



Prevalence of Burnout, Depression, Anxiety, Stress, and Hopelessness Among Healthcare Workers in COVID-19 Pandemic in Turkey

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İrem Akova, MD¹ , Esmâ Kiliç, MD², and Mehmet Emin Özdemir, MD³

Abstract

Background: This study's aim was to reveal the burnout, depression, anxiety, stress, and hopelessness levels of HCWs in the pandemic period.

Methods: The cross-sectional study was carried out with 1015 HCWs, between September 1 and October 1, 2021, in Turkey. Maslach Burnout Inventory, Beck Hopelessness Scale, and Depression Anxiety Stress Scale-21 (DASS-21) were used.

Results: Of the HCWs, 56.7% had moderate/high emotional exhaustion (EE), 35.8% had moderate/high depersonalization (D), 58.0% had low personal accomplishment (PA), 34.9% had high depression, 31.9% had high anxiety, 15.4% had high stress, and 33.3% had moderate/severe hopelessness. Risk factors for EE were working in a public hospital, increased workload intensity, decreased income, and difficulty in procuring personal protective equipment (PPE). Risk factors for D were having a male gender, being under the age of 40, being a physician, working in a public hospital, and difficulty in procuring PPE. Risk factors for depression were being under the age of 40, having contact with COVID-19 patients, and decreased income. Risk factors for anxiety were having a female gender, being under the age of 40, working in a public hospital, having a chronic disease, having contact with COVID-19 patients, and having individuals at high risk for COVID-19 at home. Risk factors for hopelessness were having a female gender, being a physician, and increased income.

Conclusion: The negative effects of the pandemic, which has been going on for over a year and a half, on the mental health of HCWs were high.

Keywords

burnout, depression, hopelessness, healthcare workers, COVID-19

¹Department of Public Health, Faculty of Medicine, Sivas Cumhuriyet University, Sivas, Turkey

²Ibn Sina Community Health Center, Sivas, Turkey

³Provincial Health Directorate, Kayseri, Turkey

Corresponding Author:

İrem Akova, MD, Department of Public Health, Faculty of Medicine, Sivas Cumhuriyet University, Sivas 58140, Turkey.

Email: irem-007@hotmail.com



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Highlights

What Do We Already Know About This Topic?

HCWs are at high risk of physical and mental problems due to their contact with COVID-19 patients. Many studies examining the psychological impact of COVID-19 on HCWs and the general population have reported high levels of problems in these dimensions.

This Research's Contribution to the Field

Our study revealed increasing mental problems in HCWs in a period when we leave behind about one and half year of the pandemic. Gender, being under the age of 40, being a physician, working in a public hospital, having a chronic disease, having contact with COVID-19 patients, increased workload intensity, having individuals at high risk for COVID-19 at home, income, and difficulty in PPE were the factors affecting the mental state of HCWs negatively during the pandemic process.

This Research's Implications Towards Theory, Practice, or Policy

The increase in cases with the emergence of new variants with each passing day continues to prolong the pandemic process. This means increased workload and worse mental state for HCWs. It may be recommended to follow up the mental status of HCWs and even to establish special follow-up centers for this purpose.

Introduction

The mental health impact of a major disaster has a wider and longer impact on people than physical injuries.¹ In particular, healthcare workers (HCWs) have been affected by many different infectious diseases and are considered to be among the occupational groups with the highest potential to be affected by future epidemics.² According to World Health Organization (WHO), HCWs are at high risk of physical and mental problems due to their contact with COVID-19 patients.³

Many studies examining the psychological impact of COVID-19 on HCWs and the general population have reported high levels of problems in these dimensions.⁴ The pooled prevalence was reported to be 33% for anxiety and 28% for depression in these studies.⁴ In addition, studies conducted in China, Italy, Turkey, Spain, and Iran reported a higher prevalence among HCWs and the general population than these values.⁴ Also a systematic review and meta-analysis determined the prevalence of burnout as 28%, the prevalence of anxiety as 30%, and the prevalence of depression as 24% in HCWs.⁵ On the other hand, in a study comparing the hopelessness levels of HCWs and the general population during the pandemic process, it was reported that hopelessness levels were higher in HCWs than in non-HCWs.⁶

Excessive stress and emotional load, long working hours, the risk of infecting themselves or their relatives, being separated from the family, lack of adequate protective equipment in the work environment, and lack of effective treatments can adversely affect the mental health of HCWs.⁷⁻⁹

It is thought that HCWs are among the occupational groups that are most affected psychologically in the COVID-19 pandemic, and it is important to take protective measures as soon as possible to prevent this situation. In the literature, no study was found in which the burnout, depression, anxiety, stress, and hopelessness levels of HCWs were evaluated simultaneously. Thus, this study aimed to reveal these mental health levels of HCWs and the affecting

factors at a time when one and a half years of the pandemic was left behind.

Methods

Study Design, Period, and Sample Size

The cross-sectional study was carried out between September 1 and October 1, 2021, in Turkey. The minimum sample size was calculated as 600 using the formula $n = [DEFF * Np(1-p)] / [(d^2 / Z^2_{1-\alpha/2} * (N-1) + p*(1-p)]$ ($N = 1.033.767$, margin of error $d = 4\%$, confidence interval = 95%, $P = 50\%$) in the OpenEpi (Version 3) program. The study was carried out to cover the whole of Turkey. The number of HCWs to be included in the sample from each region was determined, and in this way, HCWs were included in the sample. Since state hospitals in Turkey serve as pandemic hospitals where COVID-19 patients are treated, the health institution was evaluated in 3 tiers (primary healthcare, public hospital, and university hospital).

