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Original Article

An assessment of the anxiety, depression, and sleep disorders experienced by cardiologists during the COVID-19 pandemic

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Abstract: Objective: In this study, we aimed to evaluate the symptoms of stress and the anxiety levels of cardiologists who continue to treat cardiac patients in addition to their epidemic duties during the COVID 19 pandemic. Methods: This cross-sectional study included 347 cardiologists throughout Turkey from April 17 to 20, 2020. The research was conducted using a confidential online survey. The research used the Turkish versions of the 7-item Generalized Anxiety Disorder Scale (GAD-7), the 7-item Insomnia Severity Index (ISI), and the 9-item Patient Health Questionnaire (HPQ-9). Results: Among the respondents, n = 272 (78.3%) ranged in age from 31 to 50 years old and n = 84 (24.2%) were women. A considerable proportion of the participants reported symptoms of anxiety (54.2%), insomnia (44.1%), and depression (71.1%). The women cardiologists showed more severe levels of the anxiety and depression symptoms compared to the male cardiologists. The mean GAD-7 scale scores among the women vs. the men were 6.6 ± 3.5 vs. 5.0 ± 4.3; P = 0.005; the mean ISI scores among the women vs. the men were 7.3 ± 4.3 vs. 6.9 ± 4.6; P > 0.05; and the average HPQ-9 scores among the women vs. the male cardiologists were 8.0 ± 3.9 vs. 6.8 ± 4.7; P = 0.02. Conclusions: In this survey, most of the cardiologists were found to be mentally challenged while continuing their profession during this outbreak. The anxiety and depression symptoms of the female doctors were especially higher than the symptoms of their male counterparts. The stress disorders created by this pandemic may have serious future consequences, especially for female doctors.

Keywords: Cardiologists, COVID-19, anxiety, stress, sleep disorders, pandemic

Introduction

The acute respiratory distress syndrome caused by SARS-CoV2 is a member of the coronavirus family named COVID-19. This disease was first reported in Wuhan, China in December, 2019. In the months that followed, this virus spread worldwide, causing an epidemic. The first case was detected on March 11, 2020 in our country and, on the same day, the World Health Organization defined COVID-19 disease as a pandemic [1].

The first scientific data and observations from China were very valuable in this sense because the COVID-19 pandemic has never been experienced before, so it contains many unknowns which the whole medical world was following closely. Zhou et al. reported that advanced age is a risk factor for mortality in COVID-19 patients treated in Wuhan [2]. However, it was also noted that hypertension, diabetes, and coronary artery disease were frequently observed in the patients. It was recognized in the same report that patients who died had significantly more hypertension. In many articles, which were quickly accepted and published following this, it was pointed out that the presence of advanced age, coronary artery disease, and hypertension are not only risk factors for COVID-19 disease but also increase the mortality risk [3-5]. On the other hand, the drugs used by heart patients were questioned, and it was stated that some antihypertensive drug groups

may pose a risk in terms of SARS-CoV2. During this information confusion, cardiologists, who were already following cardiac patients who were already shown to be at risk for COVID-19 disease, suddenly became physicians who play an active role in the process.

According to the literature, it was known that healthcare workers were at risk and there were many healthcare workers who died in different parts of the world due to different respiratory outbreaks [6, 7]. The characteristics of SARS-CoV2, its rapid transmission rate, and the serious problems occurring in the affected countries created mental stress for our healthcare workers even before the virus was first detected in our country. However, it was not possible to prove this at that time. After the first case was detected, an increase in workload, prolonged working hours, the frequent exposure to suffering patients, and heavily requested cardiology consultations from other departments challenged cardiology physicians academically and mentally in our country.

In this study, we aimed to evaluate the stress symptoms and anxiety levels of cardiologists especially during that period when the number of cases increased and when the unknowns were the highest in our country.

Material and methods

The study was conducted between April 17 and April 20, 2020, when the measures were at the highest level of the pandemic in our country, and the cases were at their most busy period. There were more than 80,000 patients who tested positive and more than 2,000 deaths caused by COVID-19 during this period in Turkey. Only cardiology research fellows and cardiology consultant doctors were included in this study.

The research was conducted by means of a confidential online survey. All participants signed the informed consent and voluntarily filled out the survey form. In our study, we aimed to evaluate the symptoms of depression, anxiety, and insomnia among cardiologists who continued their services during the pandemic. In this study, the Turkish versions of the 9-item Patient Health Questionnarie (PHQ-9; range, 0-27), the 7-item Generalized Anxiety Disorder Scale (GAD-7; range, 0-21), and the 7-item Insomnia Severity Index (ISI; range, 0-28) questionnaires were used [8-10]. In these evaluations, the total scores are classified as follows: GAD-7, normal (0-4), mild (5-9), moderate (10-14), severe (15-21) anxiety; ISI, normal (0-7), subtreshold (8-14), moderate (15-21), and serious (22-28) insomnia; and PHQ-9, normal (0-4), mild (5-9), moderate (10-14), and serious (15-21) depression. These categories are established in the literature.

