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Anxiety levels of healthcare personnel in different stages of COVID-19 pandemic: A nationwide study from Turkey

Healthcare personnel and COVID 19

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Abstract
Aim: SARS CoV-2 transmission in healthcare personnel was first reported on January 20, 2020. The aim of this study was to evaluate the anxiety levels experienced by healthcare personnel in Turkey during the COVID-19 pandemic and the factors affecting these levels.
Material and Methods: A survey investigating sociodemographic features and examining anxiety levels was conducted among approximately 1000 healthcare personnel who were expected to take active roles in the pandemic across Turkey. The survey was conducted in three stages: before the pandemic spread to Turkey, at the beginning of the pandemic and when the pandemic became prominent. A logistic regression analysis was performed to determine the factors affecting anxiety and predictors of anxiety levels.
Results: In the first survey, always (odds ratio, 15.781; $p<0.01$) and often (odds ratio, 5.365; $p<0.05$) media use, in the second survey media use ($p<0.05$) and profession (odds ratio, 0.021; $p<0.05$) and in the third survey, marital status (odds ratio, 17.716; $p<0.01$) and gender (odds ratio, 4.431; $p<0.05$) were determined as the predictors of anxiety related to COVID-19.
Discussion: As a result of this study, healthcare personnel groups were defined (women, nurses, married people) who need special intervention and support to provide spiritual comfort when working on the front line in the fight against COVID-19. Further comprehensive studies are needed of the extent of psychological support required by healthcare personnel and to whom and how this support should be provided.

Keywords
COVID-19; SARS CoV; Anxiety; Healthcare Personnel

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Introduction

The Chinese government declared to the world that a novel type of coronavirus (SARS CoV-2) had been isolated on January 7, 2020 [1,2]. As the rapidly spreading uncontrolled outbreak has affected the whole world, the World Health Organization (WHO) declared COVID-19 to be a pandemic [available at: http://www.who.int/docs/default-source/coronaviruse/transcripts/who-audio-emergencies-coronavirus-press-conference-full-and-final-11mar2020.pdf?sfvrsn=cb432bb3_2; 2020 (accessed 14 April 2020)]. The virus infected hundreds of millions of people, including healthcare workers, and killed more than 5 million people [available at: https://www.worldometers.info/coronavirus/; 2022 (accessed 10 October 2022)]. The first SARS CoV-2 transmission to healthcare personnel in Turkey was reported on January 20, 2020 [1]. Infections in healthcare personnel by Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS-CoV) have been well-defined [3,4]. Li Weilang, who shared his concerns about the disease before SARS CoV-2 was described in China, and the Turkish doctor, Cemil Tascioglu, are among the many healthcare personnel who have died because of COVID-19 [available at: https://www.nytimes.com/2020/02/06/world/asia/chinese-doctor-Li-Wenliang-coronavirus.html; 2020 (accessed 14 April 2020) and https://www.trtworld.com/turkey/the-first-turkish-doctor-to-succumb-to-the-coronavirus-35060; 2020 (accessed time: 14.04.2020)].

Healthcare personnel may often be exposed to infectious agents while providing healthcare services. A total of 26 viruses have been described and more than 50 pathogens have been shown to cause service-related infections in healthcare personnel [5]. Even if healthcare personnel are not infected through working in conditions of exposure to pathogens with high transmission rates, they can be psychologically affected [6]. There are studies showing that healthcare personnel who cared for COVID-19 patients in Wuhan and other regions of China are suffering psychological burden [7]. This affects not only China and healthcare personnel but also the psychology of all populations worldwide as people are kept at home in lockdown as "modern prisoners", and the spreading of news about the end of the world and food shortages [available at: https://blogs.bmj.com/bmj/2020/01/24/coronavirus-the-psychological-effects-of quarantining-a-city/;2020 (accessed 14 April 2020)]. Previous studies have shown that healthcare personnel are anxious about transmitting the disease to their families, colleagues and social friends, feel discrimination and stigmatization, are reluctant to go to work and consider resigning during pandemics [8]. Therefore, it was considered necessary to examine the concerns, attitudes and psychological influence of healthcare personnel in the COVID-19 pandemic. The aim of the present study, was to evaluate possible anxiety levels experienced by the healthcare personnel in Turkey during the COVID-19 pandemic, and the factors affecting these levels.

