

COMPARISON OF ANXIETY LEVELS AMONG HEALTHCARE WORKERS WITH BECK ANXIETY INVENTORY DURING COVID-19 PANDEMIC

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ABSTRACT

INTRODUCTION: The COVID-19 pandemic is one of the disasters that has caused the highest number of healthcare worker (HCW) deaths recently. The aim of this study is to determine the anxiety levels of HCWs who are actively working during the COVID-19 pandemic.

MATERIAL AND METHODS: The study was conducted online with 177 HCWs (127 doctors, 31 nurses, 15 paramedics, and 4 health technicians) due to the pandemic. Beck Anxiety Inventory (BAI) was used for anxiety levels.

RESULTS: Anxiety levels of HCWs were found to be 48% 'minimal', 23.7% 'mild', 17.5% 'moderate' and 10.7% 'severe'. The mean BAI score of other HCWs was higher than the mean BAI score of doctors (15.94 ± 12.776 vs 9.53 ± 8.868). The highest level of anxiety was found in nurses (19.64 ± 13.370), ($p < 0.001$). The mean BAI score of female HCWs was found higher than the mean BAI of male HCWs (14.07 ± 10.899 vs 7.61 ± 8.681) and the mean BAI score of HCWs without children was found to be higher than the mean BAI score of those with children (13.77 ± 11.713 vs 9.66 ± 9.260). The mean BAI score of HCWs who live with their relatives over 65 years of age or live with a relative with a chronic disease was found to be higher than the others (14.11 ± 9.752 vs 10.44 ± 9.752), ($p < 0.05$).

CONCLUSIONS: During the COVID-19 epidemic, which has caused the highest number of HCW deaths in recent years, it has been determined that both the BAI score and anxiety levels of HCWs are high. Anxiety levels of nurses, women, those who do not have children, those who live with their relatives over 65 years of age, and those who live with chronic patients were found to be higher than the others.

KEYWORDS: COVID-19; pandemic; Beck anxiety inventory; health care worker; doctor; nurse; paramedic

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INTRODUCTION

Pandemic is the general name given to an epidemic disease that spreads to a continent or the whole world. There have been pandemics in world history that have caused great morbidity and mortality

such as the Black Death, influenza, cholera, and typhoid [1]. The New Coronavirus Disease (COVID-19) caused by the SARS-CoV-2 virus, which was first documented in Wuhan, China in December 2019, spread throughout the world, causing the biggest

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pandemic in recent years. According to the data of the World Health Organization (WHO), the number of confirmed COVID-19 cases in the world in March 2023 exceeded 750 million. In Türkiye, according to the data of the T.R. Ministry of Health, the number of confirmed COVID-19 cases in March 2023 exceeded 17 million [2, 3].

The COVID-19 pandemic emerged as a disease to be shown as an example of the WHO's definition of disease. Covid-19 has affected the health of people all over the world, not only biologically, but also psychologically and socially.

As in the 2003 SARS epidemic, it was observed that the stress experienced by people increased as the quarantine period extended during the 2019 COVID-19 pandemic. Long quarantine periods affected healthcare workers (HCWs) more than other people in terms of biological, psychological, and social aspects [4, 5]. Isolation and quarantine measures applied in epidemic diseases such as COVID-19 caused psychosocial problems such as hopelessness, insomnia, irritability, anger, loneliness, anxiety, depression, and post-traumatic stress syndrome. The reason for this is generally reported as the uncertainty of the disease, inadequacy to meet basic needs, financial losses, incorrect and insufficient information, and communication problems [4–6].

According to the WHO report, 23–46% of HCWs reported anxiety symptoms and 20–37% reported depressive symptoms during the COVID-19 pandemic [7].

In a study of 1,257 HCWs from 34 hospitals active in the fight against COVID-19 in China, 44.6% reported anxiety [8]. One of the most important conditions for HCWs which also has been observed to increase anxiety levels has been the fear of infecting family members [1, 9]. In a cross-sectional survey conducted in the United States, about one-third of participating HCWs reported fear of contracting COVID-19 infection from loved ones, one-third of participating HCWs reported fear of causing the death of loved ones, and one-fifth of participating HCWs reported worry about self-death from Covid-19 [10]. Fear of infecting the family, fear of family members' death, long working hours, working in the intensive care unit and emergency room for a long time, and not getting psychological support were reported as factors increasing anxiety in nurses [11].

