

# FEAR, ANXIETY, BURNOUT, AND INSOMNIA LEVELS OF HEALTHCARE WORKERS DURING COVID-19 PANDEMIC IN TURKEY

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## SUMMARY

**Background:** This study aims to assess fear, anxiety, anxiety sensitivity, burnout, and insomnia of healthcare workers (HCWs) during novel coronavirus-2019 (COVID-19) outbreak and to identify their relation to sociodemographic and clinical characteristics.

**Subjects and methods:** Totally 600 HCWs were included in this cross-sectional study. A Sociodemographic Data Form, Coronavirus Anxiety Scale (CAS), Fear of COVID-19 Scale (FCV-19S), Anxiety Sensitivity Index-3 (ASI-3), Maslach Burnout Inventory (MBI), and Insomnia Severity Index (ISI) were used.

**Results:** Of participants, 364 were females and 236 were males with a mean age of  $33.49 \pm 7.29$  years. About 95.3% of HCWs had a fear of infecting their loved ones. Mean MBI and ISI scores were significantly higher among HCWs working in COVID-19 clinics and intensive care units ( $p=0.000$ ;  $p=0.039$ ). Mean CAS, FCV-19S, MBI, and ISI scores were significantly higher in women than men ( $p=0.000$ ;  $p=0.000$ ;  $p=0.027$ ;  $p=0.005$ ). Mean CAS and ISI scores were significantly higher among nurses ( $p=0.008$ ;  $p=0.004$ ), while mean ASI-3 of the other HCWs and MBI scores of physicians were significantly higher ( $p=0.009$ ;  $p=0.000$ ).

**Conclusion:** The COVID-19 pandemic is a major health issue associated with psychiatric illnesses in HCW subgroups with distinct sociodemographic characteristics. It is of utmost importance to develop individualized preventive and therapeutic psychiatric services for HCWs.

**Key words:** COVID-19 - healthcare workers - mental health

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## INTRODUCTION

In December 2019, an outbreak of pneumonia-like illness caused by severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) was identified in Wuhan, Hubei province of China and infected millions of individuals worldwide rapidly. On February 11<sup>th</sup> 2020, the World Health Organization (WHO) named the disease the novel coronavirus-2019 (COVID-19) and declared COVID-19 pandemic on March 11<sup>th</sup> 2020 (Gorbalenya et al. 2020, Lazzari et al. 2020). Until December 2020, there have been a total of 74.299.042 confirmed cases including 1.669.982 deaths worldwide (WHO 2020). The COVID-19 outbreak has been one of the most serious and tragic health crises of the last century and caused significant social, economic, and mental consequences (Bošnjak et al. 2020).

Healthcare workers (HCWs) play an essential role in the COVID-19 outbreak, providing care at the frontlines. In addition to overwhelming workload, they also suffer from psychological impacts of the outbreak with the fear of being infected and infecting their loved ones (Shanafelt et al. 2020). In the literature, anxiety and burnout syndrome have been described among HCWs. During the COVID-19 outbreak, the degree of despair and anxiety has been shown to increase in HCWs than the general population (Hacimusalar et al. 2020). In a

study conducted in Wuhan, many HCWs were infected with COVID-19 with a significantly greater risk of infection and contamination (Kang et al. 2020). In this study, HCWs faced with mental health problems due to excessive workload, frustration, discrimination, isolation, fear, and exhaustion.

Since the declaration of the pandemic, the prevalence of psychological distress has increased among HCWs. In a multi-center study, the HCWs who were involved in the care of COVID-19 patients experienced post-traumatic stress disorder (PTSD) more frequently and the risk of development of other psychiatric illness was significantly higher in this population (Chew et al. 2020). In a systematic review, the impact of COVID-19 on mental health was evaluated among hospital-based HCWs and the prevalence of mental health outcomes were found to be as follows: depression 13.5 to 44.7%, anxiety 12.3 to 35.6%, acute stress reaction 5.2 to 32.9%, PTSD 7.4 to 37.4%, insomnia 33.8 to 36.1%, and occupational burnout 3.1 to 43.0% (Sanghera et al. 2020, Franza et al. 2020). In addition, direct exposure to COVID-19 patients was the most prevalent risk factor for all mental health outcomes, except for occupational burnout. Not surprisingly, the worst outcomes were reported in nurses, frontline HCWs, and those with low social support and fewer years of working experience. In another review evaluating mental health problems

faced by the HCWs during the COVID-19 pandemic, sociodemographic characteristics such as sex, profession, age, and place and department of work were associated with an increased severity of mental health problems (Spoorthy et al. 2020). Additionally, psychological variables such as low social support and self-efficacy were related to increased stress, anxiety, depression, and insomnia symptoms. The authors concluded that there was growing evidence suggesting that COVID-19 could be an independent risk factor for stress in HCWs.