The questionnaire asked about the demographic characteristics of the cardiologists, questions which included gender (male or female), age range (20-25, 26-30, 31-40, 41-50, 51-65, > 65 years), marital status, living with someone over the age of 65 years old and under the age of 18 years old, the type of hospital, any accompanying chronic disease that would pose a risk for COVID-19 disease, and working position during the COVID-19 pandemic outbreak. The questionnaire did not ask for the respondents' names. The study was approved by the Turkish Ministry of Health's and the Ufuk University's ethics committees.

Statistical analysis

The continuous study data are presented as the mean ± standard deviation. The categorical variables are presented as a number and a percentage. To compare the severity of each symptom between the groups with respect to the continuous variables, Student's t-tests or Mann-Whitney U tests were used, with the former being used for the normally distributed variables and the latter for the non-normally distributed ones. The differences with regard to the categorical variables were tested using chi-squared tests. To determine the potential risk factors for the symptoms of depression, anxiety, and insomnia among the participants, a multivariable logistic regression analysis was performed. All the statistical analyses were performed using SPSS version 21 (SPSS Inc., Chicago, IL, USA). For all the statistical analyses, a p-value of < 0.05 was considered statistically significant.

Results

347 cardiologists participated in the study between April 17-April 20, 2020. Among the 347 cardiologists, 24.2% (n = 84) of the participants were women, 78.3% (n = 272) were

Table 1. The mean scores of the mental health evaluation measurements among cardiology physicians

Scale	*Score, Mean (± SD)*
GAD-7, anxiety symptoms	5.3 ± 4.1
ISI Score	7.0 ± 4.6
PHQ-9 Score	7.1 ± 4.5

Abbreviations: GAD-7: 7-item Generalized Anxiety Disorder Scale, ISI: 7-item Insomnia Severity Index, PHQ: 9-item Patient Health Questionnarie.

between the ages of 31-50 years old, and 73% (n = 254) were married. 69.2% of them (n = 240) were working in tertiary hospitals which are centers where heart patients and COVID-19 patients are more often admitted and treated in Turkey.

A considerable proportion of the participants had shown symtoms of anxiety (n = 188; 54.2%), insomnia (n = 153; 44.1%), and depression (n = 247; 71.1%). The mean GAD 7 score of all the participants was 5.3 ± 4.1; the mean ISI score was 7.0 ± 4.6; the mean PHQ-9 score was 7.1 ± 4.5 (**Table 1**).

The participants were divided into two groups according to their GAD-7 scores. Those with a GAD score of 4 or below constituted the non-anxiety group, while those with a GAD score of 5 or above formed the anxiety group. When we compared both groups, we found that gender had a significant effect on the anxiety symptoms, but there was no significant difference between the two groups in terms of marital status, living with an individual over 65 or under the age of 18 at home, or working on the front-line in the covid pandemic. The number of female physicians was significantly higher in the anxiety group compared to the other group (P = 0.001) (**Table 2**; **Figure 1**).

Women cardiologists reported more severe levels of all the measurements of anxiety symptoms and depression symptoms than the male cardiologists. The mean GAD-7 scores among the women vs. the men were 6.6 ± 3.5 vs. 5.0 ± 4.3; P = 0.005; the mean ISI scores among the women vs. the men were 7.3 ± 4.3 vs. 6.9 ± 4.6; P > 0.05; the mean PHQ-9 scores among the women vs. the men were 8.0 ± 3.9 vs. 6.8 ± 4.7; P = 0.02. The scale evaluations of the participants are summarized in **Table 3**. No relationship was found between the age groups and the mental stress experienced by the participants. On the other hand, the symptoms of deterioration in sleep quality and depression of the young physicians who were aged 30 and under were higher, but this difference was not statistically significant (**Table 3**).

The presence of chronic diseases that could pose a risk for COVID 19 disease was reported by 12.7% (n = 44) of the participants. Among all the risk factors, hypertension was the most common, with 43.8% (n = 19). It was observed that the participants with a chronic disease developed more depression symptoms, and as a result the depression evaluation scores were found to be significantly higher than those without depression (8.5 ± 4.8 vs. 6.8 ± 4.4, P = 0.04). Similarly, the sleep quality deterioration indices were higher for the people with chronic diseases (8.7 ± 4.6 vs. 6.7 ± 4.6, P: 0.005) (**Table 3**).

A multivariable logistic regression analysis showed that the physicians living in the same house with a family member over 65 years of age had more depression symptoms (95% CI 1.05-2.32, P: 0.03). On the other hand, the presence of children under the age of 18 in the physician's house did not cause any additional anxiety or depression.

