



# Anxiety Levels and Associated Factors Among Emergency Department Personnel Fighting COVID-19

## COVID-19 ile Mücadele Eden Acil Servis Çalışanlarının Anksiyete Düzeyi ve Etkileyen Faktörler

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### Abstract

**Aim:** We aimed to determine anxiety levels of the emergency department (ED) personnel working in close contact with infected patients and potential risk factors associated with this anxiety.

**Materials and Methods:** This cross-sectional, hospital-based study was conducted among healthcare personnel working at the ED of the tertiary healthcare hospital in question, who are directly involved in the diagnosis and treatment of COVID-19 patients. The participants were administered a questionnaire that included items on sociodemographic characteristics; items on health, social, and demographic factors considered to be related with anxiety; and the 40 items of State-Trait Anxiety Inventory (STAI).

**Results:** The study included 138 healthcare professionals. In total, 29.7% of the participants were female and 70.3% were male. The minimum and maximum ages of the participants were 21 and 52 years, respectively, with a median age of 33 (27–40) years. The mean STAI-S and STAI-T scores of healthcare professionals included in the study were 45.4±10.4 and 41.3±7.3, respectively. The effect of women nurses and having children, on anxiety levels was found to be significantly high. Comparing the groups categorized for their compliance with COVID-19-related measures, the state anxiety scores of the “somewhat compliant” group were found to be higher. Participants with the perception that measures taken and institution’s available capacity were insufficient were found to have statistically significantly higher STAI-S scores than the others ( $p < 0.001$ ).

**Conclusion:** Maintaining mental health of healthcare personnel during a pandemic is vital to better control contagious diseases. Thus, exclusive effort should be made to maintain mental well-being of healthcare professionals being exposed to COVID-19.

**Keyword:** COVID-19, anxiety, healthcare personnel, State-Trait Anxiety Inventory

### Öz

**Amaç:** Bu çalışma enfekte hastalar ile yakın temasta bulunan acil servis (AS) çalışanlarında var olabilecek kaygı düzeylerini ve bunlarla ilişkili potansiyel risk faktörlerini belirlemek amacıyla yapılmıştır.

**Yöntem:** Bu çalışma COVID-19 hastalarının tanı, tedavileriyle doğrudan ilgilenen hastanemiz üçüncü basamak AS’de çalışan sağlık çalışanları arasında yapılmış kesitsel, hastane temelli bir çalışmadır. Araştırma kapsamında kişilere; sosyo-demografik özellikler (yaş, cinsiyet, medeni durum, çocuk sahibi olup/olmadığı, aile ile birlikte yaşama, eğitim düzeyleri, meslek durumu), kaygı ile ilişkili olduğu düşünülen sağlık, sosyal ve demografik faktörler (sigara kullanımı, kronik hastalığı olup/olmadığı, çalışma ortamındaki tedbirlerin yeterli olup/olmadığı, çalışma ortamından memnuniyeti ve COVID-19 nedeni ile alınan tedbirlere uyumu) ve Durumluk-Sürekli Kaygı Envanteri’nden (STAI) oluşan 40 soruluk anket uygulanmıştır.

**Bulgular:** Çalışmaya, doğrudan COVID-19 olan veya olduğundan şüphelenilen hastaların tanı ve tedavisinin yapıldığı AS bölümdeki 138 sağlık çalışanı dahil edildi. Çalışmaya katılan bireylerin %29.7’si (n=41) kadın, %70.3’ü (n=97) erkek idi. Katılımcıların yaşları en küçük 21 en büyük ise 52, medyan 33 (27-40) idi. Araştırma kapsamına alınan sağlık çalışanlarının STAI-S ortalama skoru 45.4±10.4, STAI-T ortalama skoru 41.3±7.3 olarak bulunmuştur. Kadın, hemşire olmak ve çocuk sahibi olmanın anksiyete düzeyi üzerindeki etkisi anlamlı olarak daha yüksek bulunmuştur. Katılımcıların durumluk/sürekli kaygı ölçek puanları COVID-19 nedeniyle alınan tedbirlere uyumlarına göre oluşturulan gruplar arasında istatistiksel olarak anlamlı derecede farklıydı ( $p < 0.001$ ). Alınan tedbirleri ve kurumun mevcut kapasite durumunu yetersiz olarak düşünen katılımcılarda STAI-S puanları istatistiksel olarak anlamlı düzeyde daha yüksek saptandı ( $p < 0.001$ ).