According to WHO data, the number of deaths due to COVID-19 in the world in March 2023 was

6.9 million. In addition, according to the data of the Turkish Ministry of Health, the number of deaths due to COVID-19 in Turkey in March 2023 exceeded 102,000 [2, 3].

Although there are many publications about patients and diseases due to the COVID-19 pandemic in the world literature, both scientific and official data on the number of HCWs who lost their lives while treating COVID-19 patients are insufficient and unfortunately inconsistent. A report dated March 11, 2021 claimed 3,000 HCWs had died. According to WHO, it has been suggested that between January 2020 and May 2021, between 80,000 and 180,000 HCWs may have died from COVID-19 [6, 12].

In a meta-analysis study on COVID-19 and HCWs, it was reported that the prevalence of hospitalization of HCWs was 15.1% and the mortality rate was 1.5% [13]. In the April 2022 report of the Turkish Medical Association, 506 Turkish HCWs were reported to have died due to COVID-19 up to February 28, 2022. Of those who died due to COVID-19 34.0% were doctors, 13.4% were pharmacists and 7.3% were nurses and midwives [14].

This high death rate among healthcare workers due to COVID-19 has led to more psychosocial problems for healthcare workers working in very intense and severe conditions [15–17]. In a study conducted in Turkey in 2020, it was determined that nurses who welcomed COVID-19 patients experienced moderate death anxiety [11]. On the other hand, the deaths of COVID-19 patients, for whom they were responsible for their treatment, also affected HCWs psychologically. Healthcare workers who witnessed the death of a COVID-19 patient were four times more likely to have post-traumatic stress syndrome than others [18].

The aim of this study is to investigate the anxiety levels of HCWs who are trying to save lives in intense and stressful environments by risking their own lives during the COVID-19 pandemic and the factors affecting it.

MATERIAL AND METHODS

Population and sample

This study was conducted online with 177 HCWs working in different departments of public or private hospitals in Istanbul, the city with the highest number of cases in Türkiye, between April 27, 2020 and May 27, 2020. A study announcement was made

on a platform where health professionals communicate online in Istanbul, and Healthcare workers who wished to participate voluntarily were determined. HCWs who wished to participate in the study were provided with the online link sent by e-mail to reach the questionnaire. The questionnaire was composed of three sections. The first part was comprised of instructions on how to fill out the questionnaire and information about the scale. In the second part, HCWs were asked to provide demographic information. In the third part, HCWs were asked to fill out the Beck Anxiety Inventory (BAI) scale.

The HCWs participating in this study were asked about their age, gender, marital status, the department they work in, whether they work the night shift, whether they actively examine COVID-19 patients, and how many years they have worked in the hospital. In addition, HCWs were asked whether they lived at home with a relative over the age of 65 or with a chronic illness.

Healthcare workers who did not complete the questionnaire sent to them and HCWs who did not work actively during the COVID-19 pandemic were excluded from the study.

71.8% of the 177 HCWs participating in this study are doctors and 28.2% are other HCWs. 127 doctors from 26 different branches participated in this study. Emergency medicine specialists comprised the largest group of doctors (26.7%). Nurses comprised the largest group among other HCWs (60%) (Tab. 1).

Of the 177 HCWs participating in the study, 42.6% (n = 75) were male and 57.6% (n = 102) female (Tab. 2).

The mean age of 177 HCWs participating in the study was found to be 40.61 ± 12.331 (median: 38, minimum: 21, maximum: 64). There was no statistically significant difference between the mean age of female HCWs (n = 75), (40.69 ± 12.411) and the mean age of male HCWs (n = 102), (40.55 ± 12.333), (t = 0.077, p = 0.939).

The mean age of 127 doctors participating in the study (45.37 ± 10.767) was found to be higher than the mean age of other HCWs (28.52 ± 6.335), (t = -12.865, p = 0.00).

63.8% of HCWs were married and 59.3% had children. 24.3% of HCWs lived with a relative over 65 years of age or with a relative with a chronic illness (Tab. 2). 53.7% of the 177 HCWs who participated in the research have been working in their profession for five years or less, while the rest have been working for 5 years or more (Tab. 3).