Discussion

In this study, we observed that the mental health of the cardiologists participating in the study was affected while they continued their duties during the COVID 19 pandemic. With an impairment in sleep quality at 44.1%, anxiety findings of 54.2% (albeit at different levels), and of 71.1%, we found that depression symptoms were observed. In fact, when we examine the literature, it is a condition that is observed the society and among healthcare workers after significant epidemics [11, 12]. Lai et al. found that the symptoms of anxiety and insomnia were significantly higher among the healthcare workers treating patients with COVID-19 in China [12]. In that crosssectional survey 50.4%, 44.6%, 34.0% and 71.5% of all the participants had shown symptoms of depression, anxiety, insomnia, and distress, respectively. Also, the same study further indicated that being a woman and having an intermediate technical title were associated with experiencing severe depression, anxiety, and distress.

Table 2. A comparison of the individuals with and without anxiety in terms of their demographic data and living situations

Demographic Data	Anxiety Group (n = 188)	Non-anxiety Group (n = 159)	*P* value
Gender (female) (n, %)	59 (31%)	25 (15%)	0.001*
Age (years) (n, %)			0.1
20-30	28 (14.8%)	22 (13.8%)	> 0.05
31-40	101 (53.7%)	92 (57.2%)	> 0.05
41-50	47 (25%)	33 (20.8%)	> 0.05
51-65	12 (6.4%)	7 (4.4%)	> 0.05
≥65	0	5 (3.1%)	> 0.05
Marital status			
Married (n, %)	138 (73.2%)	116 (73%)	0.5
Single[a] (n, %)	50 (26.6%)	43 (27%)	0.1
Living with someone (n, %)			
Over the age of 65	20 (10.6 %)	10 (6.3%)	0.1
Under the age of 18	113 (60.1%)	85 (53.5 %)	0.1
Accompanying chronic disease (n, %)	29 (15.4%)	15 (9.4%)	0.06
Working frontline position for the COVID pandemic (n, %)	99 (52.7%)	86 (54%)	0.4

a: single included widowed and divorced participants; *the mean difference is significant at the 0.05 level.

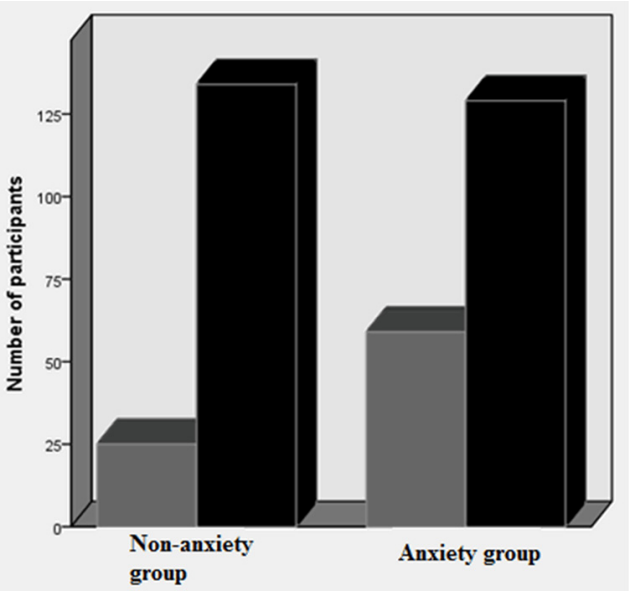

Figure 1. A comparison of the number of female and male participants in the anxiety and non-anxiety groups. The number of female physicians was significantly higher in the anxiety group, P = 0.001.

Unlike our study, most of the participants in this study were women and nurses. The fact that all the participants in our study were physicians and that all the physicians had the same specialty is an important feature that distinguishes our study from others in the literature. Compared to the study of Lai et al., more anxiety and depression symptoms were observed and more impairment was found in sleep quality in our study. Like in this study, anxiety and depression were found at a higher rate among the women in our study. On the other hand, the psychological evaluation of physicians, the health system they serve, and the socio-economic situation of the country should also be taken into consideration. For this reason, it is important for countries to make their own evaluations and to evaluate their physicians' stress levels. In fact, an interesting point that should be taken into consideration is that the doctors who participated in our study show anxiety and distress symptoms while performing their duties during this epidemic period, regardless of their front-line or additional pandemic duties.

