Original Article

The Comparison of Anxiety and Depression Levels of Resident Doctors Treating and Not Treating COVID-19 Patients

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ABSTRACT

Background: Healthcare professionals are exposed to the stress of the pandemic in the highest level and try to cope with the long-term psychological consequences. **Aim:** This study mainly aimed to compare the anxiety and depression levels of resident doctors (RDs) who cared and did not care for coronavirus disease 2019 (COVID-19) patients at the University Hospital, which has been serving as a pandemic hospital during the COVID-19 outbreak. **Subjects and Methods:** To proceed with this study, 100 RDs were included this study between March 15 and June 1, 2020. Patient Health Questionnaire (PHQ-9) was used to measure the depression levels and the Beck Anxiety Inventory (BAI) was used to measure the anxiety levels of the RDs who participated in the study. **Results:** The analysis of the responses showed that there were 49 RDs treating COVID-19 patients and 51 RDs not treating COVID-19 patients. The proportions of the RDs who had higher PHQ-9 and BAI scores were significantly greater in the RDs treating COVID-19 patients than in those not treating. **Conclusion:** Our study highlights that front-line RDs have higher levels of anxiety and depression than back-line RDs\.

KEYWORDS: *Anxiety, COVID-19, depression, resident doctor*

INTRODUCTION

The coronavirus disease 2019 (COVID-19) is a viral respiratory illness caused by severe acute respiratory syndrome - coronavirus 2 (SARS-CoV-2). The disease spread throughout the world in a very short period of time after emerging in the Hubei province of China in the last month of 2019. The World Health Organization declared a Public Health Emergency of International Concern on January 30, 2020; and declared the COVID-19 outbreak a global pandemic on March 11, 2020.[1]

Physicians, nurses, and all other healthcare professionals working in health institutions are exposed to the stress of the pandemic in the highest level and try to cope with the long-term psychological consequences. The last two decades have witnessed SARS,[2] Ebola,[3] Middle East Respiratory Syndrome (MERS)-CoV[4,5] epidemics in which healthcare workers were exposed to the risk of psychosocial difficulties. The psychosocial complications of epidemics primarily include the symptoms of psychiatric illnesses such as anxiety, depression, and post-traumatic stress disorder (PTSD). Healthcare professionals were found to be at heightened risk for developing both short-term and long-term mental health problems in epidemic/pandemic periods.[6] Parallel to previous outbreaks, COVID-19 pandemic

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has also affected healthcare professionals deeply. A recent study conducted in Wuhan-China, stated that a substantial number of front-line healthcare professionals during the COVID-19 pandemic have been affected by acute stress disorder (38.3%).[7] Another study found that the prevalence rates of anxiety, depression, insomnia, and overall psychological problems among healthcare workers who participated in front-line work were 46.04%, 44.37%, 28.75%, and 56.59%, respectively.[8] On the other hand, numerous studies have been published on protecting the mental health and psychosocial well-being of healthcare workers during the COVID-19 pandemic.[9,10] These studies emphasize that protecting psychological condition among medical staff depends on up-to-date and accurate information, taking precautionary measures and sufficient and reliable medical sources.

The first case with COVID-19 in Turkey was confirmed on March 11, 2020 by the Ministry of Health. Afterwards, the … University Medical Faculty Hospital served as a pandemic hospital across the region between March 15 and June 1, 2020. A new working schedule was introduced by the hospital administration for the treatment of the COVID-19 patients in our hospital. During this period, outpatient clinics were closed, and only the patients with urgent health problems were accepted and surgeries that need to be handled in urgency were performed. In accordance with the workload of their own departments, some of the residents from various departments were assigned to the COVID-19 clinics and emergency rooms. And the remaining residents kept working in their own departments in accordance with the arrangements of the hospital administration.

When the COVID-19 literature is reviewed, the scarcity of the studies focusing on the comparison among front-line and back-line healthcare professionals in terms of psychiatric conditions is noticeable. A study reported that front-line healthcare professionals are at higher risk for developing anxiety, insomnia, and overall psychological problems compared to back-line medical staff.[8] Another study conducted in Turkey suggested that anxiety, depression, and secondary traumatization scores were higher in front-line healthcare workers than in those who did not work in the COVID-19 field.[11] There are also other existing studies indicating that COVID-19 patient care has negative consequences such as anxiety, depression, sleep problems, psychosocial distress, and psychosocial well-being among healthcare professionals.[12-16] Given that the psychosocial stress caused by COVID-19 care management and the fear of being infected, front-line healthcare workers, especially medical doctors are more likely to feel desperate and conceivably confront difficulties of this disease whose certain treatment is still unknown. In this study, we aimed to compare anxiety and depression levels among the doctors who treated COVID-19 patients, and those who did not treat. Although there are few studies in the literature comparing the stress levels between front-line and back-line healthcare professionals, our study is one of the first studies accomplished with only resident doctors (RDs).