Material and Methods

Type and Region of the Study

This study was approved by the Ethics Committee of XXXXXX University Medical Faculty. The study was designed as a cross-sectional study and the measurements were taken before the first COVID-19 case was detected in Turkey, within three weeks after the first case, and finally within 1 week after the restriction of inter-province travel. The study was conducted in the hospitals that were planned for the care of COVID-19 cases. The first COVID-19 case was detected on March 11, 2020 in Turkey. Restriction of inter-province travel was started on April 4, 2020.

Participants

The survey was conveyed to 1000 healthcare personnel who were expected to take active charge in the pandemic across Turkey. In the pre-survey information text, a warning was issued about the non-participation of healthcare personnel who have been injured or lost their relatives within the last three years. Participation in the survey was completely voluntary. Survey participation consent was obtained from all participants with the information text. The participants were allowed to end the survey whenever they wanted. The researchers evaluating the survey were blinded to the participants and did not know who had completed which forms. Online links were created for the survey at three different times and these were conveyed to the healthcare personnel. There were no COVID-19 cases recorded in Turkey when the survey was sent for the first time. The second survey was sent within the first three weeks of the pandemic, and the third survey was sent when restrictions of inter-province travel were started. Data security was provided via SurveyMonkey enterprise.

Variables and Scales

Ten days after the survey was designed, it was sent to 10 volunteer healthcare personnel and any unclear parts were corrected. The survey consisted of 31 items: 11 questions investigating sociodemographic features of the participants, 7 questions examining their media use, and 3 questions investigating their measures of protection against COVID-19. The Modified Swine Flu Anxiety Scale (MSFAS) with 6 questions (Q12, 13, 14, 15, 16) adapted from the Swine Flu Anxiety Scale was used to investigate the anxiety level of the participants [9]. Two questions aimed to measure the anxiety level of the participants, one question to measure self-efficacy and knowledge level, and one question to measure anxiety-attitudes of the participants. The MSFAS anxiety score was calculated using a 5-point Likert scale and scores >18 represented increased anxiety. In order to evaluate news sources, the 21st question was used as a criterion, and the participants who answered as moderate influence were marked as having high media follow-up.

Statistical Analysis

Sociodemographic data of the participants were summarized as numbers and percentages. Pearson's Chi-square test was used to measure the difference between paired variables. The MSFAS anxiety score was evaluated with the ANOVA test, and post-hoc Games-Howell test was applied to differences between the groups. Logistic regression analysis was performed to evaluate the factors affecting anxiety. Statistical analysis was performed using SPSS version 20.0 software (SPSS, Chicago, IL, USA).

Ethics Statement

Approval for the study was granted by the Ethics Committee of XXXXX University Medical Faculty (decision no 15, 2020).

Table 1. Sociodemographic Features of Healthcare Personnel

	Survey-1 (n:380)		Survey-2 (n:133)		Survey-3 (n:143)	
	n	(%)	n	(%)	n	(%)
Age group (year)						
<40	354	93.2	98	73.7	105	73.4
≥40	26	6.8	35	26.3	38	26.6
Gender						
Male	191	50.4	65	48.9	83	59.3
Female	188	49.6	68	51.1	57	40.7
Marital status						
Married	156	41.2	99	73.9	98	69.5
Single	223	58.8	35	26.1	43	30.5
Children						
No	270	71.2	46	34.6	57	39.9
Infant	33	8.7	36	27.1	34	23.8
Pre-school	45	11.9	23	17.3	23	16.1
Schoolchild	26	6.9	15	11.3	16	11.2
Adolescent	5	1.3	10	7.5	9	6.3
Adult	0	0	3	2.3	4	2.8
Education level						
High School	14	3.7	9	6.9	1	0.7
Two-year degree	45	11.8	14	10.8	2	1.4
Undergraduate	165	43.4	28	21.5	55	38.5
Postgraduate	114	30.0	29	22.3	53	37.3
Doctorate and higher	42	11.1	50	38.5	31	21.8
Profession						
Physician	272	71.6	101	75.9	128	89.5
Nurse	108	28.4	32	24.1	15	10.5
Affiliation						
University	47	12.4	32	24.1	43	30.7
Training & Research hospital	90	23.7	44	33.1	13	9.3
Public hospital	152	40.0	15	11.3	28	20.0
Private hospital	30	7.9	7	5.3	2	1.4
Family health center	0	0	18	13.5	48	34.3
Paramedic	57	15.0	8	6.0	2	1.4
Affiliated	0	0	9	6.8	4	2.9
Chronic disease						
Yes	50	13.2	28	21.1	30	21.0
No	330	86.8	105	78.9	113	79.0

Results

The measurements taken in this study were based on pre-pandemic data, within 3 weeks of the outbreak, and after restriction of inter-province travel. The surveys were conveyed to the same 1000 persons at each of the 3-time points. The number of respondents to the surveys showed variability, with 380 individuals responding to the1st survey, 133 to the 2nd survey and 143 to the 3rd survey.