Table 1. Branches of the doctors participating in the study

Professions	Branches	n	%
Doctors	Emergency medicine	34	26.7
	General practitioner	15	11.8
	Internal medicine	11	8.6
	Pediatrician	9	7
	Obstetrician	8	6.2
	Pathologist	4	3.1
	General surgeon	4	3.1
	Urologist	4	3.1
	Infectious diseases	4	3.1
	Ophthalmologist	4	3.1
	Cardiologist	4	3.1
	Anesthesiologist	3	2.3
	Radiologist	3	2.3
	Dermatologist	3	2.3
	Physical therapist	2	1.6
	Pulmonologist	2	1.6
	ENT specialist	2	1.6
	Microbiologist	2	1.6
	Psychiatrist	2	1.6
	Cardiovascular surgeon	1	0.7
	Forensic medicine	1	0.7
	Family physician	1	0.7
	Neurosurgeon	1	0.7
	Neurologist	1	0.7
	Biochemist	1	0.7
	Pediatric surgeon	1	0.7
Total	127	100	
Other HCWs	Nurse	31	62
	Paramedic	15	30
	Technician	4	8
	Total	50	100

HCWs — health care workers

Beck Anxiety Inventory

The Beck Anxiety Inventory (BAI), created by Aaron T. Beck and colleagues, is a 21-question multiple-choice self-report inventory that is used for measuring the severity of anxiety in children and adults [19, 20]. The BAI contains 21 questions, each answer being scored on a scale value of 0 (not at all) to 3 (severely). Higher total scores indicate more severe anxiety symptoms. The anxiety level is determined according to the scores. Anxiety levels are categorized as follows: minimal anxiety

Table 2. Comparison of anxiety levels of health care workers (HCWs) according to their personal characteristics

Characteristics of HCWs		BAI anxiety levels				Total	Anxiety scores	p**
		MIN.	MILD	MOD.	SEV.		Mean ± SD	
Sex	Male	48	15	10	2	75	7.61 ± 8.681	t = -4.389; p = 0.00
	Female	37	27	21	17	102	14.07 ± 10.899	
	p*	p = 0.001*						
Marriage status	Married	60	25	18	10	113	10.20 ± 9.984	t = -1.927; p = 0.056
	Single	25	17	13	9	64	23.34 ± 11.137	
	p*	p = 0.321*						
Have children	Yes	57	24	16	8	105	9.66 ± 9.260	t = -2.492; p = 0.014
	No	28	18	15	11	72	13.77 ± 11.713	
	p*	p = 0.152*						
Have Elderly/patient	Yes	12	14	11	6	43	14.11 ± 9.752	t = -2.012; p = 0.039
	No	73	28	20	13	134	10.44 ± 9.752	
	p*	p = 0.025*						
Total		85	42	31	19	177		

*Pearson Chi-Square; **Independent samples; BAI — Beck anxiety inventory; MIN. — minimum; MOD. — moderate; SEV. — severe; SD — standard deviation

Table 3. Comparison of the anxiety levels of health care workers (HCWs) according to their professional characteristics

Characteristics of HCWs		BAI anxiety levels				Total	Anxiety scores	p**
		MIN.	MILD	MOD.	SEV.		Mean ± SD	
Professions	Doctors	67	33	20	7	127	9.52 ± 8.868	t = 3.254; p = 0.002
	Other HCWs	18	9	11	12	50	19.64 ± 13.370	
	p*	p = 0.001*						
Covid examination	Yes	48	26	17	10	101	11.23 ± 10.394	t = -0.148; p = 0.883
	No	37	16	14	9	76	11.47 ± 10.693	
	p*	p = 0.890*						
Shift working	Yes	49	26	22	14	111	12.42 ± 11.063	t = -1.877; p = 0.075
	No	36	16	9	5	66	9.515 ± 9.255	
	p*	p = 0.419*						
Department Of Doctors	ED-EP	17	9	7	1	34	9.61 ± 7.981	t = 1.064; p = 0.289
	Others	50	24	13	6	93	11.74 ± 10.991	
	p*	p = 0.725						
Working years	< 5 years	50	18	16	11	95	10.96 ± 10.880	t = -0.505; p = 0.614
	≥ 5 years	35	24	15	8	82	11.41 ± 10.504	
	p*	p = 0.490*						
Total		85	42	31	19	177		

*Pearson Chi-Square; ** Independent samples; BAI — Beck anxiety inventory; MIN. — Minimum; MOD. — Moderate; SEV. — severe; SD — standard deviation; ED-EP — Emergency Department-Emergency Physician

(0–7 points), mild anxiety (8–15 points), moderate anxiety (16–25 points), and severe anxiety (26–63 points). BAI was translated into Turkish by Ulusoy et al. in 1998 [21].