**Sonuç:** Salgın döneminde sağlık personelinin ruh sağlığını korumak bulaşıcı hastalıkları daha iyi kontrol etmek için gereklidir. COVID-19’a maruz kalan sağlık çalışanlarının zihinsel açıdan sağlıklı kalabilmesi konusunda özel dikkat gösterilmesi gerekmektedir.

**Anahtar Kelimeler:** COVID-19, anksiyete, sağlık personeli, durumluk sürekli kaygı envanteri



## INTRODUCTION

A novel pneumonia case caused by coronavirus disease (COVID-19), which emerged in the Wuhan City, Hubei Province of China, and rapidly spread across the world, was reported in December 2019.<sup>[1]</sup> This virus is termed as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Despite having a broad range of variations, COVID-19 is considered to have a higher mortality rate compared with seasonal influenza. Available evidence suggests the transmission mode of SARS-CoV-2 among humans to be through close contact and droplets<sup>2</sup>, which unavoidably puts healthcare professionals at high risk from coronavirus. Having the knowledge that COVID-19 can be transmitted between people, is associated with high morbidity, and is potentially fatal can increase perceived personal threat.<sup>[1-3]</sup> Faced with this large-scale infectious public health issue, healthcare professionals are under physical and psychological pressure at the same time.<sup>[4]</sup>

The psychological response of healthcare professionals to the pandemic outbreak is complicated. This response may include concerns such as the risk of getting infected with the virus; transmitting the virus to family, friends, and coworkers; social isolation anxiety; vulnerability; or the feeling of losing control.<sup>[5]</sup> The concerns of healthcare professionals may further be elevated owing to factors such as the continuous increase in number of cases, intensive workload, constant risk of infection, lack of specific medications, and limited resources.<sup>[6]</sup>

Determining the anxiety levels of healthcare professionals would thus play an effective role in providing a protective approach for the group in question and for planning relevant interventions for the problems identified. The present study aimed to determine anxiety levels of the emergency department (ED) personnel working in close contact with infected patients and potential risk factors associated with this anxiety.

## MATERIAL AND METHOD

This cross-sectional, hospital-based study was conducted among healthcare personnel working at the ED of the tertiary healthcare hospital in question, who are directly involved in the diagnosis and treatment of COVID-19 patients. Total number of personnel working in these units was 224. The study comprised 138 healthcare professionals. The study was approved by the local ethics committee (Ethics Committee Approval No: 2020-03/55).

Before the commencement of the study, the researchers verbally informed the participants about the study details and obtained the participants' informed consent. The participants were informed that they could opt out at any time. The questionnaire was anonymous and personal information was kept confidential. Total number of patients diagnosed with COVID-19 in the hospital was 85, and the number of fatalities was eight as of the period the questionnaire was applied.

The participants were administered a questionnaire that included items on sociodemographic characteristics (age, gender, marital status, child status, living with family, educational status, and occupational status); items on health, social, and demographic factors considered to be related with anxiety (smoking, presence of chronic disease, adequacy of measures in the working environment, working environment satisfaction, and compliance with COVID-19-related measures); and the 40 items of State-Trait Anxiety Inventory (STAI).

The STAI consists of two subscales, each having 20 items: The state anxiety scale (STAI-S), which assesses intensity of anxiety at any given time, and the trait anxiety scale (STAI-T), which assesses general and long-term anxiety levels. Each STAI item is given a weighted score of 1–4 on a 4-point Likert scale; 10 reverse-coded items are included in STAI-S, and seven reverse-coded items are present in STAI-T. The questionnaires are evaluated by assigning scores to the selected answers that were either termed as anxiety-absent (reducing the total anxiety score) or anxiety-present (increasing the total anxiety score) within a weighted score of 1–4. A constant of 50 for STAI-S scale and 35 for STAI-T are then added to the obtained scores. The final value obtained demonstrates the individual's total anxiety score. Scores for both STAI-S and STAI-T can vary from a minimum of 20 to a maximum of 80. Scores of 20–35 indicates no or low anxiety, 36–41 indicated moderate anxiety, and 42–80 indicated severe anxiety.<sup>[7,8]</sup>

## Statistical Analysis

Statistical analyses for the study data were performed using SPSS version 15.0 (SPSS Inc., Chicago, IL, USA). The normally distributed descriptive data were presented as Means±Standard Deviations, non-normally distributed data were presented as medians (interquartile range [IQR]), and categorical data were presented as n (%). The Kolmogorov–Smirnov test was utilized to determine whether the data was normally distributed. Student's t-test (for normally distributed data) and the Mann–Whitney U test (for non-normally distributed data) were used to compare continuous data between two groups. One-way analysis of variance and the Kruskal–Wallis test (whichever is found relevant) were used to compare continuous data between three or more groups. The post hoc Bonferroni and Tukey analyses were utilized for making subgroup comparisons. A p value of <0.05 was considered statistically significant.