In the present study, we aimed to assess fear, anxiety, anxiety sensitivity, burnout, and insomnia of HCWs during COVID-19 outbreak and to identify their relation to sociodemographic and clinical characteristics in this population.

## SUBJECTS AND METHODS

The questionnaires were fulfilled by the participants via an online survey. All participants were informed about the nature of the study in detail before the study and a written informed consent was obtained. The study protocol was approved by the Ethics Committee of Health Sciences University, Fatih Sultan Mehmet Foundation University (No: 25 - Date: 23/09/2020). The study was conducted in accordance with the principles of the Declaration of Helsinki. The data were collected between October 1<sup>st</sup> and October 31<sup>st</sup>, 2020.

### Participants

The HCWs including physicians, nurses, and other workers (i.e., psychologist, laboratory technicians, radiology technicians, hospital staff, and security staff) across the country were included in the study. Inclusion criteria were as follows: aged between 18 and 70 years; working at a university hospital, training and research hospital, or state hospital; receiving no COVID-19 treatment at the time of the questionnaire; and not being under quarantine or isolation due to close contact with a suspected COVID-19 patient. Exclusion criteria were as follows: incomplete questionnaires; being infected with COVID-19 at the time of questionnaire; being on leave at the time of questionnaire; and being unemployed.

### Materials

#### *Sociodemographic data form*

A sociodemographic data form was developed by the researchers and administered to all participants to collect data regarding age, sex, marital status, place of work, occupation, active working status in the COVID-19 clinics or intensive care units (ICUs), and psychiatric or chronic physical illness.

#### *Coronavirus Anxiety Scale (CAS)*

The CAS, which was developed by Lee (2020), is a valid and reliable tool and measures physiological reac-

tions of COVID-19-related anxiety. The validity and reliability studies of the scale in the Turkish population were conducted by Akkuzu et al. (2020). Each item is scored based on the symptoms experienced within the past two weeks using a 5-point anchored scale, ranging from 0 (not at all) to 4 (nearly every day). Higher scores indicate the greater anxiety of COVID-19.

#### *Fear of COVID-19 Scale (FCV-19S)*

The FCV-19S, which was developed by Ahorsu et al. (2020), is a valid and reliable tool for the assessment of fear of COVID-19 among the general population. The validity and reliability studies of the scale in the Turkish population were conducted by Ladikli et al. (2020). It has a single-factor structure and uses a 5-item Likert-type scale (1= strongly disagree; 5 = strongly agree). Higher scores indicate the greater fear of COVID-19.

#### *Anxiety Sensitivity Index-3 (ASI-3)*

The ASI-3 was originally developed by Taylor et al. (2007) to evaluate how sensitive individuals are to their own anxiety symptoms and experiences. The validity and reliability studies of the scale in the Turkish population were conducted by Mantar et al. (2010). It is an 18-item self-report questionnaire consisting of six items in three subscales: physical, social, and cognitive concerns. The scores are ranged on a 5-point Likert-type scale and higher scores indicate the higher anxiety sensitivity.

#### *Maslach Burnout Inventory (MBI)*

The MBI, which was originally developed by Maslach and Jackson (1981) is a self-report instrument to evaluate the intensity and frequency of perceived burnout. The validity and reliability studies of the scale in the Turkish population were conducted by Ergin et al. (1992). It consists of 22 items and the scores are ranged on a 5-point Likert-type scale and higher scores indicate the higher burnout.

#### *Insomnia Severity Index (ISI)*

The ISI is a valid and reliable tool to assess perceived insomnia severity. It was developed by Bastien et al. (2001). The validity and reliability studies of the scale in the Turkish population were conducted by Boysan et al. (2010). Each item is scored on a 5-point Likert-type scale and higher scores indicate greater insomnia severity.

