

## Factors affecting burnout in physicians during COVID-19 pandemic

COVID-19 pandemisi sırasında hekimlerde tükenmişliği etkileyen faktörler

•			
Osman Hasan Tahsin Kılıç¹匝	Murat Anıl <sup>2</sup> 🝺	Umut Varol <sup>3</sup>	Zeynep Sofuoğlu <sup>4</sup> ⊡
İstemihan Çoban⁵©	Hakan Gülmez <sup>6</sup> 匝	Güven Güvendi <sup>7</sup> 回	Berna Dirim Mete <sup>8</sup> 0
<sup>1</sup> Izmir Democracy University, E	Department of Psychiatry,	Izmir, Turkey	
<sup>2</sup> Izmir Democracy University, E	Department of Pediatrics,	Izmir, Turkey	
<sup>3</sup> Izmir Democracy University, E	Department of Internal Me	dicine and Oncology, Iz	mir, Turkey
<sup>4</sup> Izmir Democracy University, [	Department of Preventive	Medicine, Izmir, Turkey	
<sup>5</sup> Izmir Democracy University, [	Department of Anatomy, Iz	zmir, Turkey	
<sup>6</sup> Izmir Democracy University, E	Department of Family Med	licine, Izmir, Turkey	
<sup>7</sup> Izmir Democracy University, I	Department of Physiology	, Izmir, Turkey	
<sup>8</sup> Izmir Democracy University, I	Department of Radiology,	Izmir, Turkey	

### ABSTRACT

**Aim:** The COVID-19 outbreak continues to pose a threat to people's physical and mental health all over the world. The health professionals who are directly involved in the fight against the pandemic may experience stress during this crisis that can cause Burnout and Secondary traumatic stress. The objective of our study was to assess the burnout among physicians during COVID-19 pandemic and to determine related factors.

**Materials and Methods:** A cross-sectional online survey was conducted. The demographical and occupational data were collected using a questionnaire and burnout level was assessed by Maslach Burnout Inventory (MBI).

**Results:** 748 physicians took the survey. The burnout levels stated by the physicians were found to be significantly higher than before the pandemic [median before pandemic 3 (CDA: 2-4); median 4 (2-5) during pandemic; p < 0.001]. Personal Accomplishment (PA), Emotional Exhaustion (EE) and Depersonalization (D) scores of participants directly providing medical services to COVID-19 cases were significantly higher (p <0.05). While EE and D scores were highest in first step workers, PA scores were highest in third step workers. PA scores were lower in man and EE scores were higher in women (p<0.05). Negative correlation was found between the age and the EE [r: (-) 0.087; p< 0.017] and D [r: (-) 0.233; p<0.001] subscale scores.

**Conclusion:** We concluded that women, younger, first step and frontline workers had higher risks for burnout, so individual, structural, and organizational arrangements should be made by giving priority to these risky groups.

Keywords: Burnout; COVID-19; pandemic; physicians.

## ÖΖ

**Amaç:** COVID-19 salgını, tüm dünyada insanların fiziksel ve zihinsel sağlığı için tehdit oluşturmaya devam etmektedir. Salgınla mücadeleye doğrudan dahil olan sağlık çalışanları, bu kriz sırasında tükenmişliğe ve İkincil travmaya neden olabilecek stres yaşayabilmektedir. Çalışmamızın amacı COVID-19 salgını sırasında hekimler arasındaki tükenmişliği değerlendirmek ve ilişkili faktörleri belirlemektir.

Corresponding author: İstemihan Çoban Izmir Democracy University, Department of Anatomy, Izmir, Turkey E-mail: istemihancoban@gmail.com

Application date: 05.10.2020 Accepted: 24.03.2021

**Gereç ve Yöntem:** Kesitsel çevrimiçi anket uygulanmıştır. Demografik ve mesleki veriler anket kullanılarak toplanmış ve tükenmişlik düzeyi Maslach Tükenmişlik Envanteri (MBI) ile değerlendirilmiştir.

