## Original Article

# An analysis of the healthcare personnel's anxiety levels during the COVID-19 pandemic in terms of their psychological resilience and the problems they experienced

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### Abstract

**Objectives:** This study aims to analyse healthcare personnel's anxiety levels during the COVID-19 pandemic in terms of their psychological resilience and the problems they experienced.

**Methods:** The study was carried out with the relational screening model. The sample of the study consisted of 411 healthcare personnel working in various hospitals in Turkey (physicians, nurses, midwives, dentists, pharmacists, emergency medical/surgical technicians, social workers, psychologists, dieticians, paramedics, laboratory workers, medical secretaries, etc.). A personal information form, the Beck Anxiety Inventory (BAI), and the Connor-Davidson Resilience Scale (CD-RISC) were used to collect data. In the analysis of the data, Pearson's Product-Moment Correlation, Hierarchical Multiple Regression Analysis were used for descriptive statistics.

**Results:** The study results indicated that healthcare personnel had a moderate level of anxiety ($\bar{X}$=17.25 and ss=14.81) and that being female, showing the symptoms of COVID-19, having difficulty concentrating, physical fatigue, inability to obtain adequate protective equipment, being excluded due to the concern of transmitting the virus, and having problems in communicating with their spouse/partner positively predicted the healthcare personnel's anxiety levels. On the other hand, the inability to maintain their previous social life and a high psychological resilience level negatively predicted the healthcare personnel's anxiety levels, and the model explained 57.3% of the total variance.

**Conclusion:** Based on these results, it is recommended that preventive developmental mental health interventions be planned and carried out with an interdisciplinary team to reduce healthcare personnel's anxiety levels.

**Keywords:** Anxiety; COVID-19 pandemic; healthcare workers; psychological resilience.

The COVID-19, which was first observed in Wuhan, China, in December 2019, has affected the entire world. In Turkey, the first COVID-19 case was detected officially on March 11, 2020, and the World Health Organization (WHO) declared it a pandemic on March 12, 2020. According to the WHO data, there were 208,470,375 diagnosed COVID-19 cases in 216 countries and the number of deaths reached 4.377,979 on August 17, 2021.[1] It has been stated that healthcare workers make up 3% of the world's population and 14% of COVID-19 cases, the rate in the COVID-19 cases in Turkey is 57.4%, one out of every 74 people who died due to the virus was a healthcare worker,[2]

and 403 people who lost their lives due to COVID-19 until June 22, 2021, were actively working as healthcare workers.[3]

Healthcare workers, who are at high risk during the COVID-19 pandemic, have fulfilled their duties despite all the unknowns and risks in China since the first emergence of the virus, and later in other countries. In this process, healthcare workers may experience physical and mental difficulties and exhibit some physical and psychological symptoms.[4–6] Due to its rapidly changing form, the high risk of death, the discussions about the vaccines, insufficient experience on the treatment process, and lack of a defined drug for the treatment, the

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**What is presently known on this subject?**

• The subject of psychological resilience during the COVID-19 pandemic is crucial for individuals to adapt to this new situation, and the anxiety levels and psychological resilience of healthcare personnel working with great devotion at the forefront especially in this process have emerged as important factors.

**What does this article add to the existing knowledge?**

• Among healthcare personnel, cases such as showing the symptoms of COVID-19, having difficulty concentrating, physical fatigue, inability to obtain adequate protective equipment, being excluded due to the concern of transmitting the virus, and having problems communicating with their spouse/partner affect their anxiety levels.

**What are the implications for practice?**

• The study findings are thought to be beneficial in planning and implementing some interventions that will reduce the anxiety levels of healthcare personnel during the COVID-19 pandemic.

SARS-CoV-2 virus that causes COVID-19 can lead to anxiety. Anxiety is a reaction to a threat or danger. Its general purpose is to protect the organism. In the cases of anxiety which is a feeling that allows people to adapt themselves to dangerous situations, it is accompanied by some physical, behavioral, and mental symptoms.[7]

When the literature was examined, it was seen that a study conducted with physicians, nurses, and practitioner clinicians during the process when the COVID-19 pandemic first emerged indicated eight sources of anxiety in healthcare personnel.[8] Which are as follows: Access to appropriate personal equipment, exposure to COVID-19 in the workplace and transmitting the virus to their families, inability to rapidly access tests in case of the development of COVID-19 symptoms and fear of the infection progressing, the uncertainty of receiving support from the institutions where they work regarding their personal and familial needs if they are infected with COVID-19, increasing working hours and demands of access to childcare services, working hours for personal and familial needs, or foods, shelter, and transportation, ability to provide effective care due to the change in the position worked (e.g. working as an intensive care nurse), and finally, lack of access to up-to-date information.

When the studies conducted during the COVID-19 pandemic were examined, it was found that the anxiety levels of healthcare workers are so high[9–11] that their levels are quite higher than that of the other parts within society,[12] a significant number of doctors think that they are mentally affected by COVID-19,[13] and healthcare workers may generally show symptoms of common anxiety disorders, major depression, post-traumatic stress disorder, and alcohol use disorder.[14] Among the reasons for healthcare workers' anxiety, it was determined that the reasons such as fear of being infected,[13] having the anxiety of transmitting the virus to the people around them,[11,13,15,16] not being able to obtain adequate protective equipment,[14,17,18] increasing working hours,[12,14] being away from their families and not being able to spare enough time for their loved ones,[14] and being excluded/stigmatized[17,19] were effective. It was discovered that the anxiety levels of female healthcare workers are higher than that of the male healthcare workers[11–13,20] and nurses have higher levels of anxiety compared to other healthcare workers.[9,11,12]