Methods

Study design and subjects

The current study was designed as a cross-sectional study. The sample consisted of one hundred RD from the Ege University Medical Faculty Hospital. The data were collected during the COVID-19 pandemic period between March 15 and June 1, 2020. The inclusion criteria were: 1. Working as a RD in the Ege University Hospital; 2. Volunteering to take part in the study. The exclusion criteria were: 1. Not working as a RD in the Ege University Hospital; 2. Not volunteering to take part in the study. Three investigators from the current study reached to 195 RDs in 12 internal and surgical departments of the Ege University Hospital where assignments were made to COVID-19 units. Of 195 doctors, 100 completed the requirements to be involved in the study.

The COVID-19 units of our hospital were divided into COVID-19 outpatient polyclinics, COVID-19 inpatient services, and COVID-19 intensive care units. COVID-19 outpatient polyclinics were designed to scan the suspected individuals in terms of COVID-19 positivity. All the patients applying to those outpatient clinics were not COVID-19 positive cases. Most of them did not require COVID-19-specific treatment. Therefore, RDs assigned to these clinics were classified as working in a COVID-19 unit but not administering COVID-19-specific treatments. On the other hand, all the patients in COVID-19 inpatient services and intensive care units were COVID-19 positive. The RDs who were assigned to those units performed COVID-19-specific treatment on the patients.

Ethical approval was obtained from the Ege University Hospital Clinical Research Ethics Committee (10/07/2020-E.167902) and written informed consents were granted from all the participants and written informed consents were granted from all the participants.

Evaluation materials

The evaluation form of the participants was formed by the authors and the form included the following items: gender, age, marital status, the department he/she works in and the following yes/no questions: 'Did you treat COVID-19 patients?', 'Were you assigned to a COVID-19 clinic in this period?', 'Do you think that you will be assigned to a COVID-19 clinic in the near future?', 'Do you think the occupational health and safety measures are sufficient in the department you work in?', 'Are you receiving any psychiatric medication or psychological support?'

In addition, the Patient Health Questionnaire – 9 (PHQ-9) was used to measure depression levels.[17] The PHQ-9 is a measurement tool derived from the Patient Health Questionnaire and examines the frequency of symptoms of depression over the past two weeks with nine depression scanning symptoms according to the Diagnostical and Statistical Manual of Mental Disorders – IV (DSM-IV) criteria. Each item is scored as from 0 to 3 points and the total score ranges from 0 to 27. The scores between 0 and 4 are interpreted as minimal depression, 5-9 as mild, 10-14 as moderate, 15-19 as moderately severe and the scores between 20 and 27 are interpreted as the individual has severe depression. The Turkish validity and reliability study of the scale was performed by Sarı *et al*.[18]

The Beck Anxiety Inventory (BAI)[19] was applied to measure the anxiety levels of the physicians who participated in the study. The BAI has a total of 21 items examining the frequency of one's experiencing subjective, somatic, or panic-related symptoms of anxiety and includes Likert-type items ranging from responses of 'not at all' to 'severe'. A high total score indicates more severe level of anxiety. A total score ranging from 0 to 7 refers to minimal anxiety symptoms, 8-15 mild, 16-25 moderate, and 26-63 refers that the individual has severe anxiety symptoms. The validity and reliability study to adapt into Turkish was conducted by Ulusoy *et al*.[20]

Statistical analysis

The resulting data were transferred into 22nd version of the Statistical Package for Social Science (SPSS 22.0). Quantitative variables were evaluated by the Kolmogorov-Smirnov test in terms of appropriateness for normal distribution. The categorical groups were compared in terms of BAI and PHQ-9 scores with two independent sample t-tests if they were normally distributed; they were evaluated by the Mann-Whitney U-test, if not normally distributed. Descriptive statistics of quantitative variables have been shown as the mean ± standard deviation and descriptive statistics of these variables were expressed as a frequency (%). Besides that, the statistics of quantitative variables have been shown as the median (25^{th}-75^{th} percentile) if not normally distributed. Comparison of categorical variables was checked using Chi-square and Fisher's exact test analysis. The relationship between quantitative variables was studied by Spearman correlation analysis. Finally, to examine the predictors of BAI and PHQ-9 scores and to find out whether treating COVID-19 patients had effects on these scores, two linear regression models were constituted. The multiple regression analyzes did not have any issue on multicollinearity since all the variance inflation factors for each variable were less than 3,0 in all the analyzes. A *P* value less than 0.05 was considered statistically significant.