## RESULTS

The present study consisted of 138 healthcare professionals working in an ED where diagnosis and treatment of confirmed or suspected COVID-19 patients were performed. In total, 29.7% (n=41) of the participants were female and 70.3% (n=97) were male. The minimum and maximum ages of the participants were 21 and 52 years, respectively, with a median age of 33 (27–40) years.

Among the participants, 34 (24.6%) of them were nurses, and 31 (22.5%) of them were physicians. Distribution of participants regarding their sociodemographic and professional characteristics is provided in **Table 1**. The mean STAI-S and STAI-T scores of healthcare professionals included in the study were  $45.4 \pm 10.4$  and  $41.3 \pm 7.3$ , respectively.

<b>Table 1.</b> The distribution of participants by socio-demographic and professional characteristics	
<b>Variables</b>	
Age, yr, median (IQR)	33 (27-40)
Gender, n (%)	
Male	97 (70.3%)
Female	41 (29.7%)
Marital status n (%)	
Married	89 (64.5%)
Unmarried	49 (35.5%)
Child Status, n (%)	
Yes	82 (59.4%)
No	56 (40.6%)
Living with the family	
Yes	101 (73.2%)
No	37 (26.8%)
Occupation	
Physician	31 (22.5%)
Nurse	34 (24.6%)
Health officer	12 (8.7%)
Emergency medical technician	4 (2.9%)
Medical secretary	11 (8.0%)
Security	28 (20.3%)
Radiology technician	7 (5.1%)
Cleaning staff	11 (8.0%)
Smoking	
Never used	62 (44.9%)
Used and left	20 (14.5%)
Actively using	56 (40.6%)
Chronic Disease	
Yes	18 (13.0%)
No	120 (87.0%)
State Anxiety Score, mean $\pm$ SD	45.4 $\pm$ 10.4
Trait Anxiety Score, mean $\pm$ SD	41.3 $\pm$ 7.3

The analysis results indicated that women had significantly higher levels of anxiety (STAI-S= $50.02 \pm 10.32$ , STAI-T= $44.88 \pm 6.15$ ) than men ( $p < 0.001$ ). STAI-S scores of the 18–32 age groups were significantly higher than other age groups, while there was no statistically significant difference in the mean STAI-T scores ( $p > 0.13$ ). The effect of having children on anxiety levels was found to be significantly high (STAI-S  $p=0.04$ , STAI-T  $p=0.03$ ). The relationship between anxiety scores and sociodemographic characteristics is provided in **Table 2**.

Comparing the groups categorized for their compliance with COVID-19-related measures, a statistically significant difference was observed in STAI scores of participants ( $p < 0.001$ ). The Tukey post hoc subgroup analysis revealed that such a difference resulted from the difference in the mean anxiety scale scores between the “somewhat compliant” group and the “completely compliant” group (5.87; 95% Confidence Interval 1.59–10.16) ( $p=0.004$ ) (**Table 3**).

Participants with the perception that measures taken and institution’s available capacity were insufficient were found to have statistically significantly higher STAI-S scores than the others ( $p < 0.001$ ) (**Table 4**). No significant difference was observed in STAI-T scores among participants who believed that the medical equipment was insufficient ( $p=0.17$ ).

**Table 4.** Comparison of anxiety scores of the participants with the perception that measures taken and institution’s available capacity

	STAI-S score	p-value	STAI-T score	p-value
Measures taken				
Sufficient	42.03 $\pm$ 9.88	<0.001*	40 (35-45.25)	0.003¶
Insufficient	49.68 $\pm$ 9.39		43.5 (39.5-47)	
Capacity of the institution				
Sufficient	41.93 $\pm$ 9.04	<0.001*	39.63 $\pm$ 6.63	<0.001*
Insufficient	50.69 $\pm$ 10.09		44.19 $\pm$ 7.21	
Medical equipment				
Sufficient	42.43 $\pm$ 9.69	<0.001*	40.68 $\pm$ 7.35	0.17*
Insufficient	49.27 $\pm$ 10.0		42.39 $\pm$ 6.91	