Data analysis

The data obtained in the study were processed using IBM SPSS version 20.0. In this study, frequencies, percentage distributions, means, standard deviations,

and intervals (minimum, maximum) were used as descriptive analysis methods. Independent sample t test was used for comparing means of two independent groups and Pearson's chi-squared test was used for nonparametric data. $P < 0.05$ was considered statistically significant.

RESULTS

The five emotional states that HCWs gave the lowest score on the 21-question BAI scale were 'Faint/light-headed' (92.7%), 'shaky/unsteady' (84.7%), 'face flushed' (76.3%), 'hands trembling' (75.4%) and 'difficulty in breathing' (73.4%). On the other hand, the top 5 emotional states that HCWs give the highest score in the BAI were 'nervous' (12.4%), 'indigestion' (6.8%), 'fear of losing control' (4.5%), 'unable to relax' (4.5%) and 'wobbliness in leg' (3.4%).

Among the HCWs participating in the study, 48.0% ($n = 85$) had minimal anxiety, 23.7% ($n = 42$) had mild anxiety, 17.5% ($n = 31$) had moderate anxiety and 10.7% ($n = 19$) had severe anxiety (Tab. 2, 3).

In the study, more severe anxiety was observed in female HCWs than male HCWs ($p < 0.01$). In addition, the mean BAI scores of female HCWs were found to be statistically higher than the mean BAI scores of male HCWs ($p < 0.01$) (Tab. 2).

In the study, 57.5% ($n = 73$) of 127 doctors and 60% ($n = 21$) of 35 nurses were women. Severe anxiety symptoms were detected in 8.2% of female doctors and 42.9% of female nurses ($p < 0.01$). On the other hand, 1.9% of male doctors and 10% of male nurses had severe anxiety symptoms.

In this study, there was no statistical difference between the anxiety levels of HCWs who had children and those who did not ($p > 0.05$), while the mean BAI scores of those who did not were found to be statistically significantly higher ($p < 0.05$) (Tab. 2).

In this study, 13.9% of HCWs with elderly relatives (> 65 years old) or chronic patients at home had severe anxiety, while 9.7% of those who did not have severe anxiety ($p < 0.05$). The mean BAI scores of HCWs with elderly relatives or chronic patients at home were found to be statistically significantly higher ($p < 0.05$) (Tab. 2).

In this study, no statistically significant difference was found in anxiety levels and mean BAI scores between married HCWs and single HCWs ($p > 0.05$) (Tab. 2).

In this study, 5.5% of the doctors had severe anxiety, while 12.2% of the other HCWs had severe anxiety ($p < 0.01$).

In this study, the mean BAI score of all HCWs was 11.339 ± 10.494 (Min: 0; Max: 48). The mean BAI score of the doctors was 9.527 ± 8.868 , the mean BAI score of the nurses was 19.645 ± 13.370 , the mean BAI score of the paramedics was 10.466 ± 9.912 , and the mean BAI score of the technicians was 7.750 ± 6.238 .

The mean BAI scores of the nurses were found to be statistically significantly higher than the mean BAI scores of the doctors ($p < 0.01$). The difference between the mean BAI score of paramedics and technicians, whose mean BAI score was lower than that of nurses, and the mean BAI score of doctors, was not statistically significant ($p > 0.05$).

10.7% ($n = 19$) of the HCWs who participated in the study marked all questions in the BAI scale as "0 points-None". 63.1% of HCWs who gave a zero score on the BAI scale had examined COVID-19 patients. At the same time, 84.2% of those who scored zero on the BAI scale were doctors.

In this study, 2.9% of emergency medicine specialists had severe anxiety, while 6.4% of other doctors had severe anxiety. The mean BAI scores of emergency medicine specialists was found to be lower than the mean BAI score of other doctors. However, neither the anxiety level difference nor the mean BAI score difference was found to be statistically significant ($p > 0.05$) (Tab. 3).

In this study, 9.9% of the HCWs who examined COVID-19 patients had severe anxiety levels, while 11.8% of those who did not examine had severe anxiety levels. The mean BAI score of HCWs who examined COVID-19 patients was found to be lower than the mean BAI score of those who did not. However, neither the anxiety level difference nor the mean BAI score difference was found to be statistically significant ($p > 0.05$) (Tab. 3).