### Analysis of Data

Statistical analysis was performed using the SPSS version 26.0 and AMOS version 22.0 software (IBM Corp., Armonk, NY, USA) Descriptive data were expressed in mean  $\pm$  standard deviation (SD), median (min-max) or number and frequency, where applicable. Normality distribution was analyzed using the skewness and kurtosis values. As the normality was met, parametric tests were used. An independent samples t-test was performed to evaluate differences between two variables, while one-way analysis of variance (ANOVA)

was used for multiple comparisons. The Pearson correlation analysis was carried out to analyze the relationships between the total scores. The predictive performance of the variables was examined using the structural equation model. A p value of <0.05 was considered statistically significant.

## RESULTS

A total of 600 HCWs were included in this study. Of the participants, 364 (60.7%) were females and 236 (39.3%) were males with a mean age of 33.49±7.29 (range, 19 to 66) years. Among the participants, 381 (63.5%) were married and 219 (36.5%) were single or separated. In addition, 287 (47.8%) were physicians, 192 (32%) were nurses, and 121 (20.2%) were the other HCWs. A total of 292 (48.7%), 175 (29.1%), and 133 (22.2%) of the HCWs were working at a state hospital, university hospital, and training and research hospital, respectively (Table 1).

The mean CAS (t(598)=6.696; p<0.001), FCV-19S (t(598)=5.846; p<0.001), MBI (t(598)=2.214; p<0.05), ISI scores (t(598)=2.839; p<0.01) were significantly higher among female HCWs than men. However, there was no statistically significant difference in the mean ASI-3 scores between the two sexes (p=0.789). The mean

**Table 1.** Sociodemographic Characteristics of the Participants

	n (600)	%
Sex		
Female	364	60.7
Male	236	39.3
Marital Status		
Married	381	63.5
Single / separate	219	36.5
Occupation		
Physicians	287	47.8
Nurses	192	32.0
Others	121	20.2
Working institution		
State Hospital	292	48.7
Training and Research Hospital	133	22.2
University Hospital	175	29.1
Age (year) (M±SD)	33.49±7.29 (min: 19, max: 66)	

CAS (F(2/597)=4.919; p<0.01) and ISI scores (F(2/597)=5.572; p<0.01) were significantly higher among nurses, the mean ASI-3 of the other HCWs (F(2/597)=4.919718 p<0.01) and MBI scores of physicians (F(2/597)=15.120; p<0.001) were significantly higher. In addition, the mean MBI (t(598)=3.868; p<0.001) and ISI scores (t(598)=2.073; p<0.05) were

**Table 2.** Comparison of scales according to sex, occupation, working in the frontline, accompanying chronic and psychiatric illnesses

	CAS	FCV-19S	ASI-3	MBI	ISI
Sex					
Female	3.78±4.03	20.74±5.88	37.09±14.86	59.67±11.18	17.29±6.23
Male	1.78±2.77	17.80±6.23	37.42±14.76	57.53±12.18	15.86±5.72
t(598)	6.696	5.846	-0.268	2.214	2.839
p	<0.001	<0.001	0.789	0.027	0.005
Occupation					
Physician	2.54±3.43	19.14±5.77	35.40±13.92	61.18±10.85	15.99±5.29
Nurse	3.61±4.07	19.98±6.63	38.22±15.33	57.99±12.33	17.86±6.88
Other	3.10±3.66	20.01±6.37	39.94±15.54	54.59±10.93	16.69±6.18
F(2/597)	4.919	1.431	4.718	15.120	5.572
p	0.008	0.240	0.009	<0.001	0.004
Working in the frontline					
Yes	3.21±3.90	19.23±5.93	36.70±14.37	60.58±11.25	17.22±6.23
No	2.76±3.50	19.96±6.44	37.77±15.27	56.95±11.75	16.20±5.85
t(598)	1.454	-1.441	-0.882	3.868	2.073
p	0.146	0.150	0.378	<0.001	0.039
Chronic disease					
Yes	3.74±4.17	21.67±6.96	42.44±16.86	58.59±12.17	18.06±6.33
No	2.82±3.59	19.11±5.90	36.02±14.04	58.89±11.50	16.42±5.97
t(598)	2.370	4.005	4.193	-0.243	2.593
p	0.018	0.000	0.000	0.808	0.010
Psychiatric illness					
Yes	4.15±5.02	19.53±6.48	39.66±17.40	61.87±10.98	19.30±6.91
No	2.88±3.55	19.59±6.16	36.98±14.53	58.54±11.65	16.48±5.93
t(598)	2.384	-0.070	1.258	1.998	3.261
p	0.017	0.944	0.209	0.046	0.001