The reactions that individuals will have in the face of difficult life events such as a global pandemic are affected by their level of psychological resilience. The concept of psychological resilience, defined as staying strong against negative experiences, involves adaptations to incidents such as natural disasters, terror, migration, or divorce in the family.[21] A traumatic situation and the adaptation to this situation are required to define psychological resilience.[21,22] The follow-up studies after the SARS epidemic in 2003 indicated that approximately 35% of the individuals who recovered from the virus showed psychological resilience.[23] The COVID-19 pandemic can be considered a traumatic situation for all countries. Healthcare workers, who are in the high-risk group in the fight against COVID-19, are primarily affected by this situation. Moreover, their level of psychological resilience undoubtedly affects how they adapt to the conditions in which they have to work despite this threatening and traumatic situation. In this respect, healthcare workers' levels of psychological resilience during the COVID-19 pandemic have been the focus of researchers' attention. The studies found a negative relationship between the psychological resilience of healthcare workers and their perceived stress levels.[24] The relationships between the anxiety levels of healthcare workers and their psychological resilience were examined in the samples of China,[25] the USA,[15] Egypt,[20] Israel,[16] and Indonesia,[26] and a negative relationship was found between the anxiety levels of healthcare workers and their psychological resilience. In a study conducted in Turkey, sleep quality, negative and positive emotions, and life satisfaction were found to predict the psychological resilience of healthcare workers.[27] Another study found that physicians with low levels of anxiety and depression have high levels of psychological resilience.[28]

Although there are international studies on the anxiety levels of healthcare personnel during the COVID-19 pandemic in terms of their psychological resilience and various problems they experience, it is seen that studies addressing these variables and covering all healthcare personnel are limited in Turkey. How long the COVID-19 pandemic will continue and how it will affect people are unknown. In this context, determining whether the anxiety levels of healthcare workers who serve selflessly around the world are affected by their psychological resilience and the problems they experience seems to be urgent and important in terms of new arrangements to be implemented for the personnel and the results to set examples for other countries during the pandemic. This study aimed to reveal whether the anxiety levels of healthcare personnel who continue to work actively during the pandemic are affected by their demographic characteristics, psychological resilience, and the problems they experience. For this purpose, the following study questions were determined:

• What is the level of anxiety in healthcare personnel working during the pandemic?

° To what extent are the anxiety levels of the healthcare personnel working during the pandemic predicted by their characteristics such as gender, having COVID-19 symptoms, and being quarantined and their psychological resilience and the problems they experience?

This study, which shows the components of the anxiety levels and psychological resilience of healthcare personnel during the pandemic, is thought to make a significant contribution to the COVID-19 literature which is new and full of unknown factors.

## Materials and Method

### Design of the Study

This study primarily aimed to identify the components of healthcare personnel's anxiety and psychological resilience levels during the COVID-19 pandemic. Therefore, it used the relational screening model to analyze the relationships of healthcare personnel's anxiety levels with the personnel's psychological resilience and the problems they experienced during the COVID-19 pandemic.

### Population and Sample

The study population consisted of 1,176,858 healthcare personnel working in Turkey in 2020.[29] The study was conducted with healthcare workers who volunteered participating in the study and who are physicians, nurses, midwives, dentists, pharmacists, emergency medical/surgical technicians, social workers, psychologists, dieticians, paramedics, laboratory workers, and medical secretaries etc. in various healthcare institutions, particularly in public and private hospitals. The study sample was determined through snowball sampling.[30] In studies conducted with continuous variables (anxiety level score, etc.), the sample size is calculated as [(s × t) /d]2.[31] For standard deviation (s)= 0.5 and acceptable margin of error (d)= 0.05, the t value which corresponds to a relience level of 0.95 is (t)= 1.96. When these data are adapted to the formula, the sample size is found as 384. In addition, according to the table in which the acceptable sample size for certain populations is presented,[32] the sample size for the study population consisting of 1,176,858 healthcare workers was found to be 384. Due to the mandatory social distancing and the measures taken within this context during the pandemic, it was impossible to collect the data through face-to-face interviews. Therefore, the data were collected online. The participants were able to complete the "Online Data Form" after marking "yes" on the informed consent form, which was displayed first when they clicked on the link.

This study was conducted based on the 1964 Helsinki Declaration, its amendments, or comparable ethical standards after obtaining the ethical approval of Anadolu University, Social Sciences and Humanities Scientific Research and Publication Ethics Committee.

The study included 414 healthcare personnel. Three data which were considered as versatile extreme values were excluded from the analysis and the analysis continued with the data of 411 participants.[33] Of the healthcare personnel in the study, 71.3% were female, 28.7% were male, 17.1% were aged between 19 and 29, 22.9% were aged between 30 and 39, 38.5% were aged between 40 and 49, 17.4% were aged between 50 and 59, and 4% were older than 60 years of age. Of them, 76.6% were married and almost half (49.8%) had a bachelor's degree. In addition, 6% had a high school diploma, 10.1% had an associate's degree, 12.1% had a master's degree, and 22% had a Ph.D./specialty in medicine degree. Of them, 50% were nurse-midwife, 17,9% were specialist physician, 8,3% were other doctors (Practitioner physician, assistant doctor and family doctor), 8,2% were Emergency Medicine/Anesthesia/X-ray/Dialysis Technician, 6,5% were other specialist (dentist/ social workers/psychologists/dieticians/physiotherapist/audiologist), 4,5% were pharmacist and 4,6% were other (paramedics, laboratory workers, medical secretaries, etc.). More than half of the participants (51.2%) worked in public hospitals and 27.8% were working in three large cities where COVID-19 cases were most frequently observed. Also, 18% of the participants stated that they had shown COVID-19 symptoms before, 12.7% stated that they had self-quarantined, and 5.6% stated that their family members had self-quarantined.