In this study, 12.6% of the HCWs working the night shift had a severe anxiety level, while 7.5% of the non-working HCWs had a severe anxiety level. The mean BAI score of the HCWs working the night shift was found to be higher than the mean BAI score of those who did not work. However, neither the anxiety level difference nor the mean BAI score difference was found to be statistically significant ($p > 0.05$) (Tab. 3).

DISCUSSION

In the COVID-19 pandemic, which is one of the most fatal disasters in recent years, not only the patients but also the HCWs who care for the patients and their families have been affected. The COVID-19 pandemic has caused the death of HCWs at an unprecedented rate in the world. The difficulties in treating patients in the face of an unknown disease, the deaths of their own HCW friends, and the risk of infecting themselves and their families with the disease have affected the HCWs psychosocially. It has been reported that the level of anxiety is higher, especially in frontline HCWs [22].

COVID-19 has become a major epidemic that affects the whole world politically, socially, and economically. Since the first case seen in Turkey on March 11, 2020, HCWs have had to adapt to changing conditions. Changing conditions and difficult working conditions naturally directly affected the lives of HCWs. The pandemic has mentally affected HCWs who are trying to both save the lives of their patients and survive by protecting themselves and their families from COVID-19 contamination [10, 11, 14].

In a survey study conducted by Çağ et al. [23] with 1416 HCWs from 75 countries (including Türkiye), the anxiety levels of HCWs during COVID-19 were examined. According to the applied BAI, 35.5% of HCWs had minimal anxiety, 27.5% had mild anxiety, 20.3% had moderate anxiety, and 16.7% had severe anxiety [23]. In the study of Beşirli et al. [24], which was conducted in a training and research hospital in Istanbul and investigated the anxiety levels of HCWs during the COVID-19 pandemic according to their BAI scores, 60.5% of the participants had mild anxiety, 25.5% had moderate anxiety, 8.5% had moderate anxiety and 5.5% had severe anxiety. In this study, the mean BAI score was found to be 8.2 ± 9.2 [24].

In our study, the anxiety levels of HCWs were found to be lower than those of Çağ et al. [23], and higher than those of HCWs in the study of Beşirli et al. [24]. In addition, the mean BAI score of the HCWs in our study was found to be higher than the mean BAI score of the HCWs in the study of Beşirli et al. [24].

When these two studies were examined together with our study, a gradual decrease in BAI levels was observed. The first study by Çağ et al. [23] was done in March 2020, when the first COVID-19 case and the first death due to COVID-19 were seen in Türkiye. The high level of anxiety of HCWs in this study

may be due to the trauma caused by the first death. The reason for the gradual decrease in the next two studies, which were carried out independently of each other at two-month intervals, may be that the health workers got used to the disease and accepted the disease as the months passed. In addition, the increase in information about the disease since April and the increase in personal protective equipment and precautions in Turkey may also have been effective.

Studies have found higher levels of anxiety in female HCWs and nurses who deal directly with COVID-19 patients [9, 25, 26]. In this study in China, all mental health symptom measures of nurses, female HCWs, and frontline HCWs were found to be more severe than other HCWs [8]. In a study conducted in Türkiye in the early stages of COVID-19, it was reported that female HCWs and nurses had higher levels of mental health symptoms than male HCWs and doctors [25]. In a survey study conducted with HCWs working in EDs in Türkiye during the COVID-19 pandemic in 2020, it was reported that anxiety was higher in women, emergency medical technicians, those with extended families, those with few children, and those working in the city center [26].

In the study conducted by Çağ et al. in March 2020 [23], the mean BAI score of nurses (15.96 ± 12.14) was found to be statistically significantly higher than the mean BAI score of physicians (13.28 ± 11.06) [23]. In the study conducted by Beşirli et al. in May 2020, the mean BAI score of nurses (Mean: 8; IQR: 2–8) was found to be statistically significantly higher than the mean score of doctors (Mean: 4; IQR: 3–14) [24].

When the studies of Çağ et al. [23] and Beşirli et al. [24] and our study are compared, it is seen that the mean BAI score of the doctors decreases gradually as the months pass after the first COVID-19 case and the first death. However, the mean BAI scores of the nurses in our study were higher than the mean BAI scores of the nurses in both Çağ et al. [23] and Beşirli et al. study [24]. Before COVID-19, in a study conducted with nursing students in Turkey in 2017, the average BAI score (17.79 ± 12.93) was found to be lower than this study we conducted during the COVID-19 pandemic [27]. This result showed that there was an increase in the anxiety level of nurses during COVID-19.

