The Effects of the COVID-19 Pandemic on Perceived Stress, State and Trait Anxiety and Work-Related Strain in Healthcare Professionals

Sağlık Çalışanlarında COVID-19 Pandemisinin Algılanan Stres Durumluk-Sürekli Kaygı ve İş Gerginliği Üzerindeki Etkileri

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ABSTRACT

Objective: In Coronavirus disease-19 (COVID-19), as in all pandemics, employees are the human force fighting against the disease at the forefront, and they face the risk of infection for themselves and their relatives during this struggle. In this study, it was aimed to determine the stress, anxiety and work-related strain levels of healthcare employees dealing with the treatment of infected patients during the COVID-19 pandemic and the factors affecting these levels.

Methods: This descriptive study was conducted in Karadeniz Technical University Farabi Hospital. Healthcare employees who were deemed to be at high/low risk in terms of Covid-19 transmission were included in the study. Perceived stress scale (PSS), state and trait anxiety inventory (STAI-S, STAI-T), and work-related strain inventory (WRSI) were used.

Results: Stress, anxiety and work-related strain levels were high in the high-risk group. This difference was significant in PSS (p=0.000). Stress, anxiety and work-related strain levels of those working in the high and low-risk work areas and who weren't satisfied with their work were higher. This difference was significant according to WRSI (p=0.000). Stress, anxiety and work-related strain levels of men were higher in high-risk group and women in low-risk group. In high-

ÖZ

Amaç: Tüm pandemilerde olduğu gibi Koronavirüs hastalığı-2019 (COVID-19) salgınında da sağlık çalışanları hastalığa karşı en ön safta mücadele eden insan gücü olup bu mücadele sırasında kendilerinin ve yakınlarının enfekte olma riskiyle karşı karşıya gelmektedirler. Bu çalışmada COVID-19 pandemisi sırasında enfekte hastaların tedavisi ile uğraşan sağlık çalışanlarının, salgın sırasındaki stres, kaygı ve işe bağlı gerginlik seviyesini ve bu düzeylere etki eden faktörlerin saptanması amaçlandı.

Yöntemler: Tanımlayıcı nitelikte olan bu çalışma Karadeniz Teknik Üniversitesi Farabi Hastanesi'nde yapıldı. COVID-19 bulaş riski açısından yüksek ve düşük riskli kabul edilen sağlık personeli çalışmaya dahil edildi. Algılanan stres ölçeği (ASÖ), durumluk ve sürekli kaygı envanteri (DKE-SKE) ve işe bağlı gerginlik ölçeği (İBGÖ) kullanıldı.

Bulgular: Çalışmamızda yüksek riskli grupta stres, kaygı ve işe bağlı gerginlik düzeylerinin yüksek olduğu ve bu farkın ASÖ ölçeğinde anlamlı olduğu saptandı (p=0,000). Yüksek ve düşük riskli çalışma alanında görev alan ve çalıştığı işten memnun olmayanların stres, kaygı ve işe bağlı gerginlik düzeyleri daha yüksekti ve İBGÖ ölçeğine göre bu fark anlamlı idi (p=0,000). Yüksek riskli grupta erkeklerin, düşük riskli grupta ise kadınların stres, kaygı ve işe bağlı gerginlik

risk group, this difference was found to be statistically significant according to the STAI-S (p=0.048), in low-risk group this difference was statistically significant according to PSS (p=0.004) and STAI-S (p=0.010).

Conclusion: Increasing stress, anxiety and work-related strain levels with the COVID-19 pandemic negatively affect both healthcare professionals and healthcare services provided by healthcare professionals. Efforts, activities, and measures should be taken to improve and eliminate these negativities.

Keywords: Pandemic, COVID-19, perceived stress, healthcare employee

düzeylerinin daha yüksek olduğu tespit edildi. Yüksek riskli grupta bu fark DKE'ye göre (p=0,048), düşük riskli grupta bu fark ASÖ (p=0,004) ve DKE'ye (p=0,010) göre istatistiksel olarak anlamlı bulundu.

Sonuç: COVID-19 pandemisiyle birlikte artan stres, kaygı ve işe bağlı gerginlik düzeyleri hem sağlık çalışanlarını hem de sağlık çalışanlarının verdiği sağlık hizmetlerini olumsuz etkilemektedir. Bu olumsuzlukları iyileştirmeye ve gidermeye yönelik çaba, faaliyet ve önlemlerin alınması gerekmektedir.