**Bulgular:** Ankete 748 hekim katıldı. Hekimlerin belirttiği tükenmişlik düzeyleri pandemi öncesine göre anlamlı düzeyde yüksek bulunmuştur [pandemi öncesi ortanca 3 (CDA: 2-4); pandemi sırasında ortanca 4 (2-5)]. COVID-19 vakalarına doğrudan tıbbi hizmet veren hekimlerin Kişisel Başarı Hissi (PA), Duygusal Tükenmişlik (EE) ve Duyarsızlaşma (D) puanları anlamlı olarak daha yüksek saptandı (p <0.05). EE ve D puanları ilk basamakta çalışan hekimlerde en yüksek iken, PA puanları üçüncü basamakta çalışanlarda en yüksek saptandı. PA puanı erkeklerde daha düşük, EE puanları kadınlarda daha yüksek saptandı (p <0.05). Yaş ile EE ve D alt ölçek puanları arasında negatif korelasyon bulundu. (EE için r: (-) 0.087; p <0.017] ve D için [r: (-) 0.233; p <0.001]).

**Sonuçlar:** Bu çalışmada kadınların, gençlerin, birinci basamakta ve ön saflarda çalışanların tükenmişlik riskinin daha yüksek olduğu sonucuna ulaşıldı. Çalışmamızda, belirlenen riskli gruplara öncelik verilerek bireysel, yapısal ve örgütsel düzenlemeler yapılması gerektiği vurgulanmaktadır.

Anahtar Sözcükler: Tükenmişlik; COVID-19; pandemi; hekim.

### INTRODUCTION

In December 2019, a new type of coronavirus and its-related pneumonia cases were detected for the first time in Wuhan, China, and soon after the epidemic spread rapidly all over the world. The World Health Organization (WHO) defined the newly identified virus as SARS-CoV-2 (severe acute respiratory syndrome coronavirus-2) and its disease as COVID-19 (Coronavirus Disease 2019) in February 2020. Afterwards, WHO declared that this epidemic is a pandemic on March 11<sup>th</sup>, 2020 (1).

Professional Burnout is an increasing health concern affecting physicians globally. It is a workrelated phenomenon, involving emotional exhaustion (EE), depersonalization (D) and personal accomplishment decreased (PA). Psychosocial stressors such as social isolation, quarantine, stigmatization, fear of contaminating their loved ones and occupational challenges such as the huge amount of cases exceeding hospital capacity, complexity of duties and responsibilities, lack of protective equipment, difficulties in the treatment are likely to increase during COVID-19 pandemic which may lead to burnout among physicians.

Burnout has negative effects on patient care and their satisfaction, professionalism, and self-care of the physician, and as a result, the health system (2). There is only one study investigating the burnout levels of healthcare workers during the current pandemic; high EE levels were found in one third of the participants and high D levels in a quarter (3). Additionally, in two studies, investigating the psychological effect of pandemic among health professionals, has demonstrated that a considerable portion of them is adversely affected (4, 5). In our study, we aimed to evaluate burnout levels and its related factors among physicians during current pandemic.

### **MATERIALS and METHODS**

A survey including the demographical and occupational data in addition to Maslach Burnout Inventory (MBI) was created on an online survey collection tool (SurveyMonkey<sup>®</sup>). The survey was open between 16 April 2020 and 30 April 2020. The link was sent to the medical doctors via WhatsApp<sup>®</sup>. No name was written on the questionnaire and response rates could not be quantifiable.

The ethics committee approval required for the survey study was obtained from the Non-Interventional Clinical Research Ethics Committee of Izmir Democracy University (dated March 20<sup>th</sup>, 2020 and numbered 2020 / 08-4). In addition, approval of the Ministry of Health was obtained for this survey study on May 5<sup>th</sup>, 2020.

Demographic data (age, sex, marriage status, having a chronical disease, having a child, change of residency) occupational characteristics (department, academic status, institution, results of PCR tests of colleagues, average working hours) and experienced burnout levels before and during pandemic (scored between 1-5; 1: not feeling exhausted, 5: totally exhausted) were collected using a questionnaire.