In our study, similar to other studies [9, 23–26], higher levels of severe anxiety were found in female HCWs than male HCWs. However, when we separate

them according to their professions, it was determined that the level of severe anxiety in female nurses was higher than that of female doctors. It was determined that the level of severe anxiety among male nurses was higher than that of male doctors. Our study showed that being both a woman and a nurse increases the level of severe anxiety.

In our study, as in these studies, the mean anxiety scores of the nurses working on the frontline (in the emergency department) were found to be high. However, the anxiety scores of frontline technicians and paramedics were not as high as nurses. We think that the reason for the high anxiety levels of nurses is that they both work in the frontline and are women.

In a study conducted with doctors in Türkiye before COVID-19 in 2016, the mean BAI score of emergency medicine doctors (13.0 ± 9.3) was found to be higher than the mean BAI score (8.7 ± 7.0) of other specialist doctors ($p < 0.001$) [28].

In our study, the mean BAI scores of the emergency medicine specialists working on the frontline were found to be lower than the physicians working in other departments. In our study, the reason for the low anxiety levels of the emergency medicine doctors may be that they are used to emergencies every day. In addition, it may be because the first doctors who died in Turkey were clinic doctors other than the emergency department.

In our study, the level of anxiety was found to be higher in night shift workers, as expected. However, we think that the reason why the anxiety of those who examine active COVID-19 patients is lower than expected is because the number of emergency department workers in our study is high and they are used to emergency and disaster events.

In addition, among doctors, moderate and severe anxiety was more common among those who did not examine COVID-19 patients, while among nurses and paramedics, moderate and severe anxiety was more common among those who examined COVID-19 patients and those who were working night shifts. Doctors may be at a better mental level than other HCWs thanks to their age difference with other HCWs, as well as their better knowledge and experience on infectious diseases. The fact that the majority of those with a zero score as an anxiety score are doctors may be due to the fact that they are more accustomed to emergencies than other HCWs.

Similar to our findings, in other studies conducted in the USA [10], Türkiye [11], and China [9], the

mean BAI scores were found to be higher in female HCWs, those living with an elderly relative at home, and those living with a relative with a chronic disease at home.

The highest score (12.4%) given in the BAI scoring of the HCWs participating in the study was for 'nervous' mood. This emotional state was followed by 'indigestion' with 6.8%, 'fear of losing control' with 4.5%, 'unable to relax' with 4.5% and 'wobbliness in leg' with 3.4%. These data show that the emotional state of HCWs is not good during the COVID-19 process.

During the COVID-19 pandemic between 2019–2022, HCWs working almost without rest all over the world were tired both physically and mentally. We think that one of the important factors that increase the anxiety of HCWs is their inability to prevent themselves from getting sick and the deaths of their colleagues while trying to save the lives of their patients. In addition, one of the conditions affecting the psychology of HCWs working in severe conditions was the fear of infecting their families with COVID-19.

CONCLUSIONS

During the COVID-19 epidemic, which has caused the highest number of HCW deaths in recent years, it has been determined that both the BAI score and anxiety levels of HCWs are high. It has been determined that anxiety levels are higher in nurses working in the hospital ED (hospital front lines), women, those without children, those living with an elderly (> 65 years old) relative at home, and those living with a relative with a chronic disease at home during COVID-19. This study showed that comprehensive psychological support programs should be planned for all HCWs, especially nurses who are involved in the treatment process of active COVID-19 patients. COVID-19 has shown that there may be pandemics in the following years, as in previous years. Psychosocial support programs should be prepared for health workers who will have to work actively not only in the COVID-19 pandemic, but also in future pandemics.

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Ethical approval

This study was conducted with the approval of the Yeditepe University Clinical Research Ethics Committee (Date: May 8, 2020; Approval: No. 1210) and the approval of the Ministry of Health of the Republic of Türkiye.

Conflict of interest

There is no conflict of interest between the authors.

