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The Effect of the Covid-19 Pandemic on the Psychological Status of Hospital Workers

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Abstract

Background: The aim of this study was to determine the levels of disaster related depression, anxiety and stress symptoms and the affecting factors for hospital workers.
Methods: This cross-sectional survey study was conducted in a pandemic hospital between April 8, 2020 and April 14, 2020 in Turkey. The survey included demographics, 18 situations containing seven main themes (health status, vulnerability, work, isolation, income, knowledge, and media) and the Depression Anxiety Stress-21 scale (DASS-21). A multiple regression model was constructed to define the factors associated with the presence of any level depression, anxiety, and stress symptoms.
Results: In total, 1129 participants completed the survey. Of all participants, 22.5% had various levels of depression, 23.6% had anxiety, and 20.3% had stress. Female gender, previous diagnosed psychiatric disease, and request for psychological support were common factors associated with the presence of depression, anxiety, and stress. Health status, vulnerability, income, and media as the main themes were also common factors related to the three psychological conditions of hospital workers.
Conclusions: The study results demonstrated that one in every five hospital workers struggle with depression, anxiety, and stress symptoms at any level, and there was a significant relationship between certain factors and these psychological conditions.

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INTRODUCTION

A new type of Coronavirus (SARS-CoV-2) was detected in the etiology of pneumonia cases that occurred for the first time in Wuhan, China, in December 2019 [1]. SARS-CoV-2, which is thought to initially originate from wild animals, can be transmitted from person to person, and asymptomatic carriage is possible [2]. This disease caused by the virus is called COVID-19. Although fever, cough, and shortness of breath are common symptoms, other complaints have been observed [3]. The virus spread from China to the world with the possibility of transmission from person to person in the asymptomatic period [4]. The World Health Organization stated that more than 126,000 cases and 4,627 deaths occurred in 114 countries, and it described COVID-19 as a pandemic on March 11, 2020 [5]. The first case was also identified in Turkey on the same date, March 11, 2020 [6]. The number of cases continued to increase.

Healthcare workers are at high risk as COVID-19 can be transmitted through droplets and contact with contaminated surfaces [7]. To be protected, they must use personal protective equipment (PPE), such as masks, goggles, visors, and overalls, during their working hours [8]. Fear of being infected and death, risk of transmission, and necessity to wear protective equipment may cause psychological problems among healthcare professionals, especially those who care for patients diagnosed with COVID-19 or those suspected [9, 10]. Many studies conducted during the SARS epidemic showed that healthcare professionals working in high-risk departments had more stress responses, signs of posttraumatic stress, and burnout than others [11]. Likewise, the majority of healthcare workers stated that they were afraid that they and their relatives could get infected. They also experienced increased workloads and isolation from society during SARS [12]. In a study that investigated the psychological impact of the H1N1 pandemic on hospital workers, it was concluded that the most frequent concern was the infection of family and friends [13]. In a study on Covid-19 conducted on healthcare workers in China, the participants experienced high levels of depression,

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anxiety, insomnia, and stress [14].

With the ever-increasing number of cases worldwide, healthcare professionals' contact with patients diagnosed with COVID-19 is also increasing. The risky situation they are in can negatively affect the psychological status of healthcare workers. The literature shows that studies conducted on previous outbreaks generally investigate late psychological effects. There are very few studies showing the acute effects of a pandemic in the early spreading period. The aim of this study was to investigate the effect of the COVID-19 pandemic, which is still in its early spreading period in Turkey, on the psychological status of hospital workers in a tertiary care institution.

METHODS

Study Design

This cross-sectional survey study was conducted in Gazi University Hospital between April 8, 2020 and April 14, 2020. At the time the study was initiated, the number of cases was 38,226, and the deaths were 812 in Turkey. The hospital where the study was conducted is a pandemic hospital, and it served patients with COVID-19, both diagnosed and suspected. On the same date, the number of hospitalized patients diagnosed with COVID-19 was 123, and there was only one death at the hospital. Among hospital workers, COVID-19 was detected in only one staff member, and it was determined to be contacted outside the hospital.