Maslach Burnout Inventory (MBI), which is a reliable and highly validated tool was used to measure burnout in medical doctors (6). This 22-article inventory is evaluated in three subdimensions including emotional burnout,

depersonalization, and personal accomplishment. The questions related with EE (9 questions) and D (5 questions) comprise negative expressions. and questions related with PA (8 questions) are composed of positive expressions. The EE subscale measures feelings of being emotionally overextended exhausted and bv one's occupation. The D subscale measures unfeeling and impersonal responses towards recipients of one's service, care, treatment or instruction. The PA subscale measures the absence of feelings of competence and successful achievement in one's work. A high score in the EE and D subscales and a low score in the PA subscale indicates exhaustion. The Turkish validity study of the Maslach Burnout Inventory has been performed (7). The original Inventory is a 7-point Likert scale. However, it was observed that the answer options, which were composed of 7 steps, were not appropriate for Turkish culture. Thus, the answer options were arranged as 5 steps. In this arrangement, the questions in the EE and D subscales were scored as "never = 0, very rarely = 1, sometimes = 2, mostly = 3, always = 4", and the questions in the PA subscale were scored reversely (never = 4, very rarely = 3, sometimes = 2, mostly = 1, always = 0). A score ranging between 0 and 36 is obtained for EE, a score between 0 and 20 is obtained for D, and score between 0 and 32 is obtained for PA by adding these scores. A differentiation of presence or absence of burnout cannot be made because of the absence of a cut-off value for scores obtained in these subscales. It is expected that individuals who experience burnout will have high scores in the EE and D subscales, and a low score in the PA subscale. However, the burnout scores included in the first one third of the distribution are considered "low", the burnout scores included in the middle one third of the distribution are considered "moderate", and scores in the final one third are considered "high" when determining levels of exhaustion. The Cronbach alpha coefficient is 0.83 for EE, 0.72 for PA, and 0.65 for D.

## Statistical Analysis

Survey results were analyzed with IBM SPSS 20.0 Statistics (IBM Corporation, New York, USA) package program. Categorical data are indicated by number (n) and percentage (%). The numerical data that met the parametric properties are shown with arithmetic mean  $\pm$  standard deviation (mean  $\pm$  SD) and minimum-maximum

(min-max) values; those that did not meet the parametric properties were expressed with median and guarter value range (QVR). Mann-Whitney U test was used to compare two independent variables and Kruskall Wallis test post-hoc Bonferroni was used to compare more than two independent variables. Wilcoxon Test was used to compare two dependent variables. The relationship between the two groups was examined with Spearman correlation analysis. The r coefficient strengths the correlation; The (+) or (-) sign indicates the direction of the correlation. p<0.05 value was considered statistically significant.

## RESULTS

# Demographic and Occupational Characteristics

748 physicians took the survey. The average age of the participants was 40.3 ± 9.7 (min: 23-max: 63). Among all, 409 (54.7%) were women and 339 (45.3%) were men. 555 of the participants were married (74.2%), and 193 (25.8%) were single [132 were not married (17.6%), 58 were divorced (7.8%), 3 were widows (0.4%)]. The spouse of 365 (48.8%) participants was also healthcare worker and 521 (69.7%) had children. The number of the respondents working in the internal medicine was 572 (76.5%), in surgery was 115 (15.4%), in preclinical fields was 30 (4%) and 31 participants (4.1%) were dentists. The number and percentages of the physicians' specialties are given in Table 1. 542 (72.5%) of them were frontline workers and 205 of the participants (27.4%) had a chronic disease. 84 of the physicians (11.2%) were working in the first step, 186 (24.9%) in the second step, and 414 (55.3%) in the third step. 64 (8.6%) physicians were working in private practice or had administrative duties in district/provincial health directorate.

Physicians from 59 cities participated in the study. 16 of the physicians were in Adana, 1 in Adıyaman, 4 in Afyon, 48 in Ankara, 22 in Antalya, 15 in Aydın, 6 in Balıkesir, 1 in Bilecik, 1 in Bingöl, 1 in Burdur, 1 in Bolu, 10 in Bursa, 2 in Çanakkale, 28 in Denizli, 1 in Diyarbakır, 1 in Erzincan, 1 in Erzurum, 15 in Eskişehir, 2 in Gaziantep, 1 in Giresun, 1 in Hakkari, 13 in Hatay, 6 in Isparta, 5 in Mersin, 63 in Istanbul, 316 in İzmir, 1 in Kars, 1 in Kastamonu, 11 in Kayseri, 1 in Kırklareli. 8 in Kocaeli, 49 in Konya, 2 in Kütahya, 3 in Malatya, 36 in Manisa, 2 in Kahramanmaraş, 1 in Mardin, 7 in Muğla, 1 in