\* Student T test, ¶ Mann-Whitney U test, STAI-S: state anxiety scale; STAI-T: trait anxiety scale

**Table 3.** Relationship between the anxiety scale scores and the groups categorized for their compliance with COVID-19-related measures

Compliance with the COVID-19-related measures	n(%)	STAI-S score	p-value	STAI-T score	p-value
Somewhat compliant	14(10.1%)	44.43 $\pm$ 8.15		40.36 $\pm$ 6.33	
Very compliant	58(42.0%)	48.59 $\pm$ 10.42¶	<0.01*	42.66 $\pm$ 7.49	<0.22*
Completely compliant	66(47.8%)	42.71 $\pm$ 10.06		40.39 $\pm$ 7.27	

\* ANOVA (One way variance analysis), STAI-S: state anxiety scale; STAI-T: trait anxiety scale. ¶ According to the Tukey post hoc analysis, the difference between the completely compliance group with COVID-19-related measures is statistically significant. (average difference:5.87; 95% confidence interval 1.59-10.16) ( $p = 0.004$ )

**Table 2.** Relationship between anxiety scores and socio-demographic characteristics

	STAI-S score	p-value	STAI-T score	p-value
Age, years				
18-32	47.59±10.29	0.01*	42.29±7.86	0.13*
32-65	43.19±10.03		40.41±6.66	
Gender				
Male	43.38±9.77	<0.001*	39.85±7.28	<0.001*
Female	50.02 ±10.32		44.88±6.15	
Marital status				
Married	44.47±10.46	0.18*	40.78±7.46	0.22*
Unmarried	46.96±10.08		42.37±7.01	
Child Status				
Yes	47.57±10.23	0.04*	42.24±7.11	0.03*
No	44.84±10.23		42.95±7.37	
Living with the family				
Yes	44.60±10.47	0.16*	40.62±7.51	0.06*
No	47.41±9.89		43.30±6.45	
Occupation				
Physician	48 (41.0-60.0) §	<0.01¶	45 (41.0-48.0) ‡	0.4¶
Nurse	50.5 (40.0-57.25) †		44 (37-47)	
Health officer	46 (36.25-50.5)		40.5 (35-48)	
Emergency medical technician	39 (35.25-47.25)		39 (38.25-47.25)	
Medical secretary	46 (36-51)		42 (36-44)	
Security	41 (34-45)		37 (34.25-42)	
Radiology technician	46 (45-56)		38 (35-41)	
Cleaning staff	43 (38-51)		40 (38-48)	
Smoking				
Never used	45 (38-54.5)	0.61¶	42.5 (38.75-46)	0.36¶
Used and left	45 (34-50.75)		38 (34-47)	
Actively using	45 (39.25-51)		42 (36-46)	
Chronic Disease				
Yes	47.83±12.02	0.28*	42.22±7.15	0.59*
No	44.98±10.09		41.21±7.36	

\* Student T test, ¶ Kruskal-Wallis H test, STAI-S: state anxiety scale; STAI-T: trait anxiety scale  
 § There is a statistically significant difference compared to the security group (corrected p = 0.008)  
 † There is a statistically significant difference compared to the security group (corrected p = 0.006)  
 ‡ There is a statistically significant difference compared to the security group (corrected p = 0.01)

## DISCUSSION

The present study suggests that the state and trait anxiety levels varied by age, gender, profession, child status, compliance with COVID-19-related measures, and the institution's available capacity and sufficiency. It was further observed that the outbreak elevated individuals' state and trait anxiety levels (STAI-S score: 45.4±10.4, STAI-T score: 41.3±7.3). During the data collection stage of the study, the number of people who lost their lives because of COVID-19 kept increasing, as declared by the Ministry of Health through daily official announcements. Such an increase in the number of fatalities might have changed the perceptions of individuals. Anxiety levels of healthcare professionals might experience a further increase owing to the increased number of cases.