Data collection tools were delivered online with Google Forms through the WhatsApp program. A total of 1064 HCWs out of nearly 5000 HCWs (the estimation of response rate was %21.3) in WhatsApp groups agreed to fill out the form, but people with psychiatric illness and who reported receiving treatment for this reason ($n=49$) were excluded. Ultimately, the study was conducted with 1015 HCWs.

Data Collection Tools

A Socio-demographic Form, Maslach Burnout Inventory (MBI), Depression Anxiety Stress Scale-21 (DASS-21), and Beck Hopelessness Scale (BHS) were used to obtain the study data.

The Socio-demographic Form had 15 questions about age, place of the residence, gender, marital status, number of children, occupation, total working time, health institution, and the status of HCWs in the pandemic process.

Maslach Burnout Inventory was used to determine the burnout levels of the participants. It consists of 22 items and has sub-dimensions such as emotional exhaustion (EE), depersonalization (D), and personal accomplishment (PA). Scores were evaluated as ≤ 20 low, 21–27 moderate, and ≥ 28 high for EE; ≤ 8 low, 9–12 moderate, and ≥ 13 high for D; ≤ 23 low, 24–27 moderate, and ≥ 28 high for PA.¹⁰ The Turkish validity of the scale was done by Ergin.¹⁰

Depression Anxiety Stress Scale-21 is a four-point Likert-type scale in which depression, stress, and anxiety sub-dimensions are evaluated (seven questions for each). Normal scores are less than 9 for depression, less than 7 for anxiety, and less than 14 for stress.¹¹ The Turkish validity of the scale was done by Yilmaz et al.¹²

Beck Hopelessness Scale was used to examine the hopelessness levels of the participants. It contains 20 questions and questions are scored as zero or one.¹³ One point is given for each “no” answer in questions 1, 3, 5, 6, 8, 10, 13, 15, and 19 of the scale, while one point is given for each “yes” answer in the other questions. According to the scores they get, individuals are considered as 0–3 Minimal, 4–8 Mild, 9–14 Moderate, >15 severe hopelessness level. The reliability coefficient was found between .72 and .78.¹³ The Turkish validity of the scale was done by Durak et al.¹³

Ethics Statement

Informed consent was obtained from the individuals who agreed to participate in the study. Ethical approval was obtained from the Non-Invasive Ethics Committee of Sivas Cumhuriyet University (Decision no: 2020–12/19).

Statistical Analysis

The data obtained from the study was examined with SPSS 22.0. Descriptive statistics (median, interquartile range, percentage) and the Cronbach’s alpha values were calculated. The Cronbach’s alpha values were found as .912 for EE, .807 for D, .764 for PA, .924 for depression, .863 for anxiety, .901 for stress, and .857 for BHS. A limit of 11 years was used when categorizing participants’ total working time, as the median value for working years were 11. The normality of the data was analyzed by Kolmogorov-Smirnov test [The test statistics results were .060 for EE score ($P < .001$), .109 for D score ($P < .001$), .061 for PA score ($P < .001$), .104 for depression score ($P < .001$), .127 for anxiety score ($P < .001$), .100 for stress score ($P < .001$), and .095 for hopelessness score ($P < .001$)]. Mann–Whitney U test, Kruskal–Wallis test (post hoc Mann–Whitney U test) and chi-square test were used. Binary logistic regression analysis was performed (MBI subscale scores were accepted as two categories as low and moderate/high, BHS score was accepted as two categories as minimal/mild and moderate/severe). To determine the relationship between mental health levels and sociodemographic and pandemic process characteristics [contact with COVID-19 patients,

workload intensity, presence of individuals at high risk for COVID-19 at home, change in income, and difficulty in procuring personal protective equipment (PPE)] of the participants, characteristics with statistically significant differences in Table 3 were included in the models separately for each mental state. For EE, age, occupation, presence of children, total working time, health institution, contact with COVID-19 patients, workload intensity, change in income, and procuring PPE were included in the model. For D, gender, age, occupation, presence of children, total working time, health institution, place of the residence, contact with COVID-19 patients, workload intensity, individuals at high risk for COVID-19 at home, change in income, and procuring PPE were included in the model. For PA, age, marital status, occupation, presence of children, total working time, and individuals at high risk for COVID-19 at home were included in the model. For depression, age, marital status, presence of children, total working time, contact with COVID-19 patients, change in income, and procuring PPE were included in the model. For anxiety, gender, age, marital status, occupation, presence of children, total working time, health institution, presence of chronic disease, contact with COVID-19 patients, workload intensity, and individuals at high risk for COVID-19 at home were included in the model. For stress, age, presence of children, and total working time were included in the model. For hopelessness, gender, occupation, and change in income were included in the model. Hosmer-Lemeshow test results ($P > .05$) revealed that the model-data fit was good enough. $P < .05$ was considered statistically significant.

