62	0.001 <sup>a</sup>
	Female	26.43±13.03	
Chronic disease	No	24.14±13.33	0.947 <sup>b</sup>
	Yes	24.22±12.01	
Occupation	Doctor	22.89±12.63	0.004 <sup>c</sup>
	Nurse	27.92±14.44	
	Midwife	26.51±13.08	
	Secretary	24.89±11.73	
	Emergency medical technician	27.95±12.96	
	Dentist	22.33±11.66	
	Cleaning staff	27.67±12.66	
	Others	19.33±9.95	
	Family health center	21.89±12.90	
	Public hospital	26.98±12.07	
Institution of employment	Private hospital	26.00±13.96	0.004 <sup>d</sup>
	Community health center	28.40±12.52	
	University hospital	22.35±12.73	
	Others	26.38±15.10	
Status of receiving training on COVID-19 in the organization	No	25.98±12.91	0.019 <sup>a</sup>
	Yes	23.25±12.93	
Status of being a frontline worker	No	22.48±12.68	0.001 <sup>a</sup>
	Yes	26.42±13.05	
Status of being on call in COVID-19 service	No	22.54±12.50	0.001 <sup>a</sup>
	Yes	29.04±13.21	
Ownership of personal protective equipment	No	25.99±12.45	0.031 <sup>a</sup>
	Yes	22.97±13.15	
	Partially	24.05±13.80	
Exposure to negative discrimination due to being a healthcare worker in the pandemic	No	21.76±12.34	0.001 <sup>b</sup>
	Yes	29.46±12.79	
Exposure to positive discrimination because of being a healthcare worker in the pandemic	No	25.07±12.50	0.064 <sup>a</sup>
	Yes	23.03±13.42	
Being told or implied by family or environment that they may carry the virus	No	21.43±12.48	0.001 <sup>b</sup>
	Yes	25.89±13.00	

<sup>a</sup>: Independent samples t-test, <sup>b</sup>: Mann-Whitney U test, <sup>c</sup>: One-Way Analysis of Variance, <sup>d</sup>: Kruskal-Wallis test, COVID-19: Coronavirus disease-2019, CES-D: Center for epidemiologic studies-depression

COVID-19 is an infection transmitted by droplets. For this reason, the anxiety of contracting the disease is higher, especially in healthcare workers in units serving infected patients (7,19). In our study, in line with the literature, anxiety disorder was more severe in frontline workers and those who were on duty in clinics where COVID-19 patients were followed up. The lack of personal protective equipment for healthcare workers increases the risk of infection and leads to an exacerbation of stress and anxiety

(20). In our study, anxiety and depression were more severe in workers without personal protective equipment.

Anxiety and depression are more common in women during the pandemic period (21,22). In our study, anxiety and depression were more severe in women. Anxiety and depression are more common in nurses who are in direct contact with patients compared to other healthcare professionals (7,23). In our study, we found that anxiety and

depression were more severe in nurses who were in contact with COVID-19 positive patients for a longer period of time than in physicians, in accordance with the literature. Conflicting results were found in studies investigating the relationship between the presence of chronic disease and anxiety severity. Karasu et al. (21) reported that anxiety increased with the presence of chronic disease. However, studies report that there is no relationship, between the presence of chronic disease and anxiety (24). We found no relationship between the presence of chronic disease and the severity of anxiety and depression.

Studies in the literature report that the level of anxiety was lower in individuals who did not receive training on COVID-19 (21). This may be attributed to the increased awareness that individuals who receive training face a serious health problem. In our study, no relationship was found between the status of receiving training on COVID-19 in the institution and anxiety severity. Since the analysis concerns the first year of the pandemic, the relationship may not have been detected because healthcare workers now have professional experience with this issue. In our country, during the pandemic, one hospital in each city with more than one hospital was designated as a COVID-19 hospital for managing COVID-19 cases. Generally, public hospitals were used as treatment centers for COVID-19. This may be the reason why anxiety levels, depression, and insomnia in individuals working in public hospitals were more severe than in those working in university hospitals, and FHC in our study.