Previous research revealed an increase in healthcare professionals' anxiety levels during times of pandemics.<sup>[9]</sup> A study conducted in Hong Kong during the SARS outbreak

concluded that psychological reactions such as stress, helplessness, and post-traumatic disorders were found to be common among individuals during the related period.<sup>[10]</sup> Another study assessing the adverse psychological effects of the SARS outbreak reported healthcare professionals to experience elevated levels of stress, anxiety, and depression that in turn might have long-term psychological effects.<sup>[11]</sup> Healthcare professionals directly involved in the diagnosis, treatment, and care of COVID-19 patients were observed to develop mental health disorders such as fear, mood disorders, sleep disorders, psychological adaptation problems, depression, and anxiety because of being in close contact with infected patients.<sup>[12]</sup> Though similar results were reported by various studies, the results vary depending on the type of pandemic, the rate of contagiousness, and the mortality rate. The high levels of state and trait anxiety scores obtained in the present study are consistent with the literature.

Previous studies have reported old age to be a significant risk factor for COVID-19 mortality.<sup>[13,14]</sup> In this study, STAI-S scores of the 18–32 age group were significantly higher than 32–65 age group. Although old age is reported as a high-risk group, it may seem contradictory that younger participants have a higher anxiety score. Healthcare professionals are a high risk group due to constant exposure to COVID-19 patients. The reports from China and other countries indicate a high rate of infection in the healthcare professionals. The high rate of infection in the healthcare professionals might have changed the perceptions of individuals. Anxiety levels of healthcare professionals might experience a further increase.

Literature research on pandemics noted gender differences in terms of perceived risk. Former studies on pandemics revealed that females perceived diseases to be more contagious and fatal and that they possessed a higher level of anxiety compared with males.<sup>[15]</sup> A study by Raude et al.<sup>[16]</sup> suggested the existence of gender differences in terms of perceived risk; the study was conducted during the H1N1 outbreak and demonstrated that the perceived severity of disease and the fear of disease were greater among female participants. Another study conducted during the COVID-19 pandemic demonstrated that the female gender was associated with severe depression and anxiety.<sup>[17]</sup> The present study revealed that anxiety levels of females were significantly higher than that of males. This finding can be considered to be in line with the findings of a limited number of studies on COVID-19 and other outbreaks.

About one-fourth of the female participants included in the present study were nurses. The findings obtained suggested that nurses had higher anxiety levels than other occupational groups. Nurses directly involved in the treatment of COVID-19 patients on the front line are probably exposed to the highest risk of infection owing to their close and frequent contact with the patients, along with their extensive working hours.<sup>[18]</sup> A study conducted during the SARS outbreak among ED healthcare professionals reported nurses to experience elevated psychological difficulties compared with the physicians (5). Nurses treating SARS patients were reported to have both physical and psychological difficulties.<sup>[19,20]</sup> Exclusive attention shall thus be paid to the mental well-being of the females and nurses treating COVID-19 patients.

Healthcare professionals directly engaged in the diagnosis, treatment, and care of COVID-19 patients on the front line work under intense stress. Continuous and prolonged stress causes anxiety, which in turn affects the physical, mental, and social health of individuals.<sup>[21]</sup> Former studies indicated high levels of depression, anxiety, insomnia, and distress disorders among healthcare professionals who were fighting against the COVID-19 pandemic.<sup>[17]</sup> It should in the meantime be noted that anxiety levels of healthcare professionals increased because of concerns related to transmitting the virus to family and other significant ones, uncertainties regarding crisis management, conflicts in roles, frequent changes in strategy,

and uncertainty in general. The present study demonstrated that healthcare professionals with children had higher state and trait anxiety levels than those who did not. Based on their compliance with the measures taken for COVID-19, the state anxiety scores of the “somewhat compliant” group were found to be higher compared with other groups. It was further established that healthcare personnel were concerned about a shortage of protective equipment and a sense of inadequacy when faced with critical patients.

The small sample size of the present study was its most significant limitation, as its aim of determining perceptions regarding a pandemic affecting the whole world was considered. Further studies including a greater number of health institutions shall therefore be performed.

## CONCLUSION

To conclude, protection of healthcare professionals is a crucial component of public health measures related with the COVID-19 pandemic. Maintaining mental health of healthcare personnel during a pandemic is vital to better control contagious diseases. Thus, exclusive effort should be made to maintain mental well-being of healthcare professionals being exposed to COVID-19. It is believed that the anxiety levels of healthcare professionals could be alleviated by planning and implementing specific interventions aimed at controlling sources of stress such as reducing working hours and rotations, supplying adequate physical and medical equipment at health institutions, and providing psychological assistance.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** Aksaray University School of Medicine, Aksaray Education and Research Hospital Scientific Research Evaluation Committee approval was obtained for this study (approval number: 2020-03/55).

**Conflict of Interest Statement:** No conflict of interest was declared by the authors.

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