Results

Socio-Demographic and Pandemic Process Characteristics of the Participants

Of the 1015 HCWs participating in our study, 533 (52.5%) were male, 737 (72.6%) were under 40 years old, 738 (72.7%) were married, and 569 (56.1%) were physicians (Table 1). 626 (61.7%) had at least one child, 574 (56.6%) worked less than 11 years, 571 (56.3%) worked in primary healthcare, 448 (44.1%) lived in the city, 838 of them (82.6%) did not have any chronic disease. 83.9% had contact with COVID-19 patients. The workload intensity of 82% of HCWs had increased and income status of 49.6% of them had not change in the pandemic. 74.3% had no difficulty in procuring PPE (Table 1).

Prevalence of Burnout, Depression, Anxiety, Stress, and Hopelessness Among HCWs

Table 2 shows the prevalence of burnout, depression, anxiety, stress, and hopelessness among HCWs. Of the HCWs, 56.7% had moderate/high EE, 35.8% had moderate/high D, 58.0% had low PA, 34.9% had high depression, 31.9% had high

Table I. Socio-demographic and pandemic process characteristics of the participants (n = 1015).

Socio-Demographic Characteristics		n (%)
Gender	Female	482 (47.5)
	Male	533 (52.5)
Age (years)	<40	737 (72.6)
	≥40	278 (27.4)
Marital status	Single + Widow	277 (27.3)
	Married	738 (72.7)
Occupation	Physician	569 (56.1)
	Nurse	252 (24.8)
	Other HCWs	194 (19.1)
	Health officer	63 (32.5)
	Emergency medical technician	49 (25.3)
	Paramedic	35 (18.0)
	Lab technician	29 (14.9)
	Physiotherapist	18 (9.3)
Region	Marmara	171 (16.8)
	Centre Anatolia	170 (16.7)
	Aegean	157 (15.5)
	Mediterranean	149 (14.7)
	Black Sea	141 (13.9)
	Eastern Anatolia	128 (12.6)
Number of children	South eastern Anatolia	99 (9.8)
	None	389 (38.3)
	At least one	626 (61.7)
Total working time (years)	<11	574 (56.6)
	≥11	441 (43.4)
Health institution	Primary healthcare	571 (56.3)
	Public hospital	238 (23.4)
	University hospital	206 (20.3)
Place of the residence	Metropolitan	335 (33.0)
	City	448 (44.1)
	County	232 (22.9)
Presence of chronic disease	No	838 (82.6)
	Yes	177 (17.4)
Pandemic process characteristics		n (%)
Contact with COVID-19 patients	No	163 (16.1)
	Yes	852 (83.9)
Workload intensity in the pandemic	Not changed	84 (8.3)
	Increased	832 (82.0)
	Decreased	99 (9.8)
Presence of individuals at high risk for COVID-19 at home	No	561 (55.3)
	Yes	454 (44.7)
Change in income during the pandemic	Not changed	503 (49.6)
	Increased	217 (21.4)
	Decreased	295 (29.1)
Difficulty in procuring personal protective equipment	No	754 (74.3)
	Yes	261 (25.7)

n Number of participants

anxiety, 15.4% had high stress and 33.3% had moderate/severe hopelessness. The proportion of high EE was higher in physicians (30.4%) than in nurses (23.4%) and other HCWs (29.4%) ($P = .007$). The proportion of high D was higher in physicians (21.1%) than in nurses (5.2%) and other HCWs (12.4%) ($P < .001$). The proportion of low PA was higher in physicians (63.6%) than in nurses (47.2%) and other HCWs (55.7%) ($P < .001$). The proportion of high depression was lower in nurses (27.0%) than in physicians (37.1%) and other HCWs (38.7%) ($P = .009$). The proportion of high anxiety was lower in physicians (27.9%) than in nurses (38.1%) and other HCWs (35.6%) ($P = .008$). The proportion of high stress was higher in other HCWs (20.1%) than in physicians (16.0%) and nurses (10.3%) ($P = .015$). The proportion of moderate/severe hopelessness was lower in other HCWs (25.8%) than in physicians (34.3%) and nurses (36.9%) ($P = .036$) (Table 2).

Distribution of Participants' Socio-Demographic And Pandemic Process Characteristics According to MBI Subscales Scores

The EE score was higher in those younger than 40 years of age ($P < .001$), physicians ($P = .001$) (compared to nurses), who have no children ($P < .001$), who have worked less than 11 years ($P < .001$), who work in a public hospital ($P < .001$) (compared to those who work in primary healthcare and university hospital), who had contact with COVID-19 patients ($P = .016$), whose workload increased ($P < .001$) and income decreased ($P = .005$) during the pandemic process, and who had difficulty in PPE ($P < .001$) (Table 3). The D score was higher in male ($P < .001$), those under the age of 40 ($P < .001$), physicians (compared to nurses and other health workers) and other HCWs (compared to nurses) ($P < .001$), who have no children ($P < .001$), who have worked less than 11 years ($P < .001$), who work in public and university hospitals ($P < .001$), who work in metropolitan ($P < .001$), who had contact with COVID-19 patients ($P = .015$), whose workload ($P = .004$) and income decreased ($P = .017$) during the pandemic process, who have no individuals at high risk for COVID-19 at home ($P = .046$) and who had difficulty in PPE ($P < .001$). The PA score was higher in those aged 40 and over ($P < .001$), married ($P = .032$), nurses ($P < .001$), who have at least one child ($P < .001$), who have worked for 11 years or more ($P < .001$), and who have individuals at high risk for COVID-19 at home ($P = .011$) (Table 3).