When the data of all three surveys were compared, there were significant differences in terms of sociodemographic features. It was determined that 15.1% (n=99) of the study respondents were aged over 40 years, 51.7% (n=341) were males and 76.7% (n=505) were physicians. Of all the participants, 16.5% (n=108) had a chronic disease. A total of 41% (n=269) of the respondents were working in tertiary hospitals where all beds had been assigned for COVID-19 cases. The sociodemographic data of the participants are shown as numbers and percentages in Table 1.

When the cut-off value for the MSFAS anxiety score was taken as 18, a high level of anxiety was determined in 37.9% of the participants in Survey 1, 37.6% in Survey 2 and 79.7% in Survey 3. The difference between anxiety scores of the three surveys was statistically significant (F=58.075, p<0.001). In the Games Howel advanced analysis, the difference between the anxiety scores was found to result from Survey 3. The anxiety scores in Survey 3 were significantly higher than in the previous two surveys (Table 2).

Logistic regression analysis was applied to determine predictors of anxiety levels. In the first survey, media use was described as always (odds ratio, 15.781; p<0.01) and often (odds ratio,

Table 2. Comparison of the surveys performed at different periods in terms of anxiety scores

	Survey	Mean	SD	F/p
Anxiety score	1	17.155	4.689	F:58.075 P<0.001
	2	17.308	4.467	
	3	21.657	3.318	

Table 3. Factors affecting anxiety in healthcare personnel

Variables	Survey-1			Survey 2			Survey -3		
	p	OR	95% CI	p	OR	95% CI	p	OR	95% CI
Age	0.380	0.973	0.915-1.035	0.702	1.012	0.951-1.078	0.982	0.999	0.917-1.088
Gender Male-ref									
Female	0.084	1.550	0.943-2.548	0.895	1.057	0.468-2.388	0.014	4.431	1.357-14.470
Marital status Single-ref									
Married	0.715	1.131	0.585-2.185	0.687	0.745	0.178-3.118	<0.001	17.716	3.517-89.231
Children Yes-ref									
No	0.999	1.001	0.421-2.376	0.316	0.490	0.121-1.1976	0.095	4.601	0.767-27.589
Profession Physician-ref									
Nurse	0.202	0.713	0.425-1.198	0.021	0.315	0.118-0.841	0.585	1.560	0.316-7.698
Chronic disease No-ref									
Yes-ref	0.126	1.692	0.863-3.317	0.128	2.144	0.803-5.725	0.774	1.225	0.306-4.911
Media use None-ref									
A little	0.229	2.065	0.633-6.730	0.927	0.889	0.071-11.156	0.142	10.556	0.456-244.440
Moderate	0.057	2.998	0.969-9.274	0.191	4.926	0.451-53.761	0.719	1.586	0.129-19.468
Often	0.005	5.365	1.661-17.329	0.143	6.073	0.544-67.748	0.126	6.951	0.581-83.237
Always	<0.001	15.781	4.651-53.545	0.121	7.172	0.594-86.564	0.176	5.703	0.457-71.173

CI: confidence interval; OR: Odds ratio

5.365; p<0.05); in the second survey, media use (p<0.05) and profession (odds ratio, 0.021; p<0.05) and in the third survey marital status (odds ratio, 17.716; p<0.01) and gender (odds ratio, 4.431; p<0.05) were determined as the predictors of COVID-19 anxiety (Table 3).

Discussion

Pneumonia cases clustered in Hubei in December 2019, became the focus of interest not only in China, but also internationally [1]. Not long after the announcement of a novel type of coronavirus isolation, the virus was first detected in neighboring countries and later in 210 countries worldwide [available at: https://www.worldometers.info/coronavirus/; 2022 (accessed 10 October 2022)]. As of April 20, 2020 the number of cases in Turkey is greater than in China. Participation in the survey significantly decreased after the first case was detected in Turkey, which could be attributed to workload or unwillingness. The participation rate decreased for females and nurses. In this study, 15.1% (n:99) of the participants were aged over 40 years, 51.7% (n:341) were males and 76.7% (n:505) were physicians. Of all the participants, 16.5% (n:108) had a chronic disease. A total of 41% (n:269) were working in tertiary hospitals with beds completely reserved for COVID-19 cases.