Ethics committee approval (2020-04-07/04) was received from the Gazi University Ethics Commission. The study protocol was also approved by the Turkish Ministry of Health, General Directorate of Health Services (FB-2020-05-27T16_43_46).

Study Setting and Population

All staff working at the hospital were included in the study, and the questionnaire was sent electronically to the cell phones of all staff registered in the hospital system after obtaining permission from hospital management. The study began on a voluntary basis after obtaining online consent. An additional written consent was not obtained due to the risk of infection spread. The survey was completed anonymously, and multiple completion by the same person was prevented electronically. The sample size was determined using a web calculator (https://www.surveymonkey.com/mp/sample-size-calculator/), and it was found that 571 participants with a 99% confidence interval and a 5% margin of error would be ideal for the study.

The survey consisted of three parts. In the first part, the demographics of the participants, such as age, gender, marital status, additional disease, job type, working time, and work unit, were asked. In addition, whether they had received in-hospital training regarding COVID-19, contact with COVID-19 suspected / diagnosed patients, status of risky or elderly individuals among the family or those living together, and the need for psychological support were questioned. During the outbreak period, psychological support by a psychiatric clinic started to be provided for hospital staff who requested it regardless of this study. In addition, a total of 81 training sessions were provided for different groups by the hospital infection control committee prior to the study.

In the second part, 18 situations were used to measure the psychological state of the person regarding the COVID-19 pandemic. Because there is no accepted pandemic survey test for health workers, these questions were prepared based on the literature review and current complaints of hospital staff [15-19]. In this section, participants were asked to mark how often they experienced certain feelings related to the COVID-19 pandemic. The answers were classified between never and always on a 5-point Likert scale.

In the final part of the survey, the Depression Anxiety Stress-21 scale [20] (DASS-21) was used to measure the depression, anxiety, and stress responses of the hospital staff. The Turkish validity and reliability of DASS-21 has been demonstrated in previous studies [21, 22]. The participants were asked to mark how often they experienced the emotions and situations mentioned during the past week. The answers were stated on a 4-point Likert scale (Never to Always). The questions numbered 3, 5, 10, 13, 16, 17, and 21 represent the depression-related subgroup. The depression score results were classified as normal (0-9), mild depression (10-12), moderate depression (13-20), severe depression (21-27), and extremely severe depression (28-42). The questions numbered 2, 4, 7, 9, 15, 19, and 20 are associated with the anxiety subgroup. The anxiety score results are classified as normal (0-6), mild anxiety (7-9), moderate anxiety (10-14), severe anxiety (15-19), and extreme severe anxiety (20-42). The numbers 1, 6, 8, 11, 12, 14, and 18 of the questions measure the stress-related subgroup. The stress score results were classified as normal (0-10), mild stress (11-18), moderate stress (19-26), severe stress (27-34), and extreme severe stress (35-42).

Statistical Analysis

Statistical analyses were performed using the IBM SPSS statistical package for Windows, version 21 (Armonk, NY: IBM Corp.). Continuous variables were presented as median values and interquartile ranges (IQRs). Categorical variables were summarized as frequencies and percentages. The normality of the continuous variables was evaluated using the Kolmogorov-Smirnov test. The differences between two groups according to continuous variables not conforming to the normal distribution were determined by the Mann-Whitney U test. Categorical variables were compared using the Pearson x2. Odds ratios (ORs) were presented with 95% confidence intervals (95% CI). A critical α value of 0.05 was accepted as statistically significant.

A binary logistic regression model was constructed to define the factors associated with the presence of any level of depression, anxiety, and stress according to DASS-21. The univariate analyses consisted of 28 demographic

parameters and 18 situations, which were devised by authors. Each variable was tested in the univariate model, and the comparisons that had a loose p value of less than 0.1 were then tested in the multivariate model using the backward LR method. Small groups with less than 20 data were not analyzed in this test.