REFERENCES

- Past pandemics (2018). Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases (NCIRD). <https://www.cdc.gov/flu/pandemic-resources/basics/past-pandemics.html> (24.04.2021).
- WHO Coronavirus (COVID-19) Dashboard | WHO Coronavirus (COVID-19) Dashboard With Vaccination Data (2023). <https://covid19.who.int/> (25.05.2023).
- T.C. Sağlık Bakanlığı Covid-19 Bilgilendirme Platformu [T.R. Ministry of Health COVID-19 Information Platform] (2023). aglik.gov.tr (25.05.2023).
- Reynolds DL, Garay JR, Deamond SL, et al. Understanding, compliance and psychological impact of the SARS quarantine experience. *Epidemiol Infect.* 2008; 136(7): 997–1007, doi: [10.1017/S0950268807009156](https://doi.org/10.1017/S0950268807009156), indexed in Pubmed: [17662167](https://pubmed.ncbi.nlm.nih.gov/17662167/).
- Brooks SK, Webster RK, Smith LE, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet.* 2020; 395(10227): 912–920, doi: [10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8), indexed in Pubmed: [32112714](https://pubmed.ncbi.nlm.nih.gov/32112714/).
- Ellie K. (2021). One Year Into the Pandemic, More Than 3000 Healthcare Workers Have Died of COVID-19. <https://www.medscape.com/viewarticle/947304> (28.04.2021).
- WHO. World failing in 'our duty of care' to protect mental health and well-being of health and care workers finds report on impact of COVID-19. World failing in 'our duty of care' to protect mental health and well-being of health and care workers, finds report on impact of COVID-19. <https://www.who.int/news/item/05-10-2022-world-failing-in-our-duty-of-care-to-protect-mental-health-and-wellbeing-of-health-and-care-workers--finds-report-on-impact-of-covid-19> (18.04.2023).
- Lai J, Ma S, Wang Y, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open.* 2020; 3(3): e203976, doi: [10.1001/jamanetworkopen.2020.3976](https://doi.org/10.1001/jamanetworkopen.2020.3976), indexed in Pubmed: [32202646](https://pubmed.ncbi.nlm.nih.gov/32202646/).
- Chen Q, Liang M, Li Y, et al. Mental health care for medical staff in China during the COVID-19 outbreak. *Lancet Psychiatry.* 2020; 7(4): e15–e16, doi: [10.1016/S2215-0366\(20\)30078-X](https://doi.org/10.1016/S2215-0366(20)30078-X), indexed in Pubmed: [32085839](https://pubmed.ncbi.nlm.nih.gov/32085839/).
- Biber J, Ranes B, Lawrence S, et al. Mental health impact on healthcare workers due to the COVID-19 pandemic: a U.S. cross-sectional survey study. *J Patient Rep Outcomes.* 2022; 6(1): 63, doi: [10.1186/s41687-022-00467-6](https://doi.org/10.1186/s41687-022-00467-6), indexed in Pubmed: [35696006](https://pubmed.ncbi.nlm.nih.gov/35696006/).
- Alankaya N. COVID-19 contagion and death anxiety of nurses working in pandemic clinics. *Acibadem Univ Sağlık Bilim Derg.* 2022; 13(4), doi: [10.31067/acusaglik.1083390](https://doi.org/10.31067/acusaglik.1083390).
- Health and Care Worker Deaths during COVID-19. Health and Care Worker Deaths during COVID-19. <https://www.who.int/news/item/20-10-2021-health-and-care-worker-deaths-during-covid-19> (19.04.2023).
- Gholami M, Fawad I, Shadan S, et al. COVID-19 and healthcare workers: A systematic review and meta-analysis. *Int J Infect Dis.* 2021; 104: 335–346, doi: [10.1016/j.ijid.2021.01.013](https://doi.org/10.1016/j.ijid.2021.01.013), indexed in Pubmed: [33444754](https://pubmed.ncbi.nlm.nih.gov/33444754/).
- Nesanır N, Bahadır A, Karcıoğlu Ö, Fincancı ŞK. Türkiye'de sağlık çalışanı ölümlerinin anlattığı. [The story of the deaths of healthcare workers in Turkey]. *Türk Tabipleri Birliği Yayınları.* Nisan 2022, Ankara. https://www.ttb.org.tr/kutuphane/sc_olumleri.pdf (18.04.2023).
- Chew NWS, Lee GKH, Tan BYQ, et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. *Brain Behav Immun.* 2020; 88: 559–565, doi: [10.1016/j.bbi.2020.04.049](https://doi.org/10.1016/j.bbi.2020.04.049), indexed in Pubmed: [32330593](https://pubmed.ncbi.nlm.nih.gov/32330593/).
- Kang L, Ma S, Chen M, et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain Behav Immun.* 2020; 87: 11–17, doi: [10.1016/j.bbi.2020.03.028](https://doi.org/10.1016/j.bbi.2020.03.028), indexed in Pubmed: [32240764](https://pubmed.ncbi.nlm.nih.gov/32240764/).
- Zhu Z, Xu S, Wang H, et al. COVID-19 in Wuhan: Immediate Psychological Impact on 5062 Health Workers [preprint]. 2020; 24, doi: [10.1101/2020.02.20.20025338](https://doi.org/10.1101/2020.02.20.20025338).
- Mosheva M, Gross R, Hertz-Palmor N, et al. The association between witnessing patient death and mental health outcomes in frontline COVID-19 healthcare workers. *Depress Anxiety.* 2021; 38(4): 468–479, doi: [10.1002/da.23140](https://doi.org/10.1002/da.23140), indexed in Pubmed: [33544405](https://pubmed.ncbi.nlm.nih.gov/33544405/).
- Beck AT, Epstein N, Brown G, et al. An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol.* 1988; 56(6): 893–897, doi: [10.1037//0022-006x.56.6.893](https://doi.org/10.1037//0022-006x.56.6.893), indexed in Pubmed: [3204199](https://pubmed.ncbi.nlm.nih.gov/3204199/).
- Leyfer OT, Ruberg JL, Woodruff-Borden J. Examination of the utility of the Beck Anxiety Inventory and its factors as a screener for anxiety disorders. *J Anxiety Disord.* 2006; 20(4): 444–458, doi: [10.1016/j.janxdis.2005.05.004](https://doi.org/10.1016/j.janxdis.2005.05.004), indexed in Pubmed: [16005177](https://pubmed.ncbi.nlm.nih.gov/16005177/).