### Data Collection Tools

A personal information form the Beck Anxiety Inventory (BAE)[34] and the Connor-Davidson Resilience Scale (CD-RISC)[35] were used in this study.

***Personal Information Form:*** The Personal Information Form, developed by the researchers, consisted of two sections: healthcare personnel's socio-demographic characteristics and information on their life during the pandemic. The section for the participants' socio-demographic characteristics included age, gender, marital status, education level, occupation, and health institution where the participants work. The other section of the Personal Information Form included questions about the working conditions during the pandemic. In this scope, the extent of safety against the risk of COVID-19 in the working environment, experiencing any COVID-19 symptoms, and staying in quarantine or isolation were asked. To determine to what extent the participants are troubled by the issues such as the concern of being infected with the virus, the concern of transmitting the virus to relatives, the difficulties in routine activities such as transportation or shopping, inability to maintain their social life, physical fatigue, lack of sufficient appreciation, inability to obtain adequate protective equipment, etc., 5-point Likert scale was used in these questions.

***Beck Anxiety Inventory (BAI):*** The inventory was developed by Beck et al.[34] was tested for validity and reliability in Turkey by Ulusoy et al.[36] and is a self-assessment inventory used to determine the frequency of anxiety symptoms. This 4-point Likert type inventory has 21 items scored from 0 (not at all) to 3 (severely - I have difficulty in coping very much). The highest scale score is 63 and higher scores indicate higher anxiety. A

score of 0 to 7 indicates a "minimal", a score of 8 to 15 indicates a "mild", a score of 16 to 25 indicates a "moderate", and a score of 26 to 63 indicates a "severe" anxiety level. The inventory's construct validity was .92, concurrent validity was .77, test-retest reliability was .93, and internal consistency coefficient was .91. Its Cronbach's alpha coefficient was .96 in the present study.

***Connor-Davidson Resilience Scale (CD-RISC):*** This 5-point Likert type scale was developed by Connor and Davidson[35] and has 25 items. The scale was adapted to Turkish culture by Karaırmak[37] and its variance ratio, which was explained by the three-factor structure (personal competence and tenacity, tolerance to negative effects, and spiritual influences), was 52%. The highest scale score is 100 and higher scores indicate higher psychological resilience. The scale's Cronbach alpha coefficient was .92 in its Turkish adaptation and .94 in the present study.

### Data Collection

The study data were collected online between 20 May and 13 June, which provided the advantage of not limiting the participants to a single city or hospital. A data collection set was designed using Google Forms. After obtaining ethical approval, the link for the "Online Data Form" was sent to healthcare personnel via e-mail, WhatsApp, and other social media tools within the scope of the determined sampling method. In addition, the researchers communicated with the social media group administrators to reach participants through various occupational groups created on social media.

### Evaluation of the Data

Data analysis was performed using SPSS 21 (Statistical Package for the Social Sciences). For the parametric tests, the Pearson Product-Moment Correlation Coefficient and Multiple Hierarchical Regression Analysis were used. Whether the data met the assumptions related to the regression analysis were assessed before the analysis. The correlation values between the variables were -.219 and .603, and no multicollinearity problems were found.[38] The VIF values of the independent variables were between 1.004 and 1.146, the tolerance values were between .26 and .93, and no multicollinearity problems were found.[39] The result of the Durbin-Watson test was 1.82 and no autocorrelation was found.[40] The coefficients of skewness and kurtosis were assessed to determine the normal distribution of the data and the coefficient of skewness

was between -.61 and .80 while the coefficient of kurtosis was between -.32 and .55, which were both within the normal distribution limits.[38] Whether there is an extreme value in the data collected within the scope of the research was evaluated with the Mahalanobis distance.[33] When the Mahalanobis distance was assessed, the data of three participants outside the distance criteria [$\chi^2(20)=45.31$, p=.001] were accepted to be extreme values and excluded from the analysis. The multiple hierarchical regression analysis was performed with the data of 411 participants.

## Results

The findings of this study are presented in three tables: Descriptive Findings Regarding Anxiety Levels and Psychological Resilience of Healthcare Professionals; Relationships of Healthcare Professionals' Anxiety Levels with Demographic Features, Challenges during the COVID-19 Pandemic, and Psychological Resilience Levels; and Hierarchical Regression Analysis Results Regarding the Predictors of Anxiety Levels of Healthcare Professionals (Table 1).

The healthcare personnel's mean anxiety score was 17.25 and the standard deviation was 14.81. The analysis of the score distribution indicated that the highest quartile obtained scale scores ranging between 26 and 59 whereas the lowest quartile obtained scale scores ranging between 0 and 5. The scores of the groups included in the second and third quartiles ranged between 5 and 26. Based on the mean scores obtained from the scale, it can be concluded that the healthcare personnel had a moderate level of anxiety.

The healthcare personnel's mean psychological resilience score was 70.02 and the standard deviation was 16.75. The analysis of the score distribution indicated that the highest quartile obtained scale scores ranging between 82 and 100 whereas the lowest quartile obtained scores ranging between 12 and 60. The scores of the groups included in the second and third quartiles ranged between 60 and 82. Based on the mean scores obtained from the scale, it can be concluded that the healthcare personnel had a high level of psychological resilience (Table 2).