Anahtar Sözcükler: Pandemi, COVID-19, algılanan stres, sağlık çalışanı

Introduction

The Coronavirus disease-19 (COVID-19), which was caused by severe acute respiratory syndrome coronavirus, emerged in China in December 2019, spread the entire world within 4 months, and caused a serious public healthcare problem in the world today like the previous pandemics (1). The service capacity of healthcare systems is exceeded in pandemics that affect the entire world, and the healthcare employees whose workload increases in this process are also affected mentally. As in all pandemics, healthcare employees make up the human power fighting against the disease, and they face the risk of being infected during this fight. According to an article published in China, in a study with 138 series infected with COVID-19 and who developed pneumonia, 40 (29%) of the cases were healthcare employees (1). Despite the use of personal protective equipment, it is inevitable that healthcare employees who fight against a disease face a high risk of transmission and mortality (2), feel stressed in all kinds of invasive attempts that are performed when necessary. The optimum level of mental health of healthcare employees as the most important human factor in the fight against pandemics in this period is proportional to the success of the fight against the pandemic. However, it was reported in studies that investigated the mental health of healthcare employees in pandemic periods that healthcare employees also had anxiety and stress, and some studies even reported that they experienced mental health disorders as bad as psychosis (3-5).

In this study, our purpose was to determine the stress, anxiety and work-related strain levels of healthcare employees who dealt with the treatment of infected patients during the COVID-19 pandemic and the factors that affected these levels, to make recommendations to reduce these levels to minimize, to increase the comfort of healthcare employees, and to increase the quality of healthcare. This study can be a resource for future pandemics, and if the stress, anxiety and work-related strain levels of healthcare employees can be reduced to the lowest level, it can contribute to the development of healthcare services that will be provided during new pandemics which may occur in the future.

Methods

This descriptive study was conducted in a university hospital. Healthcare employees who were deemed to be at high/low risk in terms of COVID-19 transmission were included in the study. perceived stress scale (PSS), state and trait anxiety inventory (STAI) and Work-Related Strain Inventory (WRSI) were used.

Participants

The study was conducted at a Farabi Hospital of Karadeniz Technical University Faculty of Medicine in Trabzon. The healthcare employees working at hospital emergency department, pediatric emergency department, COVID-19 positive ward, possible COVID-19 ward, COVID-19 intensive care, microbiology and biochemistry laboratory, and in the imaging units (X-ray, tomography, ultrasound, magnetic resonance imaging, and interventional radiology) (doctors, nurses, helping medical staff) were included in the study. Healthcare employees who did not have contact with potential or positive COVID-19 patients/samples were excluded from this study. The healthcare staff working in COVID-19 units of emergency departments, COVID-19 positive ward, and intensive care units were considered to be at high risk because of dealing with high-risk operations, the staff working in other areas were considered to be at low risk. Healthcare employees were interviewed with a distance of at least 1 meter face-to-face using a mask. The data were collected by filling in surveys that were prepared in advance. The ethical approval was taken from the Ethics Committee Presidency of the Karadeniz Technical University Faculty of Medicine in Trabzon (ethics committee approval no: 2020/119).

In our study, healthcare workers were divided into high and low-risk groups in terms of the risk of COVID-19 transmission. Healthcare employees working in the COVID-19 unit of the pediatric and adult emergency deparments, COVID-19 positive services, COVID-19 probable services, COVID 19 PCR laboratory, COVID-19 polyclinic and COVID-19 intensive care unit where suspected COVID 19 and definite COVID 19 cases are treated, were considered as high risk due to their high-risk procedures. Personnel working in other areas (eg, green yellow trauma and monitor area of emergency department, imaging and laboratories) were considered as low risk. In addition, healthcare workers who performed procedures that we thought were high-risk due to the high risk of aerosol formation in terms of the risk of COVID-19 transmission were also considered as high-risk group regardless of the place of work. These risky procedures

were: endotracheal intubation, cardiopulmonary resuscitation, non-invasive mechanical ventilation, aspiration, COVID-19 specimen collection.