21. Ulusoy M, Şahin NH, Erkmen H. Turkish version of the beck anxiety inventory: psychometric properties. *Journal of Cognitive Psychotherapy*. 1998; 12: 2.
22. Que J, Shi Le, Deng J, et al. Psychological impact of the COVID-19 pandemic on healthcare workers: a cross-sectional study in China. *Gen Psychiatr*. 2020; 33(3): e100259, doi: [10.1136/gpsych-2020-100259](https://doi.org/10.1136/gpsych-2020-100259), indexed in Pubmed: [32596640](https://pubmed.ncbi.nlm.nih.gov/32596640/).
23. Cag Y, Erdem H, Gormez A, et al. Anxiety among front-line health-care workers supporting patients with COVID-19: A global survey. *Gen Hosp Psychiatry*. 2021; 68: 90–96, doi: [10.1016/j.genhosppsy.2020.12.010](https://doi.org/10.1016/j.genhosppsy.2020.12.010), indexed in Pubmed: [33418193](https://pubmed.ncbi.nlm.nih.gov/33418193/).
24. Besirli A, Erden SC, Atilgan M, et al. The relationship between anxiety and depression levels with perceived stress and coping strategies in health care workers during the COVID-19 pandemic. *Sisli Etfal Hastan Tip Bul*. 2021; 55(1): 1–11, doi: [10.14744/SEMB.2020.57259](https://doi.org/10.14744/SEMB.2020.57259), indexed in Pubmed: [33935529](https://pubmed.ncbi.nlm.nih.gov/33935529/).
25. Uz B, Savaşan E, Soğancı D. Anxiety, depression and burnout levels of turkish healthcare workers at the end of the first period of COVID-19 pandemic in turkey. *Clin Psychopharmacol Neurosci*. 2022; 20(1): 97–108, doi: [10.9758/cpn.2022.20.1.97](https://doi.org/10.9758/cpn.2022.20.1.97), indexed in Pubmed: [35078952](https://pubmed.ncbi.nlm.nih.gov/35078952/).
26. Kadioglu E, Erdem A, Calik M, et al. COVID-19 related anxiety levels of emergency service personnel: a cross-sectional study from Turkey. *Medicine Science | International Medical Journal*. 2022; 11(1): 20, doi: [10.5455/medscience.2021.05.152](https://doi.org/10.5455/medscience.2021.05.152).
27. Uzun S, Ulutaşdemir N. The effect of the risks health professionals of the future have during practice on anxiety levels. *Sağlık Akademisi Kastamonu*. 2020; 5(2): 104–119, doi: [10.25279/sak.688593](https://doi.org/10.25279/sak.688593).
28. Koçak M, Gül O, Aydın H, et al. Frequency of anxiety among physicians working in emergency departments and other clinics in Turkey: a cross-sectional survey. *Medeniyet Medical Journal*. 2019, doi: [10.5222/mmj.2019.34032](https://doi.org/10.5222/mmj.2019.34032).