Niğde, 3 in Ordu, 1 in Rize, 3 in Sakarya, 3 in Samsun, 1 in Tekirdağ, 1 in Tokat, 6 in Trabzon, 1 in Tunceli, 1 in Şanlıurfa, 3 in Uşak, 1 in Van 1, 9 in Zonguldak, 1 in Aksaray, 2 in Batman, 1 in Bartın, 1 in Karabük and 5 in Düzce.

### Data regarding COVID-19 pandemic

During the COVID-19 pandemic, 41 (5.5%) physicians and 65 (8.7%) family members of the physicians has changed their residence. 134 (17.9%) participants stated that they had a COVID-19 PCR test; The results were positive in 7 (0.9%) of them. COVID-19 PCR test were positive in 18 (2.4%) of medical doctors' first-degree relatives. 229 (39%), 101 (13.5%) and 131 participants (17.5%) stated that 1-10, 11-20 and >20 of their colleagues were diagnosed with COVID-19, respectively. During the pandemic, 81 physicians (10.8%) emphasized that their working hours were increased while 462 (61.8%) physicians emphasized that their working hours were decreased.

### Burnout levels and related factors

Experienced burnout levels were higher than before the pandemic [median before pandemic was 3 (CDA: 2-4); median during pandemic was

4 (2-5); p <0.001]. The scores of the Maslach Burnout Index subscales are shown in Table-2. PA scores were lower in men and EE scores were higher in women (p<0.05). A significant negative correlation was found between the age and the EE [r: (-) 0.087; p< 0.017], D [r: (-) 0.233; p<0.001] subscale scores of the participants. PA score was higher in those whose spouses were medical staff (p<0.05). Physicians with chronic disease who had to use drugs constantly had a lower PA score (p <0.05) While EE and D scores were found to be highest in first step workers, PA scores were found to be highest in third step workers (p<0.05). (Table-3).

The new conditions experienced during the pandemic were compared based on the MBI subscale scores. EE scores of those (themselves or family members) who changed residences during the pandemic period were higher (p<0,05). PA, EE, and D scores of frontline workers were significantly higher (p<0.05). PA and EE scores were higher in physicians in whom COVID-19 disease were detected in more than their 20 colleagues. (p<0.05). During the pandemic, those who had increased working hours had higher EE scores (p<0.05) (Table-4).

Table-1. The n	umber and per	centages of t	he physicians	'specialties.
	annoor ana por	contagoo or t	and priyololand	opoolaitioo.

Specialty	n	%	Specialty	n	%
General Practitioner	59	7.9	Child and Adolescent Psychiatry	2	0.3
Dentist	31	4.1	Skin and Venereal Diseases	7	0.9
Plastic, Reconstructive and Aesthetic Surgery	4	0.5	Infectious Diseases and Clinical Microbiology	14	1.9
Oral and Maxillofacial Surgery	2	0.3	Physical Therapy and Rehabilitation	17	2.3
Anesthesiology and Reanimation	27	3.6	Chest Diseases	15	2.0
Brain and Nerve Surgery	9	1.2	Public Health	1	0.1
Pediatric Surgery	1	0.1	Internal Medicine	42	5.6
General Surgery	24	3.2	Cardiology	5	0.7
Thoracic Surgery	5	0.7	Neurology	4	0.5
Ophthalmology	9	1.2	Nuclear Medicine	2	0.3
Internal Branches (Other)	1	0.1	Radiation Oncology	6	0.8
Orthopedics and Traumatology	8	1.1	Radiology	117	15.6
Medical Pathology	10	1.3	Psychiatry	21	2.8
Cardiac Surgery	2	0.3	Medical Genetics	1	0.1
Gynecology and Obstetrics	8	1.1	Anatomy	1	0.1
Urology	15	2.0	Physiology	1	0.1
Ear, Nose and Throat Diseases	18	2.4	Medical Biochemistry	3	0.4
Emergency Medicine	24	3.2	Medical Microbiology	4	0.5
Forensic Medicine	7	0.9	Medical Education	1	0.1
Family Medicine	54	7.2	Other	19	2.5
Pediatrician	147	19.7	Total	748	100

 Table-2.
 Emotional exhaustion (EB), depersonalization (D) and personal accomplishment (PA) scores of 748 physicians and dentists surveyed during COVID-19 pandemic according to Maslach Burnout Index.