The rapid and unexpected spread of SARS-CoV 2 to hospitals can be accepted as an acute part of a bio-disaster [10]. As in any disaster, the effects caused by SARS-CoV 2 may increase anxiety, concerns and unwillingness to work. During the previous SARS emergency, it was not known whether healthcare personnel were infected by exposure to the SARS virus. However, in the current pandemic, those working in healthcare services were known to be at the center of transmission from the second week [1]. Fighting a rapidly spreading fatal disease can create fear through the loss of the sense of safety [10]. In this study, anxiety level access limitation was seen to be 37.9% before the outbreak, 37.6% in the first period of the outbreak, and this rate increased significantly to 79.7% in the third period with the increased number of cases. The difference between the period before the outbreak and the third period of increasing cases was statistically significant in terms of the mean anxiety score, and the difference was determined to have originated from the third survey. The concern of healthcare personnel about their own health depends on how possible and severe a feared disease is perceived [11]. The Turkish media played two roles in this perception. Unscientific explanations were frequently included in the news before the outbreak, with comments such as this virus, which was not fully known before the pandemic, is difficult to transmit to the Turkish people racially, it can be prevented with some foods (e.g. sheep's head and foot soup) and this is a fake outbreak. The respondents who stated that they did not follow the media were found to be more anxious in the surveys performed before and at the beginning of the outbreak. When the first cases were recorded in Turkey, the media then stated that this virus is easily transmitted, suggesting a high likelihood of exposure and becoming infected. An infection tally was kept across the country and was broadcast at 19:00 every evening. The attitudes of the media before the outbreak in Turkey might have caused an underestimation of the situation at the beginning of the pandemic.

The survey results in this study showed that the anxiety experienced by the healthcare personnel did not change with age. In a study by Lai et al., the reason for nurses' anxiety was explained by younger age and lower experience [8]. In the current study, there was a high participation rate of young adults, and age did not affect anxiety. This may have been caused by the disease leading to higher morbidity and mortality in patients aged > 40 years. In a study from Turkey, forty-two percent of doctors indicated an increase in their anxiety about their education and career, with a negative impact on practical training being the most important predictor. Most (57.4%) considered extending their residency training to overcome the negative effects of the pandemic [12]. The increased anxiety level of nurses with the first cases seen in Turkey was remarkable. Nursing is performed more commonly by women in Turkey, and nursing duties that can be considered front-line such as follow-up of medical-physiological findings (temperature, pulse, arterial blood pressure) require close patient contact and this may have had an effect on these results. It was seen that women and married people had significantly higher anxiety during the quarantine implementation. The responsibility of married individuals for their family may be associated with the concern of transmission. In the study by Kılıç et al., they reported that the concern of transmission of COVID-19 to the baby during pregnancy/birth are predictors of clinical anxiety, including avoiding regular pregnancy check-ups of the COVID-19 pandemic [13]. Anxiety about infecting the close circle of healthcare workers with COVID-19 may manifest with reluctance to work [14]. The higher anxiety scores obtained by the female respondents may be due to stronger physical and psychological bonds with their children compared to males.

The sample determined in the study was not selected based on the regions where the healthcare personnel work, but was sent to the participants via web links. This may affect the ability to generalize the results of the study. In addition, although the same healthcare personnel were reached in all three periods, the changes in the participation rates could constitute another limitation of the study.

Conclusion

In this study performed on physicians and nurses working in hospitals delivering healthcare services to COVID-19 patients in Turkey, the results demonstrated that anxiety levels increased as the outbreak progressed and the factors were determined, which affected these levels. An important strong aspect of this study was that it was conducted in a period when the Turkish health system was exposed to the COVID-19 burden, and cross-sectional data were obtained about the anxiety status of healthcare personnel. The protection of healthcare personnel is an important component of the measures for fighting against COVID-19. From the results, healthcare personnel groups were identified (women, nurses, married people) who need special intervention and support to provide spiritual comfort while working on the front line in the fight against COVID-19. This research subject is of top priority for healthcare personnel because the time, dynamics and severity of the next pandemic are unpredictable. Further comprehensive studies are needed on the extent of the psychological support needed by healthcare personnel and to whom and how this support should be provided.

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Scientific Responsibility Statement
The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement
All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest
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