Results

Of the participants, 50% (n = 50) were female and 50% were (n = 50) male. Out of 100 RD, 48% (n = 48) were anesthesiologist, 23% (n = 23) child psychiatrist, 6% (n = 6) neurosurgeon, 5% (n = 5) urologist, 4% (n = 4) pediatric surgeon, 4% (n = 4) general practitioner, 3% (n = 3) cardiologist, 2% (n = 2) neurologist, 2% (n = 2) obstetrician and gynecologist, 1% (n = 1) cardiovascular surgeon, 1% (n = 1) thoracic surgeon, and 1% (n = 1) psychiatrist [see Table 1].

The analysis of the responses showed that there were 49 RDs treating COVID-19 patients and 51 RDs not treating COVID-19 patients. Among the participants in the study, the RDs from the anesthesiology department treated significantly more COVID-19 patients [χ^2 = 67.391; $P < 0.001$; see Table 2] compared to RDs from other departments did. While 43 (89.6%) of anesthesiologists were treating COVID-19 patients, only 5 (10.4%) of them did not treat [Table 2]. Out of all the participants, 65% (n = 65) were assigned to a different department other than their own the clinic to treat COVID-19 patients; however, 35% (n = 35) were not. During the pandemic period, 64% (n = 64) of the RDs divined they may be assigned to treat COVID-19 patients in the near future. While 44% (n = 44) found the occupational health and safety measures sufficient; 56% (n = 56) did not. Although 13% (n = 13) of RDs received some psychiatric medication, 87% (n = 87) did not [see Table 1].

According to the frequency analyzes regarding depression and anxiety severity, 38% of the participants in the study reported moderate or severe depression and 34% reported mild depression according to the PHQ-9; while 19% reported moderate or severe anxiety and 15% reported mild anxiety according to the BAI. Out of the RDs treating COVID-19 patients, 51% had moderate/severe depression and 32.7% had mild depression,

Table 1: Participant demographics and responses to COVID-19-associated questions

	M±SD
Age (years)	28.89±4.73
	n (%)
Sex	
Male	50 (50%)
Female	50 (50%)
Departments of RDs	
Anesthesiology	48 (48%)
Child Psychiatry	23 (23%)
Neurosurgery	6 (6%)
Urology	5 (5%)
General Practice	4 (4%)
Pediatric Surgery	4 (4%)
Cardiology	3 (3%)
Neurology	2 (2%)
Obstetrics and Gynecology	2 (2%)
Cardiovascular Surgery	1 (1%)
Thoracic Surgery	1 (1%)
Psychiatry	1 (1%)
Marital Status	
Single	67 (67%)
Married	30 (30%)
Divorced	3 (3%)
Having a child	
Yes	8 (8%)
No	92 (92%)
Treating COVID-19 patients	
Yes	49 (49%)
No	51 (51%)
Where to treat COVID-19 patients?	
Intensive care unit	44 (89.8%)
Inpatient service	5 (10.2%)
Being assigned to a COVID-19 clinic in this period	
Yes	65 (65%)
No	35 (35%)
Considering that he/she will be assigned to a COVID-19 clinic in the near future	
Yes	64 (64%)
No	36 (36%)
Considering the occupational health and safety measures are sufficient in the department he/she works in	
Yes	44 (44%)
No	56 (56%)
Receiving any psychiatric medication or psychological support	
Yes	13 (13%)
No	87 (87%)

Note. COVID-19: Coronavirus disease-2019; RD: Resident doctors

while 26.6% had moderate/severe anxiety and 20.4% had mild anxiety. 46.2% of the RDs who declared that they were assigned to work in a COVID-19 clinic reported moderate/severe depression and 29.2% reported mild depression; whereas 23.1% of them reported moderate/severe anxiety and 18.5% reported mild anxiety. The proportions of the RDs who had higher PHQ-9 and BAI scores were significantly greater in the RDs treating COVID-19 patients than in those not treating [χ^2 = 12,935, df = 4, P = 0.008; χ^2 = 6,421, df = 3, P = 0.030; respectively; see Table 3]. Although the rates of the RDs with moderate or severe symptoms of depression and anxiety were higher in the RDs who were assigned to a COVID-19 clinic than in unassigned RDs, no significant differences in proportions of the RDs with higher PHQ-9 and BAI scores were detected among the RDs who reported that they were assigned and not assigned to a COVID-19 clinic (all $P > 0.05$). Detailed outcomes are available in Table 3.