Data are given in mean ± SD, unless otherwise stated. CAS: Coronavirus Anxiety Scale; FCV-19S: Fear of COVID-19 Scale; ASI-3: Anxiety Sensitivity Index-3; MBI: Maslach Burnout Inventory; ISI: Insomnia Severity Index

significantly higher in HCWs working in the COVID-19 clinics and ICUs than those who were not working. All scale scores, except for the MBI, were significantly higher in HCWs having a chronic disease ( $p < 0.05$ ). The mean CAS ( $t(598) = 2.384$ ;  $p < 0.05$ ), MBI ( $t(598) = 1.998$ ;  $p < 0.05$ ), and ISI ( $t(598) = 3.261$ ;  $p < 0.01$ ) scores were significantly higher in HCWs with a psychiatric illness than those without (Table 2).

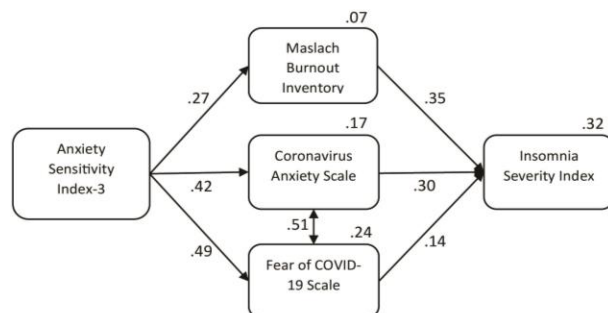
Correlation analysis revealed a mild-to-moderate, positive, statistically significant relationships between the variables (Table 3).

**Table 3.** Correlation analysis results

	CAS	FCV-19S	ASI-3	MBI
FCV-19S	0.60			
ASI-3	0.42	0.49		
MBI	0.26	0.22	0.27	
ISI	0.47	0.39	0.43	0.45

CAS: Coronavirus Anxiety Scale; FCV-19S: Fear of COVID-19 Scale; ASI-3: Anxiety Sensitivity Index-3; MBI: Maslach Burnout Inventory; ISI: Insomnia Severity Index

The multiple correlations between the variables were analyzed in a structural equation model. Accordingly, there was a significant correlation between ASI-3 scores and CAS ( $\beta = 0.42$ ;  $p < 0.001$ ), FCV-19S ( $\beta = 0.49$ ;  $p < 0.001$ ), and MBI scores ( $\beta = 0.27$ ;  $p < 0.001$ ). The CAS ( $\beta = 0.30$ ;  $p < 0.001$ ), FCV-19S ( $\beta = 0.14$ ;  $p < 0.001$ ), and MBI scores ( $\beta = 0.35$ ;  $p < 0.001$ ) could explain 32% of the ISI scores. In addition, the direct effect of anxiety sensitivity on insomnia severity was statistically significant ( $\beta = 0.29$ ;  $p < 0.001$ ). The goodness-of-fit of the model was met (CMIN/DF=15.50; GFI=0.97; CFI=0.95; IFI=0.94; NFI=0.94; RMSEA=0.10) (Figure 1).



**Figure 1.** Structural equation model

## DISCUSSION

In the present study, we assessed fear, anxiety, anxiety sensitivity, burnout, and insomnia of HCWs during COVID-19 outbreak and to identify their relation to sociodemographic and clinical characteristics in this population. Our results showed that the majority of HCWs had a fear of infecting their loved ones; the number of HCWs working in the COVID-19 wards and ICUs and experiencing burnout and insomnia was

significantly higher; and female HCWs had a higher degree of anxiety, fear, burnout, and insomnia than male HCWs. In addition, the mean CAS and ISI scores were significantly higher among nurses, while the mean ASI-3 of the other HCWs and MBI scores of physicians were significantly higher. There was also a mild-to-moderate, positive, statistically significant correlation between the FCV-19S, CAS, ASI-3, MBI, and ISI scores.

It has been estimated that about 10 to 20% of all COVID-19 cases are HCWs (CDC COVID-19 Response Team 2020; Lazzarini & Putoto 2020). As the HCWs have often a close contact with suspected or confirmed COVID-19 cases, they are at a high risk for being infected, making them asymptomatic COVID-19 carriers and a potent source of transmission out of the hospital (Black et al. 2020). The majority of HCWs experience psychological distress due to overwhelming workload and fear of being infected and infecting their loved ones (Shanafelt et al. 2020). Similarly, 95.2% of the HCWs had a fear of infecting their loved ones in our study. Self-isolation of HCWs to protect their family members and loved ones increases the psychological distress and mental health problems. Therefore, protection of HCWs with appropriate measures which minimize the infection risk, decreasing their workload, and providing physical and psychological counseling are recommended to reduce mental health problems among HCWs.