Materials

The questionnaire consisted of 6 parts. In the first part, there were questions about demographic characteristics and personal information such as age, gender, occupational group, and working duration, educational status, marital status, number of children, chronic illness, drug use history, cigarettes, and alcohol use history. In the second part, there were questions such as in which unit of the hospital the healthcare employee worked during the pandemic, the way and duration of work, what risky procedures were performed, the factors that caused stress during the pandemic, and the ways to deal with them during the pandemic. In the third part, there were questions about family and community life, such as whether they separated from their homes, families or children since the pandemic started, and whether they imposed restrictions on actions related to their social life such as going to markets and using minibuses or shuttles. In the fourth part "PSS" was used, and the 14 questions were asked to healthcare employees about their personal experiences in March 2020. In the fifth part, "STAI" was used, and 40 questions were asked on how they felt that moment. In the sixth part, the WRSI was used, and 18 questions were asked about their jobs.

Perceived Stress Scale (PSS-14): The scale was developed by Cohen et al. (6) in 1983 as a method of evaluating how much individuals perceived their experiences. Each item on the scale is evaluated with 5-Point Likert Scale ranging from "Never (0)" to "Very often (4). Seven of the items containing positive statements are reverse scored. The PSS-14 scoring system is between 0-56 points, and high scores show higher stress perception levels. If the score is between 11-26 points, the stress level is low, and scores between 27-41 points show moderate, and between 42-56 points show high-stress levels. The Turkish validity and reliability study of the scale was conducted by Eskin et al. (7) The Cronbach Alpha Internal Consistency Coefficient, which showed the reliability of the PSS, was calculated as 0.84.

State and Trait Anxiety Inventory (STAI): The scale was developed by Spielger et al. (8) in 1970 to evaluate state and trait anxiety, and the adaptation to Turkish was performed in 1982 by Öner and Le Compte (9). There are 20 questions in both scales, each of which is evaluated over a Likert-type scale ranging from "None (1)" to "Completely" (4). The score obtained from each scale ranges from 20 to 80. In STAI, high scores show a high level of anxiety of participants. The Cronbach Alpha Reliability Coefficient of STAI was found to be between 0.73 and 0.86 in various applications for trait anxiety scale, and between 0.86-0.92 for state anxiety scale (9).

Work-Related Strain Inventory (WRSI): The scale was developed to evaluate the stress and tension levels of healthcare employees who had to look after serious and terminally ill patients and consisted of 18 items. Each question is scored based on the Likert-type scale ranging from "This does not apply to

me at all (1)", and "This applies to me completely" (4). The scoring system of the WRSI is between 18-72 points. The scale was previously translated into Turkish, was applied on a nurse sampling by Aslan et al. (10), and the Cronbach Alpha Internal Consistency Coefficient, which showed the reliability of the scale, was found to be 0.63 and 0.75 in that study.

Statistical Analyses

All the data were transferred to the Statistical Package for the Social Sciences 23.0 (SPSS Inc; Chicago, IL, USA) program. Descriptive statistics of the evaluation results were given as numbers and percentages for categorical variables, and as mean, standard deviation, minimum, and maximum values for numerical variables. The chi-square test was used in independent groups when the differences between the rates of categorical variables were analyzed. The normal distribution of numerical variables was evaluated with the Shapiro-Wilk test. In comparisons of the measurement variables for the data that fit normal distribution between two independent groups, the Student t-test was used, and the Mann-Whitney U test was used in case the data were not distributed normally. The variance analysis was used in comparisons of continuous variables that fit normal distribution between three independent groups, and the Kruskal-Wallis test was used when the data did not fit the normal distribution pattern. The statistical alpha significance level was set at $p<0.05$.

Results

A total of 183 healthcare employee were included in the study. The rate of the male participants was 48.1%, and that of the female participants was 51.9%. Among the participants, 54.09% (n=99) were evaluated as having high risk due to the workplace they worked in the fight against COVID-19. The demographic characteristics according to the risk levels of the participants are compared in Table 1.

The majority of the healthcare employees who were included in the study were working in the emergency department (n=133; 72.7%). It was found that 76 of them worked in a high-risk area, and approximately 19.2% of them (n=19) did not receive any training on the use of personal protective equipment. The changes related to the social lives of the healthcare employees fighting against COVID-19 in the pandemic period are shown in Table 2. Of the participants 82% (n=150) did not change their homes, 91.3% (n=167) continued to live in the same house with their children, and 57.4% (n=105) separated from their relatives who had chronic diseases.