Pearson's Correlation Analysis was used to analyze the relationship of the healthcare personnel's anxiety levels with their psychological resilience, the problems they experienced during the COVID-19 pandemic, and various demographic variables. The analysis showed that healthcare personnel's mean anxiety scores had a positive weak relationship with

**Table 1. Descriptive findings regarding anxiety levels and psychological resilience of healthcare professionals**

| | N | $\overline{X}$ | SS | Minimum Score | Maximum Score | Percentages | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | | | 25% | 50% | 75% |
| Anxiety levels | 411 | 17.25 | 14.81 | 0.0 | 59.0 | 5.0 | 14.0 | 26.0 |
| Psychological resilience | 411 | 70.02 | 16.75 | 12.0 | 100.0 | 60.0 | 72.0 | 82.0 |

**Table 2. Relationships of healthcare professionals' anxiety levels with demographic features, challenges during the COVID-19 pandemic, and psychological resilience levels**

|  | Anxiety Level |
|---|---|
| Extent of Safety against the Risk of COVID-19 in the Working Environment | -.24** |
| Concern of being infected with the virus | .39** |
| Concern of transmitting the virus to relatives | .33** |
| Difficulties in routine activities such as transportation or shopping | .26** |
| Inability to maintain their social life | .19** |
| Irregular sleep | .46** |
| Difficulty in concentrating | .56** |
| Problems in time management | .47** |
| Lack of sufficient appreciation | .39** |
| Sense of loneliness | .52** |
| Physical fatigue | .60** |
| Inability to obtain adequate protective equipment | .28** |
| Conflicts with colleagues while working | .37** |
| Problems with the institution managers | .35** |
| Exclusion due to the concern of transmitting the virus | .48** |
| Inability to spend time with family/children | .34** |
| Problems in communicating with their spouse/partner | .45** |
| Psychological Resilience Levels TS[1] | -.22** |

*P<.05, **p<.01, [1]TS: Total Score.

their concern of being infected (r=.39, p<.05), concern of transmitting the virus to relatives (r=.33, p<.05), difficulties in routine activities such as transportation or shopping (r=.26, p<.05), inability to maintain their previous social life (r=.19, p<.05), lack of sufficient appreciation (r=.39, p<.05), inability to obtain adequate protective equipment (r=.28, p<.05), conflicts with colleagues while working (r=.37, p<.05), problems with the institution managers (r=.35, p<.05), and inability to spend time with family/children (r=.34, p<.05). The healthcare personnel's mean anxiety scores had a positive moderate relationship with irregular sleep (r=.46, p<.05), difficulty in concentrating (r=.56, p<.05), and a sense of loneliness (r=.56, p<.05). The healthcare personnel's mean anxiety scores had a positive strong relationship with their physical fatigue (r=.60, p<.05).

The healthcare personnel's mean anxiety scores had a negative weak the extent of safety against the risk of COVID-19 in the working environment (r=-.24, p<.05), and psychological resilience levels (r=-.22, p<.05) (Table 3).

The Multiple Linear Hierarchical Regression Analysis was used to analyze the predictability of the healthcare personnel's demographic characteristics and psychological resilience on their mean anxiety scores. Only the variables determined to have a significant relationship with the healthcare personnel's anxiety levels (i.e. the dependent variable) through the correlation analysis were included in the regression steps.

Three steps were used to analyze the predictability of gender, showing COVID-19 symptoms, staying in quarantine, the extent of safety against the risk of COVID-19 in the working environment, various problems experienced, and their psychological resilience on their anxiety levels.

In the first step, gender, showing the symptoms of COVID-19, staying in quarantine as the predictor variables, and the step explained 14.5% of the total variance [F(2, 407)=22.93, p<.05]. Female gender (β=.26, p<.01), showing COVID-19 symptoms (β=.25, p<.01), significantly contributed to the step but staying in quarantine did not (β=-.07, p>.05).

In the second step, the extent of safety against the risk of COVID-19 in the working environment, and various problems experienced during the pandemic were included in the step. The step explained 56.6% of the variance [F(20, 390)=25.40, p<.01]. Inability to maintain their social life (β=-.11, p<.01), difficulty in concentrating (β=.21, p<.01), physical fatigue (β=.19, p<.01), inability to obtain adequate protective equipment (β=.08, p<.05), exclusion due to the concern of transmitting the virus (β=.11, p<.01), and problems in communicating with their spouse/partner (β=.15, p<.01) had a significant contribution to the step. The included variables made a significant contribution to the change in the step (RΔ=.421, p<.01). Additionally, the significant effects of gender (female) and showing the symptoms of COVID-19, which were included in the previous step, continued.

In the last step, the third step, psychological resilience was included in the step and the step explained 57.3% of the variance [F (21, 389)=24.85, p<.05]. Psychological resilience made a significant contribution to the step (β=-.09, p<.05) (RΔ=.007,

**Table 3. Hierarchical regression analysis results regarding the predictors of anxiety levels of healthcare professionals**