The comparison between treating COVID-19 and not treating COVID-19 RDs in terms of depression and anxiety symptoms are demonstrated in Figures 1 and 2. When the BAI scores were compared among the RDs who treated and did not treat COVID-19 patients, it was established that; the RDs treating COVID-19 patients had significantly higher BAI scores [median = 7 (4 – 16)], than the RDs not treating COVID-19 patients had [median = 3 (2 – 7)], (Z = -3.224; P = 0.001). In a similar way, The PHQ-9 scores were detected significantly higher in the RDs treating COVID-19 patients [median = 10 (6 – 15)] than in those not treating [median = 6 (3 – 10)] (Z = -3.323; P = 0.001). The BAI scores were found significantly higher in the RDs who were assigned to a COVID-19 clinic [median = 5 (3 – 14.5)] compared to those not assigned [median = 3 (1 – 6)] (Z = -2.705; P = 0.007); whereas the PHQ-9 scores were detected marginally significantly higher in assigned RDs [median = 9 (4.5 – 14)] than in unassigned RDs [median = 6 (3 – 9)] (Z = -1.930; P = 0.054).

The comparison among those with and without concerns of being assigned to COVID-19 clinics in the near future elicited that the RDs having considerations of being assigned to COVID-19 clinics had significantly higher BAI and PHQ-9 scores [median = 5.5 (3 – 12); median = 9 (5 – 14.75), respectively] than those not having considerations had [median = 3 (2 – 6.75); median = 6 (3 – 9), respectively] (Z = -2.270, P = 0.023; Z = -2.569, P = 0.01; respectively). The boxplot graph can be found in Figure 3.

In addition, the correlational and categorical analyzes revealed that there was no association among BAI and PHQ-9 scores and age, gender, marital status, receiving any psychiatric medication, and concerns about occupational health and safety measures (all $P > 0.05$).

Table 2: The distribution of RDs treating and not treating COVID-19 patients in terms of their departments

Departments of PAs	RDs not treating COVID-19 patients *n* (%)	RDs treating COVID-19 patients *n* (%)	Test statistics*
Anesthesiology	5 (10.4)	43 (89.6)	
Child Psychiatry	21 (91.3)	2 (8.7)	
Neurosurgery	5 (83.3)	1 (16.7)	
Urology	5 (100)	0 (0)	
General Practice	3 (75)	1 (25)	
Pediatric Surgery	3 (75)	1 (25)	χ^2=67.391
Cardiology	3 (100)	0 (0)	*P*<0.001
Neurology	2 (100)	0 (0)	
Obstetrics and Gynecology	1 (50)	1 (50)	
Cardiovascular Surgery	1 (100)	0 (0)	
Thoracic Surgery	1 (100)	0 (0)	
Psychiatry	1 (100)	0 (0)	

Note. COVID-19: Coronavirus disease-2019; RD: Resident doctor. *Fisher's exact test was performed

Table 3: The proportions of RDs with lower and higher BAI and PHQ-9 scores

	RDs treating COVID-19 patients *n* (%)	RDs not treating COVID-19 patients *n* (%)	χ^2	df	*P**	RDs who were assigned to a COVID-19 clinic *n* (%)	RDs who were not assigned to a COVID-19 clinic *n* (%)	χ^2	df	*P**
BAI scores										
Minimal	26 (53)	40 (78.4)	6,421	3	0.030	38 (58.4)	28 (80)	4,112	3	0.245
Mild	10 (20.4)	5 (9.8)				12 (18.5)	3 (8.6)			
Moderate	9 (18.4)	3 (5.9)				10 (15.4)	2 (5.7)			
Severe	4 (8.2)	3 (5.9)				5 (7.7)	2 (5.7)			
PHQ-9 scores										
Minimal	8 (16.3)	20 (39.2)	12,935	4	0,008	16 (24.6)	12 (34.3)	4,991	4	0.356
Mild	16 (32.7)	18 (35.3)				19 (29.2)	15 (42.8)			
Moderate	10 (20.4)	9 (17.6)				16 (24.6)	3 (8.6)			
Moderately severe	12 (24.5)	1 (2)				10 (15.4)	3 (8.6)			
Severe	3 (6.1)	3 (5.9)				4 (6.2)	2 (5.7)			