The perceived stress, state and trait anxiety and work-related strain levels of the participants were evaluated with 3 separate scales, and when compared according to risk groups, the perceived stress, state and trait anxiety and work-related strain levels were found to be higher in the high-risk group. However, this difference was only found to be statistically significant in the PSS (p=0.000). The comparison of perceived stress, state and trait anxiety and work-related strain levels of the participants according to risk groups is shown in Table 3.

Table 1. Distribution of demographic characteristics of participants according to risk levels

	High risk		Low risk		Total	
	n	%	n	%	n	%
Age (mean ± SD)	31.30±6.167		35.44±8.061		33.20±7.374	
Gender						
Female	57	57.6	38	45.2	95	51.9
Male	42	42.4	46	54.8	88	48.1
Marital status						
Married	46	46.5	55	65.5	101	55.2
Single	53	53.5	29	34.5	82	44.8
Children						
Yes	33	33.3	48	57.1	81	44.3
No	66	66.7	36	42.9	102	55.7
Profession						
Doctor	60	60.6	3	3.6	63	34.4
Nurse	29	29.3	11	13.1	40	21.9
Other	10	10.1	70			
Paramedic	1	1.0	10	11.9	11	6.0
Employees	7	7.1	15	17.9	22	12.0
Technician	2	2.0	19	22.6	21	11.5
Storage attendant	-	-	2	2.4	2	1.1
Security attendant	-	-	11	13.1	11	6.0
Secretary	-	-	6	7.1	6	3.3
Other	-	-	7	8.3	7	3.8
Educational status						
Primary school			1	1.2	1	0.5
Secondary/high school	9	9.1	30	35.7	39	21.3
University	90	90.9	53	63.1	143	78.1
Chronic disease						
Yes	23	23.2	20	23.8	43	23.5
No	76	76.8	64	76.2	140	76.5
SD: Standard deviation						

The comparison of the scale scores according to the risk status is shown in Table 4. According to these data, it was found that the perceived stress, state and trait anxiety and work-related strain levels of men were higher in the high-risk group and these levels of women were higher in the low-risk group. This difference was found to be statistically significant in STAI-S in the high-risk group, and was statistically significant in PSS and STAI-S in the low-risk group. No statistically significant differences were detected according to having a chronic disease, marital status, having children, having a relative with chronic disease at home, working in an isolated area in the emergency department, receiving training on personal protective equipment, and decrease in working duration in the pandemic period. The perceived stress, state and trait anxiety and work-related strain levels were found to be higher in the participants who were not satisfied with the working environment, and this difference was statistically significant in some scales.

Discussion

It was determined in our study that perceived stress, state and trait anxiety and work-related strain levels were higher in the high-risk group in the PSS. The perceived stress, state and trait anxiety and work-related strain levels were higher in the WRSI scale in those who worked in high and low-risk working areas and who were not satisfied with their working environments. It was also found that the perceived stress, state and trait anxiety and work-related strain levels of men were higher in the high-risk group, and these levels of women were higher in the low-risk group. This difference was statistically significant according to STAI-S in the high-risk group; and was statistically significant according to PSS and STAI-S in the low-risk group. No statistically significant differences were detected according to having a chronic disease, marital status, having children, having a relative with chronic disease at home, working in the isolated area in the emergency department, receiving training on personal

Table 2. Changes in social lives of participants in the pandemic period						
	High risk		Low risk		Total	
Changing home	n	%	n	%	n	%
I move on as before	75	75.8	75	89.3	150	82.0
I sent other members of my family to another place	9	9.1	5	6.0	14	7.7
We moved to another place as a family	1	1.0	-	-	1	.5
I stay at the hotel provided by the hospital	3	3.0	-	-	3	1.6
We moved to another house form the hospital	9	9.1	2	2.4	11	6.0
Other	2	2.0	2	2.4	4	2.2
Leaving children						
Yes	9	9.1	7	8.3	16	8.7
No	90	90.9	77	91.7	167	91.3
Leaving relatives						
Yes	62	62.6	43	51.2	105	57.4
No	37	37.4	41	48.8	78	42.6
Going to market						
No change	10	10.1	14	16.7	24	13.1
Decreased	81	81.8	60	71.4	141	77.0
Increased	8	8.1	8	9.5	16	8.7
Never	-	-	2	2.4	2	1.1
Taking the service bus to the hospital						
No change	72	72.7	46	55.9	118	64.5
Decreased	9	9.1	16	19.0	25	13.7
Increased	3	3.0	4	4.8	7	3.8
Never	17	17.2	19	22.6	36	19.7
Social contact						
No change	6	6.1	3	3.6	9	4.9
Decreased	83	83.8	73	86.9	156	85.2
Increased			3	3.6	15	8.2
Never	10	10.1	5	6.0	3	1.6