Distribution Of Participants' Socio-Demographic and Pandemic Process Characteristics According to DASS-21 Subscales Scores

The depression score was higher in those under the age of 40 ($P < .001$), single/widow ($P < .001$), who have no children

($P < .001$), who have worked less than 11 years ($P < .001$), who had contact with COVID-19 patients ($P = .020$), whose income decreased during the pandemic process ($P = .033$), and who had difficulty in PPE ($P = .028$) (Table 3). The anxiety score was higher in female ($P < .001$), those under the age of 40 ($P < .001$), single/widow, nurses and other HCWs (compared to physicians) ($P < .001$), who have no children ($P < .001$), who have worked less than 11 years ($P = .003$), who work in a public hospital ($P < .001$), who have any chronic disease ($P = .023$), who had contact with COVID-19 patients ($P = .004$), whose workload increased during the pandemic process ($P = .001$), and who have individuals at high risk for COVID-19 at home ($P = .006$). The stress score was higher in those under the age of 40 ($P = .003$), who have no children ($P = .006$), and who have worked less than 11 years ($P = .001$) (Table 3).

Distribution of Participants' Socio-Demographic and Pandemic Process Characteristics According to BHS Scores

The hopelessness score was higher in female ($P < .001$), in nurses (compared to other HCWs) ($P = .022$), and in those whose income increased during the pandemic process ($P = .007$) (Table 3).

Relationship Between Mental Health Levels and Sociodemographic and Pandemic Process Characteristics of the Participants

Working in a public hospital increased the EE 2 times ($P = .001$), increased workload intensity increased the EE 2.1 times ($P = .002$), decreased income increased the EE 1.4 times ($P = .030$), and difficulty in procuring PPE increased the EE 2.2 times ($P < .001$) (Table 4). Having a male gender increased the D 1.5 times ($P = .021$), being a physician increased the D 1.7 times ($P = .009$), working in a public hospital increased the D 1.6 times ($P = .030$), and difficulty in procuring PPE increased the D 1.8 times ($P < .001$). Factors associated with low D were being in the age of 40 and over ($P = .001$) and being a nurse ($P = .029$). Having worked for 11 years or more increased the PA 1.6 times ($P = .010$). Having contact with COVID-19 (+) patients increased the depression 1.6 times ($P = .018$) and decreased income increased the depression 1.5 times ($P = .014$). Being in the age of 40 and over was associated with low depression ($P < .001$). Working in a public hospital increased the anxiety 2 times ($P = .002$), having a chronic disease increased the anxiety 2.1 times ($P < .001$), having contact with COVID-19 (+) patients increased the anxiety 1.8 times ($P = .007$), and having individuals at high risk for COVID-19 at home increased the anxiety 1.4 times ($P = .037$). Factors associated with low anxiety were being a male gender ($P = .001$) and being in the age of 40 and over ($P = .016$). Being a physician increased the hopelessness 1.5 times ($P = .024$), and increased income increased the hopelessness 1.4 times ($P =$

Table 2. Prevalence of burnout, depression, anxiety, stress, and hopelessness among health care workers.

		Physicians (n= 569)	Nurses (n=252)	Other Healthcare Workers (n=194)	Total (n=1015)
Emotional Exhaustion, n (%)	Low	220 (38.7)	131 (52.0)	89 (45.9)	440 (43.3)
	Moderate	176 (30.9)	62 (24.6)	48 (24.7)	286 (28.2)
	High	173 (30.4)	59 (23.4)	57 (29.4)	289 (28.5)
χ^2 , p			14.056, .007**		
Depersonalization, n (%)	Low	308 (54.1)	209 (82.9)	135 (69.6)	652 (64.2)
	Moderate	141 (24.8)	30 (11.9)	35 (18.0)	206 (20.3)
	High	120 (21.1)	13 (5.2)	24 (12.4)	157 (15.5)
χ^2 , p			68.640, <.001***		
Personal Accomplishment, n (%)	Low	362 (63.6)	119 (47.2)	108 (55.7)	589 (58.0)
	Moderate	130 (22.8)	77 (30.6)	49 (25.3)	256 (25.2)
	High	77 (13.5)	56 (22.2)	37 (19.1)	170 (16.7)
χ^2 , p			21.085, <.001***		
Depression, n (%)	Normal	358 (62.9)	184 (73.0)	119 (61.3)	661 (65.1)
	High	211 (37.1)	68 (27.0)	75 (38.7)	354 (34.9)
χ^2 , p			9.353, .009**		
Anxiety, n (%)	Normal	410 (72.1)	156 (61.9)	125 (64.4)	691 (68.1)
	High	159 (27.9)	96 (38.1)	69 (35.6)	324 (31.9)
χ^2 , p			9.749, .008**		
Stress, n (%)	Normal	478 (84.0)	226 (89.7)	155 (79.9)	859 (84.6)
	High	91 (16.0)	26 (10.3)	39 (20.1)	156 (15.4)
χ^2 , p			8.457, .015*		
Hopelessness, n (%)	Minimal/mild	374 (65.7)	159 (63.1)	144 (74.2)	677 (66.7)
	Moderate/ severe	195 (34.3)	93 (36.9)	50 (25.8)	338 (33.3)
χ^2 , p			6.664, .036*		

n Number of participants, χ^2 Chi-square test, * $P < .05$, ** $P < .01$, *** $P < .001$.