| Predictive variables | Step 1 | | | Step 2 | | | Step 3 | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | SH | β | B | SH | β | B | SH | β |
| Constant | 9.02 | 1.34 | | -17.97 | 3.24 | | -12.73 | 3.81 | |
| Gender[1] | 8.43 | 1.51 | .26** | 5.25 | 1.16 | .16** | 5.10 | 1.15 | .15** |
| Experiencing COVID symptoms[2] | 9.80 | 1.82 | .25** | 4.57 | 1.41 | .12 | 4.27 | 1.40 | .11** |
| Staying in quarantine[3] | 3.26 | 2.11 | .07 | .46 | 1.59 | .01 | .31 | 1.58 | .01 |
| Extent of safety against the risk of COVID-19 | | | | -.14 | .23 | -.02 | -.05 | .23 | -.01 |
| Concern of being infected with the virus | | | | 1.18 | .61 | .08 | 1.06 | .60 | .08 |
| Concern of transmitting the virus to relatives | | | | .57 | .61 | .04 | .71 | .61 | .05 |
| Difficulties in routine activities such as transportation or shopping | | | | .10 | .49 | .01 | .19 | .49 | .02 |
| Inability to maintain their social life | | | | -1.16 | .44 | -.11** | -1.12 | .43 | -.11** |
| Irregular sleep | | | | .45 | .55 | .04 | .71 | .56 | .06 |
| Difficulty in concentrating | | | | 2.40 | .74 | .21** | 2.32 | .74 | .21** |
| Problems in time management | | | | -.50 | .67 | -.04 | -.65 | .66 | -.06 |
| Lack of sufficient appreciation | | | | .47 | .45 | .04 | .47 | .44 | .04 |
| Sense of loneliness | | | | .89 | .52 | .08 | .77 | .52 | .07 |
| Physical fatigue | | | | 2.19 | .54 | .19** | 2.19 | .54 | .19** |
| Inability to obtain adequate protective equipment | | | | .92 | .45 | .08* | .99 | .44 | .09* |
| Conflicts with colleagues while working | | | | .41 | .50 | .03 | .24 | .50 | .02 |
| Problems with the institution managers | | | | .18 | .44 | .02 | .17 | .44 | .02 |
| Exclusion due to the concern of transmitting the virus | | | | .23 | .46 | .11** | 1.28 | .46 | .12** |
| Inability to spend time with family/children | | | | .05 | .41 | .01 | .12 | .40 | .01 |
| Problems in communicating with their spouse/partner | | | | 1.59 | .46 | .15** | 1.52 | .46 | .14** |
| Psychological Resilience TS4 | | | | | | | -.08 | .03 | -.09* |
| F | | 22.93** | | | 25.40** | | | 24.85** | |
| P | | .00 | | | .00 | | | .00 | |
| R² | | .145 | | | .566 | | | .573 | |
| ΔR² | | – | | | .421** | | | .007** | |

*P<.05, **p<.01, 1: Female=1, 2: Experiencing COVID symptoms yes=1, 3: Staying in quarantine yes=1, 4:TS: Total Score.

p<.05). In addition to these variables, the significant effects of gender, showing the symptoms of COVID-19, inability to maintain their social life, difficulty in concentrating, physical fatigue, inability to obtain adequate protective equipment, exclusion due to the concern of transmitting the virus, and problems in communicating with their spouse/partner continued.

Considering the latest step, the results indicated that female gender, showing the symptoms of COVID-19, having difficulty in concentrating, physical fatigue, inability to obtain adequate protective equipment, being excluded due to the concern of transmitting the virus, and having problems in communicating with their spouse/partner predict the healthcare personnel's anxiety levels. The results also showed that the inability to maintain their previous social life and high psychological resilience levels reduced the healthcare personnel's anxiety levels.

## Discussion

This study analyzed the healthcare personnel's anxiety levels during the COVID-19 pandemic in terms of their psychological resilience, gender, and the problems they experienced during the COVID-19 pandemic.

The first study question inquired about the healthcare personnel's anxiety levels. The study findings indicated that the healthcare personnel had a mean anxiety score of 17.25, which indicates a moderate anxiety level. The analysis of the anxiety scores' distribution indicated that the highest quartile obtained the scores ranging between 26 and 59. This finding is similar to that of a study which was conducted with doctors and nurses in Wuhan and has found that 34.4% of the participants had mild, 22.4% had moderate, and 6.2% had severe mental health problems.[4] This finding also has similarities with a study that was conducted with the healthcare personnel in China and has found that 44.6% of the participants had anxiety,[5] and with another study that was conducted with the healthcare personnel in Iran and has discovered that 28% of the participants had anxiety.[41] In the sample in Indonesia, it was seen that approximately 23% of the healthcare personnel experienced moderate state anxiety while 33% experienced moderate trait anxiety.[26] In another study conducted in Chi-

na, the personnel's anxiety levels were found to be quite high. [10] The rapid infection of the virus, uncertainty about the treatment, and working hours may cause various mental symptoms in healthcare workers. On the other hand, in a study conducted in Turkey, the mean scores of healthcare workers' anxiety levels were found to be lower than that in the current study.[42]

The second study question investigated the extent to which gender, showing COVID-19 symptoms, staying in quarantine, the problems experienced during the COVID-19 pandemic, and psychological resilience predicted the anxiety levels of the healthcare personnel who worked during the pandemic. One of the findings was that female healthcare personnel had high anxiety levels. Bu bulgu bazı araştırma bulgularıyla benzerlik göstermektedir.[4,11–13,20,26] A study conducted in Wuhan[4] found that young female healthcare personnel were at higher risk of mental health problems. This may be related to the fact that the prevalence of anxiety is two to three times higher in women than in men.[42] On the other hand, in the sample in Iran, it was found that gender was not a predictor of anxiety levels for healthcare workers.[40]

Another finding of the present study was that showing COVID-19 symptoms and the concern of being infected with the virus were important predictors of anxiety levels. Other studies also support this finding[43,44] and there are similarities with the study findings that fear of being infected increases the anxiety level.[13] This finding suggests that working directly with COVID-19 patients, working in the isolation units, concerns about being infected, or the idea that the pandemic cannot be controlled may increase healthcare personnel's anxiety levels.

Another finding of the study was that difficulty in concentrating was a predictor of the healthcare personnel's anxiety levels. In other words, those who had difficulty in concentrating had high anxiety levels. Studies conducted during the COVID-19 pandemic reported no similar findings; however, a study conducted during the SARS pandemic indicated that the healthcare personnel at high risk of being infected with the virus had more difficulty in concentrating on recent events compared to the control group,[45] which was similar to the finding of the present study. This suggests that difficulty in concentrating on a certain subject may be the result, not a cause, of anxiety.