RESULTS

In total, 1,129 forms were completed, and 60.3% was female. The median age was 35 (IQR 29-43). Of the population, 68.2% was married, and 60% had children. The proportion of at-risk or elderly people among the participants' families or those they lived with was 45.1%. The most common comorbidities were psychiatric disease (7.8%), hypertension (5.9%), and asthma / COPD (5%), respectively. Of all participants, 27.3% comprised physicians, 24.3% nurses, 14.1% other medical staff, and 34.4% non-medical staff. The rate of the hospital staff working in shifts was 64%. Daytime was 31.4%, and not actively working was 4.6%. Among participants, 68.4% worked in the non-COVID-19 area, 17.5% in the COVID-19 area, and 14.1% in the emergency department. Among hospital workers, the proportion of in-hospital training for pandemics received was 60%, and the proportion of contact with COVID-19 suspected / diagnosed patients was 28.3%. Of all participants, 1.5% stated that they received psychological support, 28% requested it, and the remaining 70.5% did not request it (Table 1). Among the 18 situations created for the pandemic, the median scores were significantly higher in the depression, anxiety, and stress groups compared with the normal group (<0.001) (Table 2).

Table 1. The comparison of demographics between the groups with and without depression, anxiety, and stress

	Total n=1129	Depression at any level n=254	Depression absent n=875	P	Anxiety at any level n=266	Anxiety absent n=863	P	Stress at any level n=229	Stress absent n=900	P
Female gender, n(%)	681 (60.3%)	196 (77.2%)	485 (55.4%)	<0.001	204 (76.7%)	477 (55.3%)	<0.001	184 (80.3%)	497 (55.2%)	<0.001
Age, median (IQR)	35 (29-43)	34 (29-40)	36 (29-44)	0.006	36 (30-43)	35 (29-43)	0.602	34 (29-42)	36 (29-43)	0.104
Married, n(%)	770 (68.2%)	160 (63%)	610 (69.7%)	0.043	182 (68.4%)	588 (68.1%)	0.930	155 (67.7%)	615 (68.3%)	0.851
With children, n(%)	676 (59.9%)	142 (55.9%)	534 (61%)	0.143	171 (64.3%)	505 (58.5%)	0.093	137 (59.8%)	539 (59.9%)	0.986
Comorbidities, n(%)										
DM	44 (3.9%)	8 (3.1%)	36 (4.1%)	0.484	10 (3.8%)	34 (3.9%)	0.894	9 (3.9%)	35 (3.9%)	0.977
HT	67 (5.9%)	16 (6.3%)	51 (5.8%)	0.780	20 (7.5%)	47 (5.4%)	0.211	18 (7.9%)	49 (5.4%)	0.167
Malignancy	5 (0.4%)	2 (0.8%)	3 (0.3%)	0.314	2 (0.8%)	3 (0.3%)	0.385	2 (0.9%)	3 (0.3%)	0.272
Asthma/COPD	56 (5%)	18 (7.1%)	38 (4.3%)	0.076	23 (8.6%)	33 (3.8%)	0.002	16 (7%)	40 (4.4%)	0.114
CAD	14 (1.2%)	4 (1.6%)	10 (1.1%)	0.531	4 (1.5%)	10 (1.2%)	0.751	4 (1.7%)	10 (1.1%)	0.438
Rheumatologic	41 (3.6%)	6 (2.4%)	35 (4%)	0.220	6 (2.3%)	35 (4.1%)	0.170	4 (1.7%)	37 (4.1%)	0.088
Psychiatric	88 (7.8%)	35 (13.8%)	53 (6.2%)	<0.001	52 (19.5%)	126 (14.6%)	0.053	45 (19.7%)	133 (14.8%)	0.071
Other	178 (15.8%)	46 (18.1%)	132 (15.1%)	0.241	42 (15.8%)	46 (5.3%)	<0.001	34 (14.8%)	54 (6%)	<0.001
Risky or elderly individuals among the family or those living together, n(%)	509 (45.1