Note. COVID-19: Coronavirus disease-2019; BAI: Beck Anxiety Inventory; PHQ-9: Patient-Health Questionnaire-9; RD: Resident Doctor.
* Fisher's exact test was performed

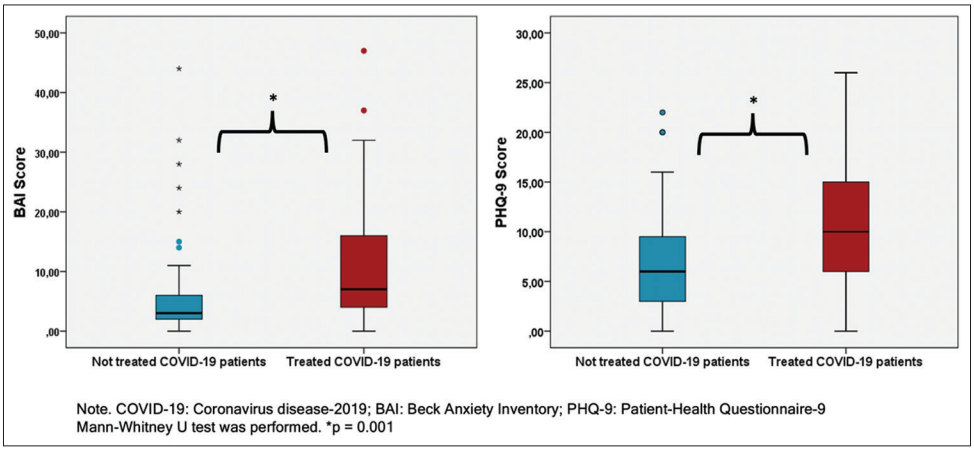

Figure 1: Comparison among RDs who treated and did not treat COVID-19 patients in terms of BAI and PHQ-9 scores

To demonstrate depression and anxiety levels of anesthesiologists and to make comparisons with the levels of other RDs, we conducted ANOVA test and performed pairwise comparisons via Tukey's post hoc test. Compared to anesthesiologists and child psychiatrists, the numbers of other RDs in our sample were very low (fewer than 7), hence other RDs were grouped under one group ("others").

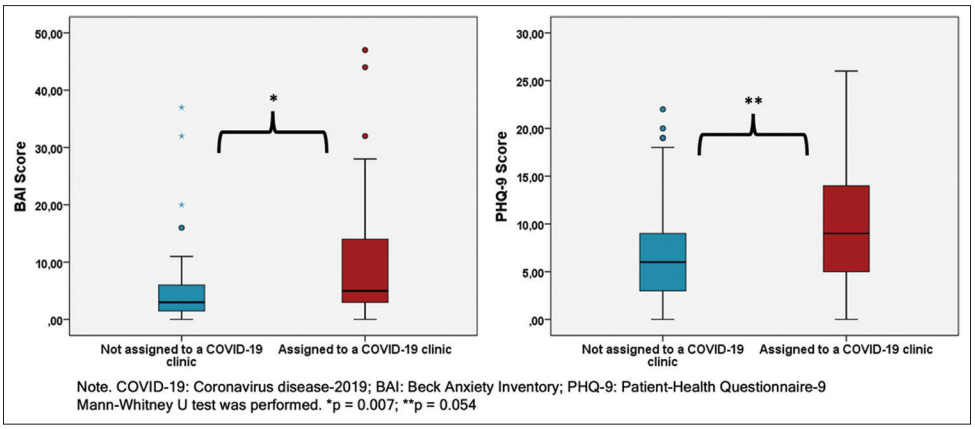

Figure 2: Comparison among RDs who were assigned and not assigned to a COVID-19 clinic in terms of BAI and PHQ-9 scores