Table 3. Comparison of stress scale scores of participants according to risk levels								
Risk level	PSS*		STAI-S**		STAI-T***		WRSI****	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
High risk	28.68	6.636	45.60	9.973	43.11	8.405	38.47	7.142
Low risk	24.58	8.450	43.73	9.879	41.96	7.432	36.70	5.542
	p=0.000	t=3.597	p=0.206	t=1.269	p=0.334	t=0.970	p=0.061	t=1.888

PSS*: Perceived stress scale, STAI-S**: State and trait anxiety inventory-state, STAI-T***: State and trait anxiety inventory-trait, WRSI****: Work-related strain inventory

protective equipment, and decrease in working durations in the pandemic period.

On the one hand, healthcare employees work in close contact with infected or possibly infected patients, and thus, jeopardize their health, on the other hand, they fight against the fear that they may infect their family members and their loved ones; sometimes they leave their homes for an uncertain time to avoid this, or tend to live in separate rooms in their homes to avoid infection. Another difficulty of being a healthcare employee is that the social environment and the community may stigmatize them by considering them as possible infection sources (11). Also, during the pandemic period, increasing workload and social isolation caused that the healthcare employees, who witnessed the worst moments of their patients in hospital, worked in the hospital

Table 4. Comparison of scale scores according to descriptive characteristics and risk status

	High risk (mean ± SD)				Low risk (mean ± SD)			
	PSS	STAI-S	STAI-T	WRSI	PSS	STAI-S	STAI-T	WRSI
Gender								
Female	29.3±6.93	44±11.35	42.5±9.2	37.5±7.18	30 (9-40)	50 (26-66)	43.4±7.65	37.4±5.48
Male	27.8±6.19	47.8±7.32	43.9 ± 7.23	39.7±6.98	24 (7-36)	41.5 (24-67)	40.8±7.12	36.1±5.58
	p=0.280	**p=0.048**	p=0.437	p=0.132	**p=0.004**	**p=0.010**	p=0.116	p=0.283
Profession								
Healthcare employee	29.1±6.55	47 (20-71)	43.4±8.39	38.5±7.17	27.4±9.25	45.2±10.33	41.3±8.05	37.7±5.87
Other	24.4±6.33	42 (38-56)	39.9±8.39	38.2±7.33	23.5±7.91	43.1±9.72	42.2±7.23	36.3±5.4
	p=0.044	p=0.472	p=0.230	p=0.912	p=0.051	p=0.388	p=0.603	p=0.296
Emergency service areas								
Isolated area	28.6±6.27	46.8±9.22	41.9±7.83	38.1±7.7	29±2.83	49±0.0	49±8.49	36 ±1.41
Other	28.7±6.84	45±10.31	43.7±8.66	38.7±6.92	24.5±8.52	43.6±9.97	41.8±7.38	36.7±5.61
	p=0.897	p=0.405	p=0.350	p=0.724	p=0.458	**p=0.000**	p=0.177	p=0.857
Being satisfied with the work environment								
Satisfied	28.3±6.81	45.3±10.09	42.8±8.57	37 (20-55)	24.5 (7-40)	41.0 (24-66)	40.5±6.88	36.0 (25-44)
Not satisfied	30.8±5.31	47.1±9.53	45±7.44	44 (39-56)	30 (12-38)	53.0 (36-67)	45.3±7.66	40.5 (30-54)
	p=0.161	p=0.506	p=0.329	**p=0.000**	p=0.45	**p=0.000**	**p=0.005**	**p=0.000**

*Analyses were made by using the Mann-Whitney U test for the data that were not distributed normally, and median, minimum-maximum values were identified.
SD: Standard deviation, PSS: Perceived stress scale, STAI-S: State and trait anxiety inventory-state, STAI-T: State and trait anxiety inventory-trait, WRSI: Work-related strain inventory

longer, and remained away from activities that might make them feel good. The fact that the personal protective equipment, which is worn for protection from infection, is disturbing and heavy has also moved healthcare employees away from their comfortable area. Although such equipment makes them feel protected from the disease, it also constantly reminds them that they are face-to-face with the infection. In addition, seeing that their patients and colleagues are infected with COVID-19 and that they lose their life threaten the mental health of the employees. Previous studies show that clinical symptoms such as anxiety, uneasiness, insomnia, and depression are frequent in healthcare employees due to all these reasons (12,13).