In the current study, the mean CAS, FCV-19S, MBI, and ISI scores were significantly higher in women than men. However, no statistically significant difference was observed in the mean ASI-3 scores between the two sexes. In the literature, it has been well documented that women more frequently experience depression and anxiety than men with a significantly higher rate of mental health problems. Previous studies reported that the rate of depression and anxiety was significantly higher among female HCWs than male HCWs (Hossain et al. 2020, Lai et al. 2020, Li et al. 2003, Naser et al. 2020). In addition, the rate of depression was 1.6-fold higher in women than men, suggesting that sex is a risk factor for psychiatric illnesses (Albert 2015, Bartels et al. 2013). This can be attributed to more frequent hormonal fluctuations in women than men and sex-specific frailty. The significantly higher CAS, FCV-19S, MBI, and ISI scores in female HCWs can be explained by this concept, requiring additional protective measures for this population during the COVID-19 pandemic.

Furthermore, the mean MBI and ISI scores were significantly higher in HCWs working in the COVID-19 clinics and ICUs than those who were not working in our study. However, we found no significant difference in the mean CAS, FCV-19S, and ASI-3 scores. In a study, individuals living in Wuhan, Hubei province of China, where the first case of COVID-19 was identified, more frequently experienced psychological problems than those living outside of Wuhan (Lai et al. 2020). In addition, the authors reported that HCWs who involved in the care of confirmed cases experienced more depression, anxiety,

and burnout symptoms (Sanghera et al. 2020). However, some authors showed no significant difference in the depression and anxiety scores between HCWs working in the COVID-19 clinics and those who were not (Liang et al. 2020). Nonetheless, having a closer contact and providing care to the confirmed COVID-19 cases in the pandemic clinics and ICUs may make HCWs susceptible to infection and transmit the disease to their loved ones, which pose a psychological distress for this population. Consistent with the literature, the mean ISI and MBI scores were significantly higher in HCWs working in the pandemic wards and ICUs. Although there are some findings supporting our results (Lai et al. 2020), some authors have reported controversial results (Sanghera et al. 2020). The significantly higher rate of burnout in our study can be attributed to the excessive workload, long hours of working, and uncertainty over the end of the pandemic. The significantly higher ISI scores can be explained by long hours of working and working in shifts (day/night). Unlike previous findings, however, we found no statistically significant difference in the mean CAS, FCV-19S, and ASI-3 scores between HCWs working in the COVID-19 clinics and those who were not, probably due to the fact that not only HCWs working in the pandemic clinics or ICUs, but also all HCWs experience fear and anxiety stemming from excessive workload, long hours of working, constant exposure to massive data about COVID-19 in visual and print media, and a poor social support network due to COVID-19 restrictions.

Several studies have shown that HCWs are exposed to many psychosocial stressors, leading to mental health problems including depression, anxiety, insomnia, and burnout (Hacimusalar et al. 2020, Hossain et al. 2020, Lai et al. 2020, Matsuo et al. 2020). In a study, 56.59% of HCWs reported anxiety, depression, and insomnia symptoms, while the symptoms were mild in 38.47% and moderate in 18.12% of them (Que et al. 2020). In this study, these symptoms were most frequently seen in nurses and less frequently seen in residents. In another study investigating the prevalence of burnout in HCWs, the overall burnout rate was 31.4% with the highest rate among nurses (Matsuo et al. 2020). In a Chinese study, HCWs providing care to COVID-19 cases experienced more frequent anxiety, depression, and insomnia symptoms and these symptoms were more prevalent among nurses than physicians (Lai et al. 2020). In another study investigating the psychological effect of COVID-19 and coping strategies of frontline HCWs, nurses felt more anxious and nervous while working on the ward than the other HCWs (Cai et al. 2020). Similarly, the mean CAS and ISI scores were significantly higher in nurses in our study, while the mean ASI-3 scores of the other HCWs and MBI scores of the physicians were significantly higher. However, there was no significant difference in the other variables among the work groups. It has been well established that HCWs are at a high risk for mental health problems with varying complaints in different settings. Although it is difficult to describe these

problems as a single entity, HCWs are clearly at a high risk for COVID-19 infection, irrespective of the work description. Therefore, it would be wise to protect HCWs with appropriate measures, improve the working conditions and settings, decreasing their workload, providing social support network, and increase their awareness on mental health problems.