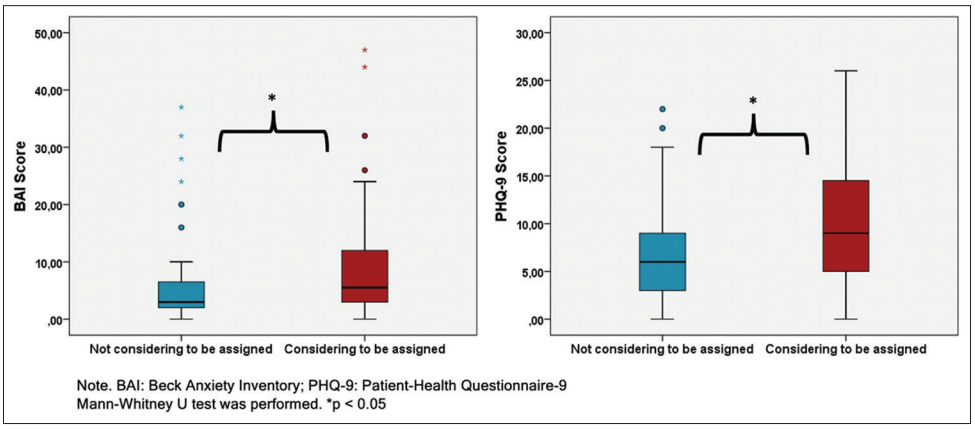

Figure 3: Comparison among PAs who considered and did not consider to be assigned to a COVID-19 clinic in terms of BAI and PHQ-9 scores

Table 4: The comparison of anxiety and depression levels among anesthesiologists, child psychiatrists, and other doctors from different departments

	Anesthesiologists (*n*=48) (1)		Child psychiatrists (*n*=23) (2)		Others (*n*=29) (3)		*P**			Pairwise Comparison
	M±SD	Median	M±SD	Median	M±SD	Median	1 vs 2	1 vs 3	2 vs 3	
BAI score	10.79±10.21	7.50	3.21±2.29	3.00	9.34±11.24	5.00	**0.006**	0.790	0.056	1>2; 3=1, 2
PHQ-9 score	10.35±5.99	10.00	5.39±3.44	5.00	8.13±6.52	7.00	**0.002**	0.228	0.200	1>2; 3=1, 2

Note. BAI: Beck Anxiety Inventory; PHQ-9: Patient-Health Questionnaire-9. Bold values mark statistically significant differences.
*One-way ANOVA test was performed with Tukey's post hoc tests

Table 5: Multiple linear regression model examining the predictors of PHQ-9 scores

Dependent Variable: PHQ-9 scores	Unstandardized Coefficients		Standardized Coefficients Beta	*t*	Sig.	95% Confidence Interval for B	
	B	Std. Error				Lower Bound	Upper Bound
(Constant)	2.340	4.683		0.500	0.618	-6.958	11.638
COVID-19 patient care	**2.512**	**1.187**	**0.211**	**2.116**	**0.037**	**0.155**	**4.869**
Weekly working hours	-0.019	0.049	-0.053	-0.383	0.703	-0.115	0.078
Monthly number of shifts	**0.838**	**0.345**	**0.354**	**2.432**	**0.017**	**0.154**	**1.523**
Male gender	**-3.317**	**1.190**	**-0.279**	**-2.789**	**0.006**	**-5.679**	**-0.955**
Age	0.228	0.124	0.180	1.843	0.068	-0.018	0.473

Adjusted R^2=0,178; F=5,291; *P*<0,001. Bold values mark statistically significant differences. Abbreviations. PHQ-9: Patient Health Questionnaire-9; COVID-19: Coronavirus disease-2019

The analysis revealed that anesthesiologists had significantly greater BAI and PHQ-9 scores than child psychiatrists (p = 0.006; *P* = 0.002; respectively), and marginally greater BAI and PHQ-9 scores than RDs

Table 6: Multiple linear regression model examining the predictors of BAI scores

Dependent Variable: BAI scores	Unstandardized Coefficients		Standardized Coefficients Beta	*t*	Sig.	95% Confidence Interval for B	
	B	Std. Error				Lower Bound	Upper Bound
(Constant)	-4.907	7.717		-0.636	0.526	-20.229	10.415
COVID-19 patient care	1.528	1.956	0.079	0.781	0.437	-2.356	5.412
Weekly working hours	**0.167**	**0.080**	**0.290**	**2.089**	**0.039**	**0.008**	**0.326**
Monthly number of shifts	0.846	0.568	0.219	1.490	0.140	-0.281	1.974
Male gender	-2.662	1.960	-0.137	-1.358	0.178	-6.554	1.230
Age	0.094	0.204	0.045	0.459	0.647	-0.311	0.498

Adjusted R^2=0,167; F=4,967; P<0,001. Bold values mark statistically significant differences. Abbreviations. BAI: Beck Anxiety Inventory; COVID-19: Coronavirus disease-2019

from other branches other than child psychiatry. The findings in detail can be seen in Table 4.

Finally, in order to examine the predictive factors of depression scores in the PHQ-9 and anxiety scores in the BAI, multiple linear regression models whose independent factors were COVID-19 patient care, weekly working hours, monthly number of shifts, gender, and age were constituted [see Tables 5 and 6]. The analyzes revealed that elevated PHQ-9 scores were uniquely associated with COVID-19 patient care (B = 0.211; P = 0.037), increased monthly number of night shifts (B = 0.354; P = 0.017) and reversely associated with male gender (B = -0.279; P = 0.006). However, elevated BAI scores were only found to be positively associated with increased weekly working hours (B = 0.290; P = 0.039).