The endurance of healthcare employees who are exposed to continuous increasing workload causes that optimum yield is obtained from healthcare systems. Endurance is the ability to fit and adapt to conditions causing stress for an individual, and individuals who can endure negative conditions have optimism and confidence in control of conditions even under difficult conditions. The more resistant healthcare employees, the lower levels of anxiety they experience (14). However, it is also known that healthcare employees experience feelings such as anger, fear, disappointment, guilt, helplessness, and anxiety, and are subject to being stigmatized by society and experiencing more trauma symptoms in the long term. In previous studies conducted with STAI-S and STAI-T to determine the anxiety experienced by healthcare employees due to the pandemic, it was found that STAI-S scores were at statistically significant levels in healthcare employees than individuals who did not work in the field of

healthcare, and there were no significant differences in terms of STAI-T scores. Again, it was found that STAI-S scores were higher at statistically significant levels in women than in men, in married ones than in single ones, and in nurses than in doctors; and there were no significant differences in terms of STAI-T scores (15). In a study in which STAI was evaluated, it was found that the STAI scores of healthcare employees were high (14). In another study, no significant relations were detected between age, gender and anxiety scores (16). In our study, the perceived stress, state and trait anxiety and work-related strain levels of the female gender were found to be higher in the low-risk group in PSS and STAI-S. The perceived stress, state and trait anxiety and work-related strain levels of the male gender were found to be higher in the high-risk group in STAI-S. We believe that gender has no significant effects on anxiety because of the elevated scores found in different scales in different groups in males and females. The fact that the infection and mortality of the COVID-19 pandemic are independent of gender can be considered as a reason for this.

When the literature data were evaluated, according to the study of Liu et al. (16) using the self-rating anxiety scale, it was determined that the anxiety scores of healthcare workers who had direct contact with COVID-19 were high. According to the study of Lai et al. (17) using the Patient Health Questionnaire, Generalized Anxiety Disorder, Insomnia Severity Index, Impact of Event Scale-Revised scales, the high level of mental health symptoms such as depression (50.4%), anxiety (44.6%), insomnia (34.0%), distress (71.5%) were detected. According to another study of Zhang et al. (18) using the Insomnia

Severity Index, the Symptom Check List-revised, and Patient Health Questionnaire-4 scales, it was found that the prevalences of insomnia, anxiety, somatization, and obsessive-compulsive disorder were higher in medical health care workers compared to non-medical health workers. According to another study of Lu et al. (19) using the "Numeric rating scale", "Hamilton Anxiety Scale", and "Hamilton Depression Scale's, fear, anxiety and depression scale values were found to be higher in health workers when medical health workers and administrative staff were compared. In our study, we found that the levels of perceived stress, state and trait anxiety and work-related strain were higher in the high-risk group in the PSS (Table 3). However, it was found in some studies conducted with healthcare employees working in the field of COVID-19 by using the PSS that no significant differences were detected in PSS between healthcare employees working in risky places and healthcare employees working in other units (20). In a study conducted in 2003 during the SARS pandemic, it was found that the stress levels were higher in the high-risk group compared to the low-risk group, and no statistically significant differences were detected; and this difference was found to be statistically significant in the same health professionals in another study conducted one year after the SARS pandemic was over (21). In our study, the perceived stress, state and trait anxiety and work-related strain levels were higher in the high-risk group in all scales, and these differences were found to be statistically significant according to PSS; however, this difference was not significant according to the WRSI, STAI-S, STAI-T scales. The reasons why the perceived stress levels were found to be higher in employees with high risk in our study in PSS might be increased work life of healthcare employees in the pandemic period, the fear of being infected with the disease, the fear of infecting their children or beloved ones, fear of death, and the restrictions on social life. The reason for no statistically significant differences in other scales might be that the emergency services were very busy, and the stress, anxiety and work-related strain levels of employees in this area were high also before the COVID-19, and that the employees were already familiar with stress, anxiety and work-related strain. Also, it may be considered that pandemics may affect people in social, economic, and psychological terms regardless of being a high-risk or low-risk employee, and the increased stress, anxiety and work-related strain levels in both groups may have hindered the occurrence of statistically significant levels. It was shown in previous studies that the mental effects of the pandemic might continue for months even for years after returning to routine life (22). We are planning to clarify this by repeating the same study on the same individuals 1 year after the pandemic.