The present study also found that physical fatigue predicted the healthcare personnel's anxiety levels. Although the literature was seen to have no findings regarding the direct effects of physical fatigue on anxiety levels during the COVID-19 pandemic, stress factors associated with the COVID-19 pandemic include physical fatigue,[15,16] fatigue was observed to be a cause of stress for the healthcare personnel at high risk during the SARS pandemic.[45] This finding is also paralel with the findings that there is a negative relationship between the working conditions of healthcare workers and their anxiety levels[9] and that increasing working hours are related with anxiety.[12,14,16] Physical fatigue and long-term fatigue were also emphasized to cause burnout in nurses, along with other factors.[46] A simi-

lar effect may also be valid for other healthcare personnel.

The present study indicated that the inability to obtain adequate protective equipment increased anxiety levels. Other studies in the literature conducted during the COVID-19 pandemic also report difficulties in accessing protective equipment is a source of anxiety among healthcare personnel. [8,14,17,18,44] In a study, providing adequate equipment was found to increase the well-being of the workers.[15] Identification of the sources of anxiety among the healthcare personnel enables healthcare institutions to create new targets to alleviate these concerns. In this regard, the sources of anxiety identified during the COVID-19 pandemic were seen to be healthcare personnel's five requests from health institutions: "hear me", "protect me", "be prepared", "support me", and "take care of me"[8] Healthcare personnel request assurance that healthcare institutions will support them and their families. In this context, they want to be sure that healthcare institutions for which they work listen to their concerns, take all the necessary precautions to protect them and prevent them from being infected with the COVID-19 disease, and medically and socially support them and their families in case they are infected.

The present study also found that exclusion due to the concern of transmitting the virus increased anxiety levels. This finding is similar to the findings of some other studies.[17,19,48] In Nepal, it was observed that 57% of healthcare workers perceive themselves as stigmatized due to COVID-19 and the perception of stigma is associated with anxiety.[19] In a study conducted in Turkey,[48] a positive relationship was found between anxiety and perceived stigma. On the other hand, in a study conducted in Sub-Saharan African countries such as Ethiopia and Nigeria, it was observed that 73.7% of healthcare workers perceived themselves as stigmatized, but did not experience depression, anxiety, or any psychological distress.[49] In another study, it was found that perceived stigma was not associated with anxiety but with post-traumatic stress disorder and alcohol use disorder.[50] Healthcare personnel are generally regarded in the risk group in terms of the potential to transmit the disease because they have direct contact with the infected patients, and this causes them to experience exclusion.

Another finding of the study was that problems in communicating with their spouse/partner increased the healthcare personnel's anxiety levels. The literature was found to include no studies conducted during the pandemic with similar findings. However, the healthcare personnel often stayed away from their spouses and families in isolation considering their working conditions. This may have increased the communication problems between the spouses and caused anxiety among healthcare personnel. On the other hand, the flexible working hours and the arrangements to reduce working hours despite the increased work intensity in Turkey may have increased the time that some healthcare personnel spent at home. Therefore, the fact that concerned individuals spent more time together may have triggered the communication problems.

One of the findings of the present study was that the inability

to maintain their previous social life negatively predicted the healthcare personnel's anxiety levels. No studies were found in the literature with similar findings. However, it may be considered that healthcare personnel perceived not going out and participating in the social life as safer, thereby reducing their anxiety levels.

Finally, the present study also found that high psychological resilience reduced the healthcare personnel's anxiety levels. Resilience is very significant in coping with the stress caused by an infectious disease epidemic in healthcare personnel. The present study also found the healthcare personnel's psychological resilience mean scores to be high. This finding is similar to the study findings that the psychological resilience of physicians[16,28] and all healthcare personnel[15,24,25] negatively affects their anxiety levels. Another similar finding is that physicians who adopted a resilient coping style had lower levels of anxiety.[20]

These findings suggest that high psychological resilience supports the work-life balance and increases self-efficacy during a crisis, thereby reducing the healthcare personnel's anxiety levels.

## Conclusion

The COVID-19 pandemic, which threatens life around the world, has substantial physical and psychological effects on the healthcare personnel who fight against the virus at the forefront. Therefore, understanding the healthcare personnel's psychological status and the affecting factors is of extreme importance. The present study found that the healthcare personnel who actively worked during the COVID-19 pandemic had a moderate anxiety level and a high psychological resilience level. Female gender, showing the symptoms of COVID-19, inability to obtain adequate protective equipment, physical fatigue, having difficulty in concentrating, exclusion due to the concern of transmitting the virus, and having problems in communicating with their spouse/partner increased, and inability to maintain social life, and a high psychological resilience level decreased, the healthcare personnel's anxiety levels. Therefore, planning interventions to reduce the healthcare personnel's anxiety levels based on the findings of the present study is considered effective. Supplying protective equipment, producing the equipment that enables the healthcare personnel to feel safer, providing psychosocial support including coping methods to protect mental health, and making arrangements for the families of the healthcare personnel should be included in the precautions to reduce anxiety levels. The finding that physical fatigue and problems in focusing increase anxiety levels reveals the necessity of regulations regarding the working hours of healthcare personnel. Exclusion due to the concern of being infected with the virus or transmitting it can complicate the lives of healthcare workers as well as their families. It would be appropriate to develop policies to inform the society correctly on this issue and to use the media effectively. Planning preventive developmental

mental health interventions to reduce the healthcare personnel's anxiety levels and implementing these interventions with an interdisciplinary team are warranted.