Discussion

During pandemics causing significant, widespread increases in morbidity and mortality around the world, the healthcare systems, among some other institutions, work under the serious pressure. Although pandemic badly affects all the people in the world, healthcare professionals, who have a major responsibility toward society, are more significantly affected in pandemics and at risk for developing mental health-related disorders. A study conducted with 994 healthcare personnel (18% doctors, 82% care workers) stated that one-third of the participants were found to develop signs of mental disorders.[21] Anxiety, depression, and sleep disorder were frequently found as a result of a review, which included 13 studies investigating the mental health of healthcare workers during the COVID-19 pandemic period.[10]

In this study, we found that 38% of the whole RDs, 51% of the RDs treating COVID-19 patients and 46.6% of the RDs working in any COVID-19 clinic reported moderate or severe levels of depression. When the mild symptoms were taken into account, the rates of the RDs with depression and anxiety were established as 72% and 34% among all the participants, as 83.7% and 47% among those treating COVID-19 patients, and as 75.4% and 41.6% among those who were assigned to a COVID-19 clinic. In line with our results, Xiao *et al*.[22] from Wuhan where the COVID-19 outbreak was first identified, have reported that 54.2% and 58% of the participants presented the symptoms of anxiety and depression immediately after the outbreak. In another study carried out with 37 healthcare professionals in China, high levels of stress were detected in 18.9% of the sample; and the signs of moderate and severe depression were also demonstrated in those participants.[23] Also consistent with our results, in another study conducted with 230 front-line doctors and nurses, symptoms of anxiety disorders were observed in 23%, and symptoms of burnout syndrome in 27.4% of the participants.[24] A cross-sectional survey conducted with 1257 participants in China showed a high prevalence of mental health symptoms among healthcare workers treating COVID-19 patients.[14] As a result, 50.4%, 44.6%, 34.0%, and 71.5% of all respondents reported symptoms of depression, anxiety, insomnia, and distress, respectively, in this study with which our study had similar rates for anxiety and depression. The study also showed the mild symptoms of depression and anxiety were observed at rates of not as low as 35.6% and 32.2%[14] Our results were also consistent indicating a mild depression proportion range from 29.2% to 34%. The fact that approximately a third of medical doctors exhibit mild depressive symptoms in the COVID-19 pandemic period suggests that medical doctors with moderate/severe depressive symptoms and burnout symptoms may increase given that the outbreak may last for a long time.

It is clear that all pandemics primarily risk the physical and psychosocial health of healthcare professionals working during the epidemic. In the first place, active front-line workers should be supported to combat the pandemic. Thus, it is necessary to represent all the essential characteristics of healthcare professionals including job descriptions, their qualifications related to the work environment, risk and protective factors in

a systematic and complete framework. The risk factors on mental health of healthcare professionals working against coronavirus should be defined well. A study from China addressing this issue included healthcare workers and they were divided into three groups (Wuhan, other regions in Hubei province, and regions outside Wuhan province) to compare interregional differences. In all the groups and measurements, working in the front line was an independent risk factor for worse mental health consequences.[14] Our results were very similar to this study. The RDs treating COVID-19 patients had statistically significantly higher levels of anxiety and depression compared to those who did not. In a similar study, 120 healthcare workers were investigated. Sixty of them had an active role in the treatment of COVID-19, and the other sixty had worked in the background. The levels of anxiety and sleep disorder were found to be higher in those who worked on the front line compared to the other group.[25]

It must be admitted that, due to the nature of their profession, anesthesiologists often manage high-risk patients and emergency circumstances which makes them susceptible to stress and psychological problems. Furthermore, due to the work areas of anesthesiologists, the possibility of encountering COVID-19 positive or suspected patients for them is very high. This high probability inevitably implies more severe stress, anxiety, and depressive symptoms in anesthesiologists. Continuous exposure to the infectious agent, concerns about becoming infected and spreading the infection to those around them/loved ones are likely to mediate the increased levels of stress, anxiety, and depression in anesthesiologists.[26] In our study, it was detected that the vast majority of anesthesiologists cared for COVID-19 patients, and perhaps due to the abovementioned reasons, they had cumulatively higher levels of anxiety and depression compared to doctors from other branches. When combined with stress arising from the nature of anesthesiology itself, the extra responsibilities imposed on anesthesiologists by the COVID-19 pandemic cause cumulatively excessive stress and burden in anesthesiologists. This potentialized excessive stress may lead burnout symptoms and avoidance behaviors beyond anxiety and depression. A web-based survey conducted with 1375 physician trainees presented that exposure to COVID-19 patients and caring for them was found to be associated with increased stress and burnout levels.[27] It should be underlined that it is necessary to find solutions against psychological problems caused by the pandemic in order to maintain professional efficiency in all healthcare professionals, but especially in anesthesiologists.