.032). Being a male gender is associated with low hopelessness ($P = .048$) (Table 4).

Discussion

HCWs are considered to be among the groups with the highest potential to be affected by epidemics.² In a study with HCWs during the peak of the pandemic in Italy, it was observed that 37.0% of the HCWs showed high score of EE and 24.7% of them showed high levels of D, and 15.3% of them reported low levels of PA.¹⁴ In another study, burnout levels in HCWs were reported as 41% for EE, 15.2% for D, and 8.4% for low PA.¹⁵ The burnout levels detected in our study were higher than those in these studies. This situation may be related to the prolonged pandemic process. The prolongation of the process may have driven health workers to more burnout.

A limited number of studies have been found in the literature that present the prevalence of burnout among HCWs by occupational groups. In a study in Taiwan, it was determined that 45% of the nurses and 31% of the physicians suffered from burnout.¹⁶ Roslan et al reported that burnout levels were between 26.6% and 63.5% for physicians, 14.9% to 55.3% for nurses.¹⁷ Although different rates were determined between burnout levels according to

occupational groups in our study and other studies, it was observed that burnout was high in HCWs during the pandemic process.

In a study, the prevalence of moderate/severe anxiety was found as 11.9% in physicians, 14.9% in nurses, 18.4% in public health professionals, and 8.9%–14.5% in other HCWs during the pandemic process.¹⁸ In the same study, the prevalence of moderate/severe depression was found as 12.8% in all HCWs, 12.9% in physicians, 12.0% in nurses, 20.8% in public health professionals, and 11.2%–12.2% in other HCWs.¹⁸ A systematic review and meta-analysis found the prevalence of depression and anxiety in HCWs to be 23.2% for anxiety and 22.8% for depression.¹⁹ The reason for the higher rates of depression and anxiety that we found in our study may be that we conducted the study in the second year of the pandemic (prolongation of the pandemic process). However, the fact that anxiety prevalence was found to be higher in nurses than physicians, and depression prevalence in physicians than nurses support our study. On the other hand, there are studies reporting higher rates of depression and anxiety than we found in our study. In two previous studies, the prevalence of anxiety and depression was 44.7%, 50.7%,²⁰ and 44.6%, 50.4%,²¹ respectively. This may be since these studies were conducted among HCWs working in the hospital.

Table 3 Distribution of participants' socio-demographic and pandemic process characteristics according to Maslach Burnout Inventory and Depression, Anxiety, Stress Scale-21 subscales, and Beck Hopelessness Scale scores (n=1015).