### Limitations and Future Directions

There are several limitations to the present study. The risks brought by the COVID-19 pandemic, contact limitation, and data collection via the Internet due to the working conditions of the healthcare personnel are among limitations of the present study. Despite these limitations, the findings of the present study are thought to serve as a guide for the interventions to be carried out for healthcare personnel. It will be useful to address this subject with different demographic variables and conduct intercultural studies with similar variables. Due to the ongoing uncertainty of the COVID-19 pandemic and the predictions that it will last for a long time, this subject should be assessed with multiple variables through qualitative studies, and technology should be used effectively in this regard.

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## References

1. WHO. Coronavirus disease (COVID-19) pandemic. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019 Accessed on 18 August 2021.
2. Türk Toraks Derneği. Mesleksel Akciğer Hastalıkarı Çalışma Grubu Basın Bildirisi. Avaialable from: https://www.toraks.org.tr/site/community/news/10240. Accessed on Jul 28, 2021. [Turkish]
3. Türk Tabibleri Birliği. Türkiye'de Sağlık Çalışanı Ölümlerinin Anlattığı. Avaialable from: https://www.ttb.org.tr/userfiles/files/son_son_saglik_emekcileri_olumleri_rapor.pdf. Accessed on Jul 28, 2021. [Turkish]
4. Kang L, Ma S, Chen M, Yang J, Wang Y, Li R, et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: a cross-sectional study. Brain Behav Immun 2020;87:11–7.
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 Netw Open 2020;3:e203976.
6. Chen Q, Liang M, Li Y, Guo J, Fei D, Wang L, et al. Mental health care for medical staff in China during the COVID-19 outbreak. Lancet Psychiatry 2020;7:e15–6.
7. Türkçapar H. Anksiyete bozukluğu ve depresyonun tanısal ilişkileri. Klinik Psikiyatri 2004;Suppl 4:12–6. [Turkish]

8. Shanafelt T, Ripp J, Trockel M. Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. JAMA 2020;323:2133–4.

9. Bostan S, Akbolat M, Kaya A, Ozata M, Gunes D. Assessments of anxiety levels and working conditions of health employees working in COVID-19 pandemic hospitals. Electron J Gen Med 2020;17:em246.

10. Pan R, Zhang L, Pan J. The anxiety status of chinese medical workers during the epidemic of covid-19: a meta-analysis. Psychiatry Investig 2020;17:475–80.

11. Tengilimoğlu D, Zekioğlu A, Tosun N, Işık O, Tengilimoğlu O. Impacts of COVID-19 pandemic period on depression, anxiety and stress levels of the healthcare employees in Turkey. Leg Med (Tokyo) 2021;48:101811.

12. Hacimusalar Y, Kahve AC, Yasar AB, Aydin MS. Anxiety and hopelessness levels in COVID-19 pandemic: a comparative study of healthcare professionals and other community sample in Turkey. J Psychiatr Res 2020;129:181–8.

13. Kurt O, Deveci SE, Oğuzöncul AF. Levels of anxiety and depression related to covid-19 among physicians: an online cross-sectional study from turkey. Ann Clin Anal Med 2020;11(Suppl 3) S288–93.

14. Hennein R, Lowe S. A hybrid inductive-abductive analysis of health workers' experiences and wellbeing during the COVID-19 pandemic in the United States. PLoS One 2020;15:e0240646.

15. Huffman EM, Athanasiadis DI, Anton NE, Haskett LA, Doster DL, Stefanidis D, et al. How resilient is your team? Exploring healthcare providers' well-being during the COVID-19 pandemic. Am J Surg 2021;221:277–84.

16. Mosheva M, Hertz-Palmor N, Dorman Ilan S, Matalon N, Pessach IM, Afek A, et al. Anxiety, pandemic-related stress and resilience among physicians during the COVID-19 pandemic. Depress Anxiety 2020;37:965–71.

17. Doğan A, Keskin G. Mental problems ın the pandemıa process: a trauma based approach to the response of health workers to the COVID-19. Journal of Pre-Hospital 2021;6:159–74. [Turkish]

18. Lázaro-Pérez C, Martínez-López JÁ, Gómez-Galán J, López-Meneses E. Anxiety about the risk of death of their patients in health professionals in spain: analysis at the peak of the covid-19 pandemic. Int J Environ Res Public Health 2020;17:5938.

19. Adhikari SP, Rawal N, Shrestha DB, Budhathoki P, Banmala S, Awal S, et al. Prevalence of anxiety, depression, and perceived stigma in healthcare workers in nepal during later phase of first wave of covid-19 pandemic: a web-based cross-sectional survey. Cureus 2021;13:e16037.

20. Khalaf OO, Khalil MA, Abdelmaksoud R. Coping with depression and anxiety in Egyptian physicians during COVID-19 pandemic. Middle East Curr Psychiatry 2020;27:1–7.

21. Karaırmak Ö. Resilience, risk and protective factors. Türk Psikolojik Danışma ve Rehberlik Dergisi 2016;3:129–42. [Turkish]

22. Gizir CA. A literature review of studies on resilience, risk, and protective factors. Türk Psikolojik Danışma ve Rehberlik Dergisi 2016;3:113–28. [Turkish]

23. Bonanno GA, Ho SM, Chan JC, Kwong RS, Cheung CK, et al. Psychological resilience and dysfunction among hospitalized survivors of the SARS epidemic in Hong Kong: a latent class approach. Health Psychol 2008;27:659–67.

24. Huang L, Wang Y, Liu J, Ye P, Cheng B, Xu H, et al. Factors associated with resilience among medical staff in radiology departments during the outbreak of 2019 novel coronavirus disease (COVID-19): a cross-sectional study. Med Sci Monit 2020;26:e925669.