Healthcare professionals are concerned about the large number of patient admissions, staff shortages, long working hours, insomnia, fatigue, new, or unknown clinical roles in the care of COVID-19 patients, and increased workload.[28] In our study, the levels of anxiety and depression were found to be higher in those who were assigned or thought that they would be assigned to another department to treat COVID-19 patients. These results could be interpreted as, not only the real anxiety of working with COVID-19 patients but also anticipatory anxiety affects negatively the mental health of medical doctors. However, our study also revealed that although the rates of the doctors with elevated anxiety and depression were significantly higher in those treating than in those not treating COVID-19 patients, there were no significant differences in the rates of the doctors with higher anxiety and depression between those working and not working in COVID-19 clinics. This unexpected outcome can be interpreted as the RDs treating COVID-19 patients frequently work in intensive care units [n = 44, 89.8%; see Table 1] where extra efforts are required to cope with ingravescent COVID-19 patients. As a result, the presence of PAs with moderate/severe anxiety and depression was detected more prominently higher in those treating COVID-19 patients compared to those who worked another COVID-19 clinics where comparably less bad patients applied.

It should also be emphasized that our study findings indicated COVID-19 patient care management and treatment was associated with clinician's depressive symptoms rather than anxiety symptoms. In line with our result, other studies also suggested that front-line healthcare workers engaged in direct diagnosis, treatment, and care of patients with COVID-19 were associated with a higher risk of symptoms of depression.[14,16] However, the complement of big picture leading depression in doctors is not only related to COVID-19 patient care. Female gender and increased number of night shifts contributed developing depressive symptoms according to our results. In another study using the PHQ-9 questionnaire that we used in our study, it was determined that nurses, women, front-line healthcare workers had more severe mental health symptoms.[14] Besides, it is well known that the monthly number of night shifts and weekly working hours potentialize the depression- and anxiety-increasing effect of COVID-19 patient care as indicated in our study. Working in these inappropriate working conditions lead to difficulty in sleep latency, short sleep durations, and daytime dysfunction.[13] Such sleep problems inevitably bring more burnout, more depression, and more anxiety in healthcare professionals who are expected to treat COVID-19–which has no certain treatment. Although

our results did not indicate a clearly strong association between COVID-19 patient treatment and high-level anxiety in doctors, existing studies confirm that COVID-19 care management has an effect to increase anxiety in healthcare professionals because of high-level feeling of responsibility.[14-16]

Strengths, limitations, and future directions

The results of this study should be interpreted with the limitations. First, the small number of the study sample should be taken into consideration. Second, although the depression and anxiety levels of the participants were measured by self-reported scales, the lack of a mental status examination or a structured interview prevented us from making sure of the psychiatric conditions of the participants. Despite these limitations, the current study is considerably important in terms of revealing the frequency and intensity of mental health problems of medical doctors who are at the forefront of the fight against COVID-19 in Turkey. It is yet to be known how long the COVID-19 pandemic will last, and since it is assumed that the pandemic will be prolonged, larger sampled follow-up studies in which the depression and anxiety levels of healthcare professionals and doctors are measured and monitored are needed.

Conclusions

COVID-19 pandemic maintains affecting healthcare professionals including doctors negatively, as well as all humanity. Front-line doctors spend a significant amount of effort to protect public health. However, this effort against COVID-19 is bringing increases in anxiety and depression levels of them. Our study highlights that front-line RDs have higher levels of anxiety and depression than back-line RDs. The current study also reports that anxious and depressive symptoms are quite frequent among doctors who are expected to be 'strong' against COVID-19. During this period, necessary measures must be taken to protect the mental health of doctors and other healthcare professionals. Tele-health services, including video conferences with mental health professionals, mobile apps, online resources, and virtual peer support may provide important mental healthcare. Healthcare establishments should regularly monitor the mental health conditions of all the healthcare professionals caring for patients with COVID-19 and prioritize the mental and physical health needs to sustain and restore front-line healthcare workers.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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