Characteristic	Emotional Exhaustion		Depersonalization		Personal Accomplishment		Depression		Anxiety		Stress		Hopelessness	
	M (IQR)	Test, p	M (IQR)	Test, p	M (IQR)	Test, p	M (IQR)	Test, p	M (IQR)	Test, p	M (IQR)	Test, p	M (IQR)	Test, p
Total	22 (13)		6 (8)		22 (8)		6 (9)		4 (5)		7 (7)		7 (6)	
Gender														
Female	22 (13)	U=121 859.0, .157	5 (7)	U=159 250.5, <001***	23 (7)	U=119 300.0, .050	6 (8)	U=123 436.0, .281	5 (6)	U=104 099.0, <001***	7 (6)	U=123 667.0,0.304	7 (6)	U=110 825.0, <001***
Male	22 (14)		7 (8)		22 (8)		6 (9)		3 (6)		7 (7)		6 (7)	
Age (years)														
<40	23 (12)	U=84 523.0, <001***	7 (7)	U=79 625.5, <001***	22 (8)	U=123 611.5, <001***	7 (9)	U=80 332.0, <001***	5 (6)	U=87 787.0, <001***	7 (8)	U=90 241.0, .003**	7 (6)	U=95 426.5, .091
≥40	20 (14.3)		5 (7)		24 (8)		5 (7)		3 (5)		7 (6)		6 (6)	
Marital status														
Single + Widow	23 (11)	U=96 884.5, .200	7 (7)	U=94 690.0, .070	21 (8)	U=111 118.0, .032*	7 (8.5)	U=86 953.0, <001***	5 (6)	U=92 625.5, .021*	7 (7)	U=95 696.0, .116	7 (6)	U=100 527.0,0.684
Married	22 (14)		6 (8)		23 (7)		6 (8)		4 (6)		7 (7)		7 (7)	
Occupation														
Physician ¹	23 (12)	$\chi^2=13.969, .001**$	8 (7)	$\chi^2=119.073, <001***$	21 (7)	$\chi^2=34.135, <001***$	7 (8)	$\chi^2=4.166, .125$	4 (6)	$\chi^2=16.832, <001***$	7 (7)	$\chi^2=6.035, .050$	7 (7)	$\chi^2=7.653, .022*$
Nurse ²	20 (14)		4 (4.8)		24 (6.8)		6 (7)		5 (6)		7 (6.8)		7 (5)	
Other HCWs ³	22 (16)		5 (7.3)		23 (8)		6 (10)		5 (6)		7 (8)		6 (7)	
Post hoc		1>2		1>2,1>3,3>2		2>1,2>3				2>1,3>1				2>3
Number of children														
None	24 (13)	U=101 794.5, <001***	7 (7)	U=103 560.5, <001***	21 (7)	U=139 980.0, <001***	7 (8)	U=98 132.0, <001***	5 (6)	U=105 987.0, <001***	8 (7)	U=109 193.0, .006**	7 (6)	U=120 520.5, .785
At least one	21 (15)		6 (8)		23 (7)		6 (8)		4 (6)		7 (7)		7 (6)	
Total working time (years)														
<11	23 (12)	U=107 668.0, <001***	7 (7)	U=102 493.0, <001***	21 (7)	U=151 697.5, <001***	7 (8)	U=104 531.0, <001***	5 (6)	U=113 023.5, .003**	8 (7)	U=111 670.5, .001**	7 (6)	U=123 861.0, .557
≥11	21 (15)		5 (8)		24 (8)		6 (7.5)		4 (6)		7 (6)		6 (6)	
Health institution														
Primary healthcare ¹	21 (14)	$\chi^2=16.754, <001***$	6 (9)	$\chi^2=17.571, <001***$	23 (8)	$\chi^2=5.429, .066$	6 (9)	$\chi^2=3.025, .220$	4 (5)	$\chi^2=18.448, <001***$	7 (7)	$\chi^2=3.784, .151$	7 (6)	$\chi^2=1.473, .479$
Public hospital ²	24 (12)		7 (8)		23 (6)		7 (8)		5 (7)		8 (8)		6.5 (7.3)	
University hospital ³	22 (12.3)		7 (7)		21 (7.3)		6 (9)		3 (5.3)		7 (6.3)		7 (7)	
Post hoc		2>1,2>3		2>1,3>1						2>3,2>1				
Place of the residence														
Metropolitan ¹	23 (14)	$\chi^2=3.853, .146$	8 (8)	$\chi^2=21.129, <001***$	22 (8)	$\chi^2=4.407, .110$	6 (9)	$\chi^2=2.793, .247$	4 (6)	$\chi^2=4.380, .112$	7 (7)	$\chi^2=4.663, .097$	6 (7)	$\chi^2=0.90, .956$
City ²	22 (12)		6 (7)		23 (7)		7 (8)		4 (6)		7 (7)		7 (7)	
County ³	21 (15)		5 (7)		22.5 (8)		6 (8)		4 (5)		7 (8)		7 (6)	
Post hoc		1>2,2>3		2>1,3>1			1>3,1>2							
Presence of chronic disease														
No	22 (13)	U=71 413.0, .437	6 (8)	U=74 800.0, .857	22 (8)	U=77 854.5, .297	6 (9)	U=69 270.0, .166	4 (6)	U=66 158.5, .023*	7 (7)	U=70 401.0, .287	7 (6)	U=77 588.5, .332
Yes	23 (14)		6 (8)		22 (8)		7 (9)		5 (6)		8 (8)		6 (6)	
Contact with COVID-19 patients														
No	20 (15)	U=61 164.5, .016*	5 (9)	U=61 134.5, .015*	22 (8)	U=67 970.5, .668	6 (7)	U=61 459.0, .020*	3 (5)	U=59 471.5, .004**	7 (7)	U=67 105.0, .495	7 (6)	U=73 111.0, .282
Yes	22 (12)		6 (8)		22 (7.8)		6 (8)		4 (6)		7 (7)		7 (6.8)	
Workload intensity in the pandemic														
Not changed ¹	18 (14.8)	$\chi^2=16.965, <001***$	6 (7.8)	$\chi^2=10.832, .004**$	21.5 (6.8)	$\chi^2=7.75, .679$	6 (8)	$\chi^2=2.343, .310$	3 (6)	$\chi^2=14.385, .001**$	7 (6)	$\chi^2=2.042, .360$	6 (6)	$\chi^2=1.387, .500$
Increased ²	23 (13)		6 (8)		22 (8)		6 (9)		4 (6)		7 (7)		7 (6)	
Decreased ³	20 (15)		7 (8)		22 (7)		6 (7)		3 (5)		7 (6)		6 (6)	
Post hoc		2>1		3>1, 3>2						2>3,2>1				
Presence of individuals at high risk for COVID-19 at home														
No	21 (14)	U=118 627.0, .060	6 (8.5)	U=136 605.0, .046*	22 (8)	U=115 584.0, .011*	6 (8)	U=126 175.0, .800	4 (6)	U=114 647.0, .006**	7 (7)	U=119 111.5, .076	7 (6)	U=134 145.0,0.142
Yes	22.5 (13)		6 (7)		23 (7)		6.5 (9)		5 (6)		7 (8)		6 (7)	

(continued)

Table 3 (continued)