	Emotional Exhaustion	Depersonalization	Personal Accomplishment
Mean ± SD (Min-Max)	19.7 ± 8 (0-36)	6.9 ± 4.5 (0-20)	8.9 ± 5.1 (0-25)
Median (IQR)	19 (26-14)	7 (3-10)	9 (5-13)

SD: standard deviation; Min: minimum; Max: maximum; IQR: interquartile range

**Table-3.** Comparison of the general characteristics of 748 physicians surveyed in terms of emotional exhaustion.

 Depersonalization and personal accomplishment scores.

	Emotional Exhaustion Median (IQR)	Depersonalization Median (IQR)	Personal Accomplishment Median (IQR)
Sex	× ,		
Female (n=409)	20 (15-26)	7 (3-10)	9 (6-13)
Male (n=439)	18 (13-25)	6 (3-10)	8 (4-12)
p*	0.004	0.722	0.005
Marriage status			
Married (n= 555)	18 (14-25)	6 (3-10)	8 (5-12)
Single (n=193 ->132 not married, 58 divorced, 3 widows)	21 (15-27)	8 (5-11)	10 (7-14)
p*	<0.001	<0.001	<0.001
Having a child			
Yes (n=521)	19 (13-25)	6 (3-10)	8 (4-12)
No (n=227)	20 (15-27)	8 (5-11)	10 (7-14)
p*	0.011	<0.001	<0.001
Work of spouse			
Health care worker (n=365)	19 (14-25)	6 (3-10)	9 (5-12)
Other (n=383)	17 (12-25)	5 (3-10)	8 (3-12)
p*	0.026	0.461	0.017
Having a chronical disease			
Yes/ with medication (n=205)	20 (14-26) <sup>1</sup>	6 (3-10)	8 (4-12) <sup>1</sup>
Yes/without medication (n=36)	23 (18-28)	8 (5-10)	9 (4-14)
No (n=543)	19 (14-26)	7 (3-10)	9 (5-13)
p**	0.145	0.218	0.018
Department			
Internal Medicine (n=572)	19 (14-26)	7 (3-10)	9 (5-13)
Surgery (n=115)	20 (13-28)	8 (3-11)	8 (4-12)
Preclinical Fields (n=30)	18 (14-25)	6 (3-10)	10 (8-13)
Dentist (n=31)	21 (14-27)	6 (3-8)	6 (3-12)
p**	0.921	0.497	0.166
Level of Healthcare			
First step (n=84)	23 (16-29) <sup>2</sup>	8 (4-11)	7 (4-13)
Second step (n=186)	20 (14-27)	6 (3-11)	8 (4-12)
Third step (n=414)	19 (14-25)	7 (3-10)	9 (6-13) <sup>3:</sup>
Other (n=64)	17 (11-26)	5 (2-9)	6 (3-11)
p**	0.010	0.065	0.002

IQR: interquartile range; \*: Mann Whitney U Test; \*\*: Kruskal Wallis Test;

<sup>1:</sup> "Yes/ with medication" group was significantly different from two other groups

<sup>2</sup>: "first step" group was significantly different from "third step" group and "other" group.

<sup>3:</sup> "third step group" was significantly different from "first step" group, "second step" group and "other" group.