People and healthcare employees in particular are affected in terms of social, economic, and psychological aspects in pandemics. Factors such as the quarantine process and social isolation, the fear of the disease, the fear of being infected with the disease, the stress of treating colleagues infected with the disease, job stress, the fear of being stigmatized by the society due to the fear of carrying the infection, the fear of infecting relatives for whom the healthcare employee is providing care at home affect the lives of healthcare employees (23). In our study, it was found that the

majority of the healthcare employees working in both high-risk and low-risk areas did not change their homes, and those who were married did not separate from their children. The reason for this may be that our healthcare employees are used to work in crowded, intense, chaotic emergency services as well as their economic problems.

According to the study of Birhanu et al. (24), healthcare employees constitute an important group that might be affected by workplace stress because of their unique working environments. The stress levels due to the workplace were found to be high in healthcare employees in this study (24). Similar to the literature data, the stress, anxiety and work-related strain levels of healthcare employees who were not satisfied with their working environment were found to be higher in all scales in our study. This difference was found to be significant in the WRSI. Job is an important part of life, and as a result of this, it is expected to affect the quality of life of people. It is inevitable that people who are not satisfied with their work environment have higher stress, anxiety and work-related strain levels.

Although high anxiety scores were detected in single individuals in the study of Zhang et al. (18), no significant relations were detected between marital status and anxiety levels in most studies (15,25,26). In our study, in line with the literature, no significant differences were detected between age, marital status, having children, and perceived stress, state and trait anxiety and work-related strain levels of healthcare employees.

Insomnia, depression, anxiety, and somatization symptoms were detected to be higher in those with non-organic diseases according to the study conducted by Zhang et al. (18). Again, in the same study, when those who lived with their families were compared according to the depression model, it was found that depression levels were higher in those living alone (18). In our study, no significant differences were detected between chronic disease and living alone and the perceived stress, state and trait anxiety and work-related strain levels of employees. The stress, anxiety and strain caused by the fear of transmitting the disease to their loved ones in those living with their families, and the low sociability in the lonely ones may be the reasons for the lack of difference between the two groups that were living alone or living with family.

Study Limitations

The first one was that the number of participants was limited to 183 healthcare employees. The second one was that although there were patients with COVID-19 in the city in the period of the study, their number did not reach peak level. The third limitation was that a pandemic hospital was established in our city, and COVID-19 positive patients were referred to this hospital. As a result, COVID-19 risk remained relatively lower than the pandemic hospital due to the admission of mild and outpatients to our hospital. The fourth limitation was the examination of mental problems such as anxiety levels at one time in pandemics. As a matter of fact, it would not provide accurate results examining psychological problems that would be brought by a pandemic, which started in 2019 and was still

in progress, and whose end was not known. Because the stress, anxiety, work-related strain levels of healthcare employees may vary with increasing positive cases and difficult conditions. To address these limitations, we are planning to evaluate the stress, anxiety and work-related strain levels of our same healthcare employees with the same scales.

Conclusion

Our study can constitute a source for possible pandemics that may occur in the future for healthcare employees to work with more self-confidence and to increase the psycho-social support training for healthcare employees to minimize their perceived stress, state and trait anxiety, work-related strain levels during pandemics. It is among the most important factors for us to improve the mental states of healthcare employees to provide the best quality of healthcare services during pandemics.

Ethics

Ethics Committee Approval: Karadeniz Technical University Faculty of Medicine Scientific Research Ethics Committee Presidency (number: 24237859-416/date: 03.07.2020).

Informed Consent: Survey study.

Peer-review: Externally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: Y.K., A.G., V.Ö., Concept: Y.K., A.G., V.Ö., P.Ş., M.İ., S.P., D.S.A., M.T., A.G., Design: Y.K., A.G., V.Ö., P.Ş., M.İ., S.P., D.S.A., M.T., A.G., Data Collection or Processing: Y.K., A.G., V.Ö., P.Ş., M.İ., S.P., D.S.A., M.T., A.G., Analysis or Interpretation: Y.K., A.G., V.Ö., P.Ş., Literature Search: Y.K., A.G., V.Ö., Writing: Y.K., A.G., V.Ö.

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