25. Lin J, Ren Y, Gan H, Chen Y, Huang Y, You X. Factors influencing resilience of medical workers from other provinces to Wuhan fighting against 2019 novel coronavirus pneumonia. BMC Psychiatry 2020;417:1–15.

26. Setiawati Y, Wahyuhadi J, Joestandari F, Maramis MM, Atika A. Anxiety and resilience of healthcare workers during COVID-19 pandemic in indonesia. J Multidiscip Healthc 2021;14:1–8.

27. Bozdağ F, Ergün N. Psychological resilience of healthcare professionals during COVID-19 pandemic. Psychol Rep 2021;124:2567–86.

28. Arslan HN, Karabekiroglu A, Terzi O, Dundar C. The effects of the COVID-19 outbreak on physicians' psychological resilience levels. Postgrad Med 2021;133:223-30.

29. Cumhurbaşkanlığı İletişim Başkanlığı. Asrın Küresel Salgını-Türkiye'nin Koronavirüsle Başarılı Mücadelesi. Erişim Tarihi: 28.07.2021 Available from: https://www.iletisim.gov.tr/images/uploads/dosyalar/TurkiyeninKoronavirusleBasariliMucadelesi.pdf. Accessed on Jul 28, 2021. [Turkish]

30. Yıldız S. Sosyal bilimlerde örnekleme sorunu: nicel ve nitel paradigmalardan örnekleme kuramına bütüncül bir bakış. Kesit Akademisi Dergisi 2017;3:421–42. [Turkish]

31. Baştürk S, Taştepe M. Evren ve örneklem. Bilimsel Araştırma Yöntemleri. Ankara: Vize Yayıncılık; 2013 p. 129–59. [Turkish]

32. Altunışık R, Coşkun R, Bayraktaroğlu S, Yıldırım E. Sosyal Bilimlerde Araştırma Yöntemleri: SPSS Uygulamalı. Sakarya: Sakarya Yayıncılık; 2012. [Turkish]

33. Tabachnick BG, Fidell LS. Using multivariate statistics. 6th ed. London: Pearson; 2013.

34. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. J Consult Clin Psychol 1988;56:893–7.

35. Connor KM, Davidson JRT. Development of a new resilience schale: The Connor- Davidson resilience schale (CDRISC). Depression and Anxiety 2003;18:76–82.

36. Ulusoy M, Sahin N, Erkmen H. Turkish version of the beck anxiety inventory; psychometric properties. J Cognit Psychother 1998;12:163–72.

37. Karaırmak Ö. Establishing the psychometric qualities of the Connor–Davidson Resilience Scale (CD-RISC) using exploratory and confirmatory factor analysis in a trauma survivor sample. Psychiatry Res 2010;179:350–6.

38. Field A. Discovering statistics using SPSS. 2nd ed. California: SAGE Publications; 2005. p. 12.

39. Çokluk Ö, Şekercioğlu G, Büyüköztürk Ş. Sosyal Bilimler için Çok Değişkenli İstatistik: SPSS ve LISREL Uygulamaları. Anka-

ra: Pegem Akademi; 2012. [Turkish]

40. Montgomery DC, Peck EA, Vining GG. Introduction to linear regression analysis 4th ed. New York: John Wiley & Sons; 2012.

41. Zhang SX, Liu J, Afshar Jahanshahi A, Nawaser K, Yousefi A, Li J, Sun S. At the height of the storm: Healthcare staff's health conditions and job satisfaction and their associated predictors during the epidemic peak of COVID-19. Brain Behav Immun 2020;87:144–6.

42. Şahin T, Aslaner H, Eker OO, Gokcek MB, Dogan M. Effect of COVID-19 pandemic on anxiety and burnout levels in emergency healthcare workers: a questionnaire study. Res Sq 2020;1–22.

43. Gökalp PG. Stres, anksiyete ve kadın. İçinde: Akın A, editör. Toplumsal cinsiyet, sağlık ve kadın. Ankara: Hacettepe Üniversitesi Yayınları; 2003. p. 165–73. [Turkish]

44. Lu W, Wang H, Lin Y, Li L. Psychological status of medical workforce during the COVID-19 pandemic: a cross-sectional study. Psychiatry Res 2020;288:112936.

45. Liu CY, Yang YZ, Zhang XM, Xu X, Dou QL, Zhang WW, et al. The prevalence and influencing factors in anxiety in medical workers fighting COVID-19 in China: a cross-sectional survey.

Epidemiol Infect 2020;148:e98.

46. Chua SE, Cheung V, Cheung C, McAlonan GM, Wong JW, Cheung EP, et al. Psychological effects of the SARS outbreak in Hong Kong on high-risk health care workers. Can J Psychiatry 2004;49:391–3.

47. Günüşen NP. Protection and strengthening of nurse's mental health. Türkiye Klinikleri J Psychiatr Nurs-Special Topics 2017;3:12–8. [Turkish]

48. Teksin G, Uluyol OB, Onur OS, Teksin MG, Ozdemir HM. Stigma-related Factors and their Effects on Health-care Workers during COVID-19 Pandemics in Turkey: A Multicenter Study. Sisli Etfal Hastan Tip Bul 2020;54:281–90.

49. Assefa N, Soura A, Hemler EC, Korte ML, Wang D, Abdullahi YY, et al COVID-19 Knowledge, perception, preventive measures, stigma, and mental health among healthcare workers in three Sub-Saharan African countries: a phone survey. Am J Trop Med Hyg 2021;105:342–50.

50. Hennein R, Mew EJ, Lowe SR. Socio-ecological predictors of mental health outcomes among healthcare workers during the COVID-19 pandemic in the United States. PloS One 2021;16:e0246602.