Characteristic	Emotional Exhaustion		Depersonalization		Personal Accomplishment		Depression		Anxiety		Stress		Hopelessness	
	M (IQR)	Test, p	M (IQR)	Test, p	M (IQR)	Test, p	M (IQR)	Test, p	M (IQR)	Test, p	M (IQR)	Test, p	M (IQR)	Test, p
Change in income during the pandemic														
Not changed ¹	21 (14)	$\chi^2=10.799, .005^{***}$	6 (8)	$\chi^2=8.093, .017^*$	22 (7)	$\chi^2=3.746, .154$	6 (9)	$\chi^2=6.842, .033^*$	4 (6)	$\chi^2=2.035, .361$	7 (7)	$\chi^2=4.839, .089$	7 (6)	$\chi^2=9.976, .007^{***}$
Increased ²	20 (11)		6 (8)		22 (8)		6 (7)		5 (6)		7 (7)		7 (6)	
Decreased ³	24 (14)		7 (8)		22 (8)		7 (9)		5 (6)		8 (7)		6 (7)	
Post hoc	3>1				3>1				3>1					2>3
Difficulty in procuring personal protective equipment														
No	21 (14)	$U=74.138.5, <.001^{***}$	6 (7)	$U=73.699.0, <.001^{***}$	23 (7.3)	$U=105.934.5, .064$	6 (9)	$U=89.448.0, .028^*$	4 (6)	$U=92.578.0, .152$	7 (7)	$U=91.345.0, .083$	7 (6)	$U=104.525.5, .132$
Yes	25 (12.5)		9 (8)		22 (7)		7 (8)		5 (6)		8 (7.5)		6 (7)	

n Number of participants, M Median, IQR Interquartile range, HCW Healthcare worker, χ^2 Kruskal–Wallis H test, U Mann–Whitney U test. * $P<.05$, ** $P<.01$, *** $P<.001$.

Table 4. The relationship between mental health levels and sociodemographic and pandemic process characteristics of the participants (n= 1015).

	Emotional Exhaustion ¹	Depersonalization ¹	Personal Accomplishment ¹	Depression ²	Anxiety ²	Stress ²	Hopelessness ³
	OR _a (95% CI), p	OR _a (95% CI), p	OR _a (95% CI), p	OR _a (95% CI), p	OR _a (95% CI), p	OR _a (95% CI), p	OR _a (95% CI), p
Gender (Ref C= female)							
Male	Not included	1.49 (1.06–2.09), .021*	Not included	Not included	.55 (.39–.77), .001**	Not included	.73 (.53–.99), .048*
Age (Ref C= <40)							
≥40	.71 (.48–1.04), .078	.49 (.32–.76), .001**	1.21 (.84–1.76), .297	.47 (.31–.71), <.001***	.59 (.39–.91), .018*	.57 (.33–1.01), .050	Not included
Marital status (Ref C= Single + Widow)							
Married	Not included	Not included	.94 (.63–1.40), .763	.91 (.61–1.34), .621	1.08 (.72–1.64), .727	Not included	Not included
Occupation (Ref C= Other healthcare worker)							
Physician	1.35 (.93–1.95), .111	1.68 (1.14–2.49), .009**	.74 (.52–1.04), .078	Not included	.70 (.47–1.03), .091	Not included	1.54 (1.06–2.24), .024*
Nurse	.74 (.50–1.11), .143	.57 (.35–.95), .029*	1.40 (.95–2.05), .090	Not included	.73 (.47–1.14), .155	Not included	1.44 (.93–2.22), .105
Presence of children (Ref C= None)							
At least one	.77 (.56–1.06), .105	.79 (.57–1.10), .155	1.19 (.80–1.77), .389	.67 (.45–1.01), .052	.78 (.51–1.18), .253	.77 (.52–1.15), .205	Not included
Total working time (years) (Ref C= <11)							
≥11	.86 (.59–1.24), .410	.93 (.63–1.37), .698	1.60 (1.12–2.29), .010*	1.04 (.71–1.51), .836	.94 (.64–1.39), .752	.92 (.57–1.49), .746	Not included
Health institution (Ref C= University hospital)							
Primary healthcare	.90 (.62–1.29), .564	1.23 (.84–1.80), .285	Not included	Not included	1.13 (.76–1.69), .524	Not included	Not included
Public hospital	2.00 (1.31–3.03), .001***	1.61 (1.05–2.47), .030*	Not included	Not included	1.98 (1.28–3.06), .002**	Not included	Not included
Place of the residence (Ref C= County)							
Metropolitan City	Not included	1.41 (.93–2.13), .102	Not included	Not included	Not included	Not included	Not included
City	Not included	1.01 (.69–1.47), .975	Not included	Not included	Not included	Not included	Not included
Presence of chronic disease (Ref C= No)							
Yes	Not included	Not included	Not included	Not included	2.06 (1.43–2.96), <.001***	Not included	Not included
Contact with COVID-19 (+) patients (Ref C= No)							
Yes	1.14 (.80–1.65), .467	.93 (.63–1.38), .728	Not included	1.61 (1.09–2.38), .018*	1.79 (1.17–2.72), .007**	Not included	Not included
Workload intensity in the pandemic (Ref C= Not changed)							
Increased	2.14 (1.31–3.51), .002**	1.63 (.96–2.79), .073	Not included	Not included	1.06 (.62–1.81), .805	Not included	Not included
Decreased	.98 (.53–1.82), .944	1.56 (.82–3.00), .179	Not included	Not included	.85 (.42–1.73), .631	Not included	Not included
Presence of individuals at high risk for COVID-19 at home (Ref C= No)							
Yes	Not included	.88 (.66–1.17), .373	1.29 (.99–1.67), .055	Not included	1.35 (1.02–1.80), .033*	Not included	Not included
Change in income during the pandemic (Ref C= Not changed)							
Increased	.97 (.69–1.38), .882	.87 (.60–1.28), .484	Not included	.86 (.60–1.23), .412	Not included	Not included	1.44 (1.03–2.01), .032*
Decreased	1.42 (1.04–1.96), .030*	1.27 (.92–1.77), .150	Not included	1.48 (1.08–2.01), .014*	Not included	Not included	.92 (.67–1.27), .616
Difficulty in procuring personal protective equipment (Ref C= No)							
Yes	2.24 (1.61–3.12), <.001***	1.84 (1.34–2.53), <.001***	Not included	1.35 (.99–1.83), .056	Not included	Not included	Not included

n Number of participants, OR_a Adjusted odds ratio, CI Confidence interval, Ref C Reference category, Reference categories; ¹=Low, ²=Normal, ³=Minimal/mild *P<.05, **P<.01, ***P<.001.