During pandemic periods, healthcare workers are stigmatized by society due to concerns that they may transmit diseases. During the COVID-19 period, healthcare workers were also stigmatized by society (25). Stigmatization is also a factor that triggers psychiatric disorders. In our study, anxiety and depression were found to be more severe in participants who were exposed to negative discrimination during the pandemic because they were healthcare workers, and whose family or environment suggested that they could carry the virus.

Depression was reported as one of the mental disorders emerging in healthcare workers in China, the initial center of the pandemic (7). In the literature, the rate of depression in healthcare workers during the pandemic varied (23). Sahebi et al. (26) reported the rate of depression in healthcare workers as 24.8%. Moya-Salazar et al. (27) reported the prevalence of depression in 89% of healthcare workers COVID-19 care and isolation center. We found depression in 69.2% of the participants, and the severity of

depression was mild in 11.8%, moderate in 26%, and severe in 31.4% of the participants. The different prevalence of depression in the studies may result from the working status units where COVID-19 cases were managed. In our study, in support of this theory, depression was more severe in frontline workers and healthcare workers who were on duty in the units where COVID-19 patients were treated or monitored compared to other healthcare workers. We found that depression was more severe in people who were not trained against COVID-19. This may be because healthcare workers do not know how to protect themselves against infection.

Stress, sleep deprivation, shift work, and fatigue often cause sleep disturbance and poor sleep quality in healthcare workers (28). In our study, we found moderate clinical insomnia in 22.4% of the participants and severe clinical insomnia in 6.1%. 43.5% of our subjects experienced subthreshold insomnia. The most important causes of insomnia in healthcare workers are shift work and long shifts. However, in our study, we found more severe insomnia in those who worked shifts, and insomnia was negatively correlated with the duration of shifts. This may be because most of our cases did not maintain shifts. In studies, sleep disturbance and poor sleep quality are more common in frontline workers (29). We found that insomnia was more severe in frontline workers.

The risk of insomnia has been reported to be higher in women than in men and higher in nurses than in other healthcare workers (30). This may be due to hormonal differences, women's workload, being higher in social life, and women's psychology being more easily affected. In our study, insomnia was found to be more severe in women and nurses. In our study, insomnia was found to be more severe in those who lacked personal protective equipment, who were exposed to negative discrimination, and who were perceived by their family or environment to carry the virus. This may be due to increased anxiety, social loneliness, and other psychological negativities triggering insomnia.

### Study Limitations

The limitations in our study included not determining which department the healthcare professionals worked in before the pandemic, and not knowing the personality traits and psychological backgrounds of the participants.

## Conclusion

As a result, healthcare workers are akin to soldiers on the front line during the pandemic. Therefore, negative



psychological effects are more frequent and severe in healthcare workers, especially frontline workers. Therefore, it is important to provide the necessary psychological and social support for healthcare workers during and after pandemics.

## Ethics

**Ethics Committee Approval:** Ethics committee approval was obtained for this study from the Ethics Committee of Atatürk University, dated 28.05.2020, numbered B.30.2.ATA.0.01.00/33. This study was conducted in accordance with the Helsinki Declaration, revised in 2013, "Ethical Principles for Medical Research Involving Human Subjects".

**Informed Consent:** Informed consent was obtained from all participants online before filling out the form.

## Footnotes

### Authorship Contributions

Concept: S.S., G.S., E.Ç.T., Z.Ö., Design: S.S., G.S., E.Ç.T., Z.Ö., Data Collection or Processing: S.S., M.B., E.Ç.T., Analysis or Interpretation: S.S., G.S., M.Ş., Y.Ç., Drafting Manuscript: S.S., M.Ş., E.Ç.T., Y.Ç., Critical Revision of Manuscript: M.B., G.S., Z.Ö.Ü., Final Approval and Accountability: S.S., G.S., E.Ç.T., M.B., M.Ş., Z.Ö., Y.Ç., Supervision: G.S., Y.Ç., Writing: S.S., G.S., E.Ç.T., M.B., M.Ş., Z.Ö., Y.Ç.

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