	Emotional Exhaustion Median (IQR)	Depersonalization Median (IQR)	Personal Accomplishment	
	inoulair (ruit)	inouluir (i City)	Median (IQR)	
Change of residency				
Physician changed (n=41)	25 (17-30) <sup>1</sup>	9 (4-12)	9 (7-15)	
Family changed (n=65)	21 (16-27) <sup>1</sup>	7 (3-10)	9 (5-13)	
No change (n=642)	19 (14-25)	6 (3-10)	9 (5-12)	
p*	0.012	0.100	0.170	
Front-line worker				
Yes (n=542)	20 (15-26)	7 (4-11)	9 (6-13)	
No (n=206)	17 (13-25)	5 (3-9)	8 (3-11)	
p**	<0.001	0.001	0.001	
PCR test				
Positive (n=7)	20 (16-26)	7 (4-11)	9 (5-12)	
Negative (n=127)	12 (11-21)	8 (2-9)	10 (2-15)	
Not done (n=614)	19 (14-26)	6 (3-10)	9 (5-13)	
p*	0.102	0.507	0.892	
PCR test in colleagues				
1-10 colleague (+) (n=292)	19 (15-25)	6 (4-10)	8 (5-12)	
11-20 colleague (+) (n=101)	18 (13-25)	5 (3-10)	9 (6-12)	
>20 colleague (+) (n=131)	21 (17-27) <sup>2</sup>	8 (4-10)	10 (7-13) <sup>2</sup>	
None (n=224)	17 (12-26)	6 (3-10)	8 (4-12)	
p*	0.003	0.070	0.026	
1° relative Test				
Positive (n=18)	19 (12-24)	9 (5-11)	10 (8-16)	
Negative/ not done (n=730)	19 (14-26)	6 (3-11)	9 (5-13)	
p**	0.536	0.157	0.093	
Working hours				
Increased (n=81)	23 (17-30) <sup>3</sup>	7 (3-11)	9 (5-13)	
Decreased (n=462)	19 (14-25)	6 (3-10)	9 (5-13)	
Not changed (n=205)	19 (13-26)	7 (3-11)	9 (5-12)	
p*	0.011	0.598	0.618	

**Table-4.** Comparison of participants' pandemic period-specific variables in terms of emotional exhaustion (EB). depensionalization (D) and sense of personal accomplishment (PA).

IQR: interquartile range; \*: Kruskal Wallis Test; \*\*: Mann Whitney U Test; <sup>1:</sup> "Physician changed" and

"Family changed" groups were significantly higher than other group; <sup>2</sup>: ">20

colleague" group is significantly different.  $^3$ : "increased" group is significantly different.

### DISCUSSION

This study is the first study in our country investigating the burnout in physicians during the current pandemic. It was determined that experienced burnout increased during the pandemic. EE was found higher in younger, female, first step and frontline workers and those who changed their residence and whose working hours were increased. EE was found higher in women healthcare workers and it has been reported that younger and female healthcare workers are more adversely affected during the current pandemic (3-5). Work–home conflict is a known strong predictor of burnout in female physicians (8). Consistent with previous data, we found that burnout levels are associated with female gender and younger age. Increasing work-home conflicts during pandemic may explain our results. On the other hand, with the announcement of the pandemic in our country, the new legal arrangements were made for resident physicians and they started working in the front lines regardless of their specialties. Increased weekend and night calls, intense workload and lack of experience may explain higher levels of burnout among younger physicians.

Higher PA scores in male physicians was reported in two previous studies from our country (9,10). There was also another study which did not find any difference between genders. In the literature, there were additional several studies, but they did not consider the personal accomplishment subscale a part of burnout assessment (11). Contrary to previous data from our country, we found higher PA scores in female physicians. To our knowledge this is the first study found higher PA scores in females in Turkey. Although females have tendency to score slightly higher on exhaustion, and males often score higher on depersonalization, sex has not been accepted a strong predictor of burnout (11).

In the study conducted by the Turkish Medical Association no statistically significant difference was found between general practitioners and specialist physicians in terms of EE, DP and PA scores (12). However, this research was done before switching to the "family medicine" model. In another study it was reported that switching to "family medicine" model increased competition, workload, stress, and ethical corruption among family medicine physicians (13). For this reason, we can speculate that after switching to family medicine model, first step physicians' burnout risk might be increased. Additionally, it has been reported that general practitioners had the highest burnout scores among all physicians in UK (14). In accordance with this data, we found highest EE and D scores in first step physicians in our study.

It has been reported that having a health-worker spouse is protective for physician burnout (2). During the SARS outbreak in the United States, fewer than half of healthcare professionals reported volunteering to work (15). In contrast previous data we found that EE subscale scores were higher in physicians whose spouse were health workers. Fear of contaminating their loved ones and their family members may have increased emotional exhaustion when both spouses are health workers. Social support has been shown to be protective factor against burnout in physicians (16). In our study, EE was higher in those who were single and started to live separately from their families during the pandemic. Moreover, contrary to our expectations and previous studies, EE was lower in physicians with children. Being married, having a child, and living with the family may have increased the perceived social support, thus protecting against EE in this difficult period.

Burnout was found to be higher in some specialties such as emergency medicine, anesthesiology, and neurology in which long and risky work hours are present (17, 18). In our country, many hospitals were declared as pandemic hospitals, and physicians took part in the treatment and care of COVID-19 patients regardless of their specialty. In our study, we did not compare burnouts of physicians according to their specialty. However, when physicians were classified as internal medicine, surgical and preclinical, there was no difference between burnout levels. EE and D scores were higher among physicians involved in the care and treatment of COVID-19 patients.

EE and DP scores were reported to be higher in physicians who work more than 8 hours and examine more than 40 patients per day (19). Data from cross-sectional studies reported 3% increased odds of burnout for each additional hour per week. In our study, EE scores were higher in those with increased working hours. The longer daily work hours may lead to burnout by reducing attention, increasing risk of mistakes, and inability to allocate time to themselves (20).

Psychological burden of pandemic was found higher in health care workers, those in Wuhan, China (5). It is understandable that the stress experienced is higher in regions where the outbreak is widespread. The number of cases in the cities of our country was not disclosed at the time of the study. For this reason, we investigated the number of diagnosed healthcare professionals to determine the spread of disease at least in their institutions. We found that EE was higher in institutions in which there were more than 20 health workers with positive test results.

Interestingly, EE was not found to be higher in physicians who had positive PCR test results and in those who had PCR test positivity in their firstdegree relatives. This may be related to the low number of tests. Less than a fifth of the physicians were tested and only 7 physicians had positive results, so the number is so low to compare.

Increased stress levels which are driven to burnout in healthcare professionals during and after outbreaks have been shown in many studies (21-23). Confusion in duties and responsibilities. given the real and understandable fear of the disease. lack of knowledge using personal protective of equipment, uncertainty in personal needs. public, from reactions the isolation and stigmatization can increase stress levels (24). We do not know the burnout levels of the population participating in our study before pandemic. However, the physicians who participated in our study stated that the level of burnout experienced during the pandemic increased.

Our study has some limitations. First, the sample was not representative of the Turkish Physicians

population so our results cannot be generalized. Second, our study was cross sectional. Thus, the cause-effect relationship cannot be established with our findings. Follow-up, longitudinal studies should be needed.

In conclusion, individual, structural and organizational arrangements should be made by giving priority to women, younger, first step and frontline workers in order to protect the well-being of physicians in the current pandemic.

#### Acknowledgements

We would like to thank the all-health care workers who are responsible for the care and treatment of patients with COVID-19. We thank all those who contributed to the various stages of the study.

**Conflict of Interest:** The authors declared no conflict of interest.

### References

- 1. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of coronavirus disease 2019 in China. New England journal of medicine 2020; 382 (18): 1708-1720.
- 2. West CP, Dyrbye LN, Shanafelt TD. Physician burnout: contributors, consequences and solutions. Journal of internal medicine. 2018; 283 (6): 516-529.
- 3. Barello S, Palamenghi L, Graffigna G. Burnout and somatic symptoms among frontline healthcare professionals at the peak of the Italian COVID-19 pandemic. Psychiatry Research. 2020; 113129.
- Rossi R, Socci V, Pacitti F, Di Lorenzo G, Di Marco A, Siracusano A, et al. Mental Health Outcomes Among Frontline and Second-Line Health Care Workers During the Coronavirus Disease 2019 (COVID-19) Pandemic in Italy. JAMA Network Open. 2020; 3 (5): e2010185-e2010185.
- 5. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA network open. 2020; 3 (3): e203976-e203976.
- 6. Maslach C, Jackson S, Leiter M. Burnout inventory manual. Palo Alto, CA: Consulting Psychologists. 1996.
- 7. Capri B. Tukenmislik olceginin Turkce uyarlaması: Gecerlik ve guvenirlik calimasi. Mersin Universitesi Egitim Fakultesi Dergisi. 2006; 2 (1): 62-77.
- 8. Ádám S, Gyorffy Z, Susánszky É. Physician burnout in Hungary: a potential role for work family conflict. Journal of health psychology. 2008; 13 (7): 847-856.
- 9. Aslan SH, Ünal M, Aslan RO. Pratisyen Hekimlerde Tükenme Düzeyleri. Düşünen Adam 1996; 9: 48-52.
- 10. Sünter, A. T., Canbaz, S., Dabak, Ş., Öz, H., & Pekşen, Y. (2006). Pratisyen hekimlerde tükenmişlik, işe bağlı gerginlik ve iş doyumu düzeyleri. *Genel Tıp Dergisi*, *16* (1), 9-14.
- 11. Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. Annual review of psychology, 52 (1), 397-422.
- Aslan, D., Kiper, N., Karaağaoğlu, E., Topal, F., Güdük, M., & Cengiz, Ö. S. (2005). Türkiye'de tabip odalarına kayıtlı olan bir grup hekimde tükenmişlik sendromu ve etkileyen faktörler. *Ankara: Türk Tabipleri Birliği* Yayınları.
- 13. Kaya, A., Çetinkaya, F., Naçar, M., & Baykan, Z. (2014). Aile hekimlerinin tükenmişlik durumları ve ilişkili faktörler. *Türkiye Aile Hekimliği Dergisi*, *18* (3), 122-133.
- 14. Imo, U. O. (2017). Burnout and psychiatric morbidity among doctors in the UK: a systematic literature review of prevalence and associated factors. *BJPsych bulletin*, *41* (4), 197-204.
- 15. Qureshi K, Gershon RRM, Sherman MF, Straub T, Gebbie E, McCollum M, et al. Health care workers' ability and willingness to report to duty during catastrophic disasters. J Urban Heal. 2005; 82: 378–88.

- 16. Shanafelt TD, Gorringe G, Menaker R, Storz KA, Reveez D, Buskirk SJ, et al. Impact of organizational leadership on physician burnout and satisfaction. Mayo Clin Proc. 2015; 90: 432–40.
- 17. Shanafelt TD, Balch CM, Bechamps GJ, Russel T, Lotte D, Satele D, et al. Burnout and career satisfaction among American surgeons. Ann Surg. 2009; 250: 463–71.
- Shanafelt TD, Dyrbye LN, Sinsky C, Hasan O, Satele D, Sloan J et al. Relationship between clerical burden and characteristics of the electronic environment with physician burnout and professional satisfaction. Mayo Clin Proc. 2016; 91: 836–48.
- 19. Özkula, G., & Durukan, E. (2017). Hekimlerde Tükenmişlik Sendromu: Sosyodemografik Özelliklerin Rolü. *Dusunen Adam*, 30 (2), 136.
- 20. West, C. P., Dyrbye, L. N., & Shanafelt, T. D. (2018). Physician burnout: contributors, consequences and solutions. *Journal of internal medicine*, 283 (6), 516-529.
- Lung FW, Lu YC, Chang YY, Shu BC. Mental symptoms in different health professionals during the SARS attack: a follow-up study. Psychiatry Q. 2009; 80 (2): 107–16.doi: 10.1007/s11126-009-9095-5. Epub 2009 Feb 27.
- 22. Mak IWC, Chu CM, Pan PC, Yiu MGC, Chan VL. Long-term psychiatric morbidities among SARS survivors. Gen. Hosp. Psychiatry. 2009; 31 (4): 318–26. doi:10.1016/j.genhosppsych. 2009.03.001. Epub 2009 Apr 15.
- 23. Lu YC, Shu BC, Chang YY, Lung FW. The mental health of hospital workers dealing with severe acute respiratory syndrome. Psychother Psychosom. 2006; 75 (6): 370–5.
- 24. Sultana A, Sharma R, Hossain M, Bhattacharya S, Purohit N. Burnout among healthcare providers during COVID-19 pandemic: Challenges and evidence-based interventions. 2020.