As Kisely et al. stated in their meta-analysis, this type of epidemic shows that acute and post-traumatic stress disorders are more common among the personnel who treat the

Table 3. A comparison of the participants divided into groups by their GAD-7, ISI, and PHQ scores

Variables	*GAD-7*	*ISI Score*	*PHQ Score*
Gender			
Male	5.0 ± 4.3	6.9 ± 4.6	6.8 ± 4.7
Female	6.6 ± 3.5	7.3 ± 4.3	8.0 ± 3.9
P value	0.005*	> 0.05	0.02*
Marital status			
Married	5.4 ± 4.1	7.1 ± 4.6	7.0 ± 4.5
Single	5.4 ± 4.3	6.6 ± 4.6	7.3 ± 4.5
P value	0.95	0.34	0.55
Living with someone over the age of 65			
Yes	7.2 ± 5.5	8.4 ± 4.4	8.9 ± 6.7
No	5.2 ± 4.0	6.8 ± 4.6	6.9 ± 4.2
P value	0.06	0.07	0.11
Living with someone under the age of 18			
Yes	5.7 ± 4.2	7.0 ± 4.4	7.0 ± 4.5
No	4.9 ± 4.1	6.9 ± 4.8	7.2 ± 4.6
P value	0.11	0.89	0.64
Accompanying chronic disease			
Yes	6.3 ± 4.0	8.7 ± 4.6	8.5 ± 4.8
No	5.2 ± 4.2	6.7 ± 4.6	6.8 ± 4.4
P value	0.11	0.005*	0.04*

Abbreviations: GAD-7: 7-item Generalized Anxiety Disorder Scale, ISI: 7-item Insomnia Severity Index, PHQ: 9-item Patient Health Questionnaire. *the mean difference is significant at the 0.05 level.

patients [13]. Unlike being younger and being the parents of dependent children, which were shown to be risk factors in the same study, in our study, the presence of individuals over 65 years old who lived together in the same house caused an increase in physician anxiety. Although the difference was not statistically significant, the cause of this increased anxiety may be the concern about spreading the pathogen to elderly individuals in their houses due to the occupational exposure that physicians are exposed to.

It is claimed in the literature that women are more sensitive in terms of mental health problems [14, 15]. Referring to Chong et al., during the severe acute respiratory syndrome (*SARS*) epidemic, psychological morbidity was shown to be higher, especially for female healthcare workers [16]. In our study, the high levels of the anxiety and depression symptoms among the female physicians are compatible with other studies. No statistically significant difference in psychiatric morbidity was found in relation to age, marital status, or living conditions. Due to the traditional social roles in Turkey, female physicians may face serious dilemmas. They squeeze their time between work and family care. Sometimes this situation can be a great source of stress. Moreover, the relatively low number of female cardiologists in our country and their inability to express themselves comfortably in male-dominated cardiology clinics may have facilitated this situation.

The important point is whether physicians will have the strength to overcome these stress disorders and continue their mentally healthy lives after surviving this initial shock. Wu et al. stated that psychological stress in hospital workers can last up to three years after a SARS epidemic [17]. According to the European Society of Cardiology (ESC) Atlas 2020, the number of cardiologists per million people in Turkey is 20-59. Turkey is one of the countries with the most limited number of cardiologists in Europe [18]. On the other hand, in recent years, Turkish physicians have been frequently exposed to severe workplace violence from patients and their relatives. Actual threatening and aggressive behavior towards physicians and other healthcare professionals is a growing worldwide concern [19-24]. Under all these challenging conditions, the additional psychological stress caused by the COVID-19 pandemic may cause long-term psychological problems, especially in physicians in busy branches such as cardiology.

The prolongation of this pandemic process, the self-isolation and persistence of fear, and the increasing workload of non-pandemic cardiology can worsen symptoms and cause new mental health problems that may increase the risk of suicide in this group of physicians who have already developed psychological morbidity.

This study was done in our country when the pandemic had reached its peak. The anxiety levels of the participants in the study were not evaluated again. This is an important limitation of this study. On the other hand, this pandemic period is challenging and full of unknowns. We must face this period with patience and wisdom alongside protecting the common sense of medicine. At a point where all eyes are turned to the treated patients, the psychosocial evaluation of physicians whose daily practical lives are already busy, and bringing these points to the literature is at the point of necessity. The effect of the mental health problems may last longer than the real pandemic period, especially for the physicians of the busy branches, such as cardiology, whose normal practical life is already stressed. In this sense, it will be appropriate to carry out national research and plan national strategies.

Conclusion

In this study, we found that the epidemic is causing mental difficulties for most of the cardiologists who are continuing their profession at the same time. Female doctors are more inclined to have anxiety and stress disorders compared to their male collegues. This anxiety and stress disorders which are caused by the pandemic may have serious future results, specifically for physicians working in busy branches such as cardiology, who have to serve large patient groups in low and middle-income countries. It should be taken into consideration that the female doctors working in these branches are more likely to have burnout syndrome. There is a need for governments and health institutions to take action to address mental stress among healthcare professionals.

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Disclosure of conflict of interest

None.

Abbreviations

GADS, Generalized Anxiety Disorder Scale; ISI, Insomnia Severity Index; PHQ-9, Patient Health Questionnarie-9; SARS, Severe acute respiratory syndrome; ESC, European society of cardiology.

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