In another systematic review, while moderate/high levels of anxiety (26.5%–44.6%) and depression (8.1%–25%) were found in HCWs, paradoxically, stress levels were found to be below expectations (3.8%–68%).²² In a study in Italy, the

prevalence of hopelessness was 16.7% for physicians and 29.2% for nurses.²³ The reason for the higher levels of hopelessness in our study may be that we carried out this study in the later stages of the pandemic, as a matter of fact, the

prolongation of the process leads to more hopelessness especially in HCWs who are very worn out in this process.

In their study, Hacimusalar et al⁶ found that nurses' hopelessness levels were higher than physicians and also found that state-anxiety levels in nurses were higher than physicians similar to our study. But, in another study among HCWs working in pandemic hospitals, it was reported that the mean scores of burnout of the nurses were higher than the mean scores of physicians and other HCWs.²⁴ In another research, burnout levels of nurses were found to be higher than other HCWs.¹⁴

Factors affecting the mental state of HCWs were listed as follows in many studies. Pappa et al found that female HCWs and nurses had higher rates of emotional symptoms.¹⁹ In the study by Lai et al, it was pointed out that being a female and working in the front line are risk factors for stress symptoms.²¹ On the other hand, young age, female gender, working in a high-risk environment, and less work experience were reported as factors that cause anxiety, depression and burnout in HCWs.⁵ In the study carried out by Yıldırım et al, the researchers detected that those who were female, divorced/widowed, and those with less knowledge about COVID-19 had higher levels of depression and anxiety, and they also detected that those who were young had only higher level of anxiety.²⁵ Another study found higher levels of hopelessness in HCWs compared to non-HCWs, in nurses, in those with increasing weekly working hours, in female, in those living with a high-risk individual at home, in those who had difficulty in caring for children, and in those whose income decreased.⁶ In the another study, the risk factors were as follows: working in a high-risk department, diagnosed family member, inadequate hand hygiene before and after contact with patients, inappropriate use of PPE, and long daily contact hours.²⁶ As it can be seen in the results of these studies, like our study, younger age, female gender, working in a high-risk environment, workload intensity, and difficulty in procuring or inappropriate use of PPE appear as factors that negatively affect the mental state of HCWs. Unlike our study, being nurse come to the fore affecting the mental state of HCWs negatively. In the current study, being a physician and having a male gender were risk factors especially for burnout (D). Additionally, being a physician was found to be a risk factor for hopelessness. Being a nurse was also a factor that increased the level of hopelessness, although it was not statistically significant. Thus, in our study, it was also observed that burnout, depression, and hopelessness levels were higher in physicians, anxiety and hopelessness levels were higher in nurses, and depression, anxiety, and stress levels were higher in other HCWs.

As we determined in our study, female gender also has been shown as a risk factor that increases hopelessness in previous studies.^{6,27} On the other hand, increased income was found as a risk factor for hopelessness in our study. We can explain this unexpected finding as follows: additional payments were made periodically to HCWs working actively during the pandemic in Turkey. However, the additional

payments made were not at a level to satisfy the HCWs. This situation may have led to increased hopelessness.

The limitations of our study can be listed as follows: using only MBI, DASS-21, and BHS, respectively, to determine the levels of burnout, depression, anxiety, stress, and hopelessness of HCWs; the mental state evaluations of the participants were not supported by clinical examinations, not knowing these mental states of the participants before the pandemic process, a limited number of participants who may limit the generalization of the findings, low study response rate, and not having any information about the characteristics of those who did not respond.

Conclusions

In this study, the prevalence of burnout, depression, anxiety, and hopelessness was found to be much higher in HCWs than in studies on similar subjects in the literature (except for studies conducted only with HCWs working in hospitals). Younger age, gender, working in a public hospital, workload intensity, chronic disease, individuals at high risk for COVID-19 at home, contact with COVID-19 patients, income, and difficulty in procuring PPE were the factors that affect the mental state of HCWs. Unlike other studies in the literature, being a physician and having a male gender were risk factors especially for burnout (D). Additionally, being a physician was found to be a risk factor for hopelessness. This study revealed increasing mental problems in HCWs in a period when we leave behind about one and half year of the pandemic. The increase in cases with the emergence of new variants with each passing day continues to prolong the pandemic process. This means increased workload and worse mental state for HCWs. It may be recommended to follow up the mental status of HCWs and even to establish special follow-up centers for this purpose. More studies are needed to better understand the experiences and needs of HCWs and to further explore their expectations during the pandemic.

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ORCID iD

İrem AKOVA, MD  <https://orcid.org/0000-0002-2672-8863>

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