Previous studies have demonstrated that the presence of accompanying chronic diseases is a risk factor for psychiatric illnesses during the COVID-19 pandemic (Hao et al. 2020, Li et al. 2020). In their study, Özdin & Özdin (2020) assessed the degree of depression, anxiety, and health-related anxiety during the pandemic and found that 15.7% of the participants had an accompanying chronic disease with a significantly higher anxiety level. Moreover, elderly and those with chronic diseases were shown to be at a higher risk for COVID-19 infection (Wang et al. 2020) and advanced age and accompanying chronic diseases were the major risk factors for COVID-19-related mortality (Zhou et al. 2020). Consistent with these findings, we also found significantly higher MBI scores in HCWs having an accompanying chronic disease. An excessive amount of news and reports released since the start of pandemic regarding the increased risk for COVID-19 in individuals with chronic diseases; relevant expert statements in mass media; and the particular emphasis on this subject for COVID-19 restrictions may have put an additional pressure on this vulnerable population, as well as HCWs, and made them feel less secure.

Furthermore, several studies have suggested that individuals with an accompanying psychiatric illness are more affected by COVID-19 pandemic-related consequences and more prone to mental health problems (Tan et al. 2020). In a study carried out during the peak of the pandemic with strict lockdown measures, symptoms of depression, anxiety, stress, and insomnia were more severe with a higher rate of impulsivity and intense suicidal ideation in psychiatric patients than healthy controls (Hao et al. 2020). Immediate changes such as infectious disease outbreaks can cause emotional distress and anxiety, adversely affecting the health of psychiatric patients and disrupting their access to the healthcare services (Montemurro 2020). Throughout the world, many hospitals have deferred non-urgent visits and procedures of non-COVID-19 patients and mostly admitted only COVID-19 cases. This is one of the main reasons for the inability to access to psychiatry services for all individuals including HCWs with a psychiatric illness. Undoubtedly, it is essential to take necessary measures and maintain treatment of these patients in the practice of psychiatry. Consistent with the literature, the mean CAS, MBI, and ISI scores of the HCWs with an accompanying psychiatric illness were significantly higher in our study, indicating a greater risk for this population.

Mental health of HCWs should be evaluated from various aspects. A series of factors should be considered to implement psychological interventions, including

external factors (i.e., social support and demographic risk factors) (Jacob 2015). In a study, severe PTSD and burnout symptoms persisted in HCWs for 13 to 26 months after the 2003 SARS outbreak (Mauder et al. 2006). The spread of COVID-19 as a pandemic has also affected the mental health of HCWs adversely due to its high impact on the healthcare services. Therefore, longitudinal follow-up of this group of workers is critical for the accurate evaluation of mental health problems, and preventive measures should be taken and novel therapeutic options should be developed.

Furthermore, we found a mild-to-moderate, positive, statistically significant correlation between the FCV-19S, CAS, ASI-3, MBI, and ISI scores using a structural equation model. Accordingly, anxiety sensitivity showed a significant effect on increased CAS, FCV-19S, and MBI scores, leading to the sleep problems.

The main limitation of the present study is its cross-sectional design. The use of self-report instruments and the lack of a face-to-face questionnaire are the other limitations. In addition, the number of questions is limited, as the increased number of questions reduces the number of participants in such surveys. On the other hand, the main strength of this study is its relatively large sample size, due to its electronic nature. Also, the questionnaires with missing and incorrect responses were able to be eliminated easily.

## CONCLUSION

In conclusion, COVID-19 is still one of the major threats worldwide with a global effect on mental health. During the pandemic, COVID-19 has affected all HCWs, whether they are frontline workers or not. Taken together, psychological distress related to the pandemic may have also triggered an outbreak of psychiatric illnesses. It is critical to identify high-risk groups, provide psychosocial interventions, and refer selected patients requiring treatment to psychiatry services to manage mental health problems of HCWs and to maintain delivery of healthcare services successfully. Further studies are warranted to shed light into the early recognition of mental problems, prompt treatment, and being prepared for the future outbreaks.

### Contribution of individual authors:

Yavuz Yılmaz: conceptualization, data curation, methodology, software, formal analysis, investigation, writing-original draft, writing-review & editing.

Ali Erdogan: conceptualization, methodology, data curation, investigation, writing-original draft, writing-review & editing.

Erdi Bahadır: data curation, methodology, investigation, writing-original draft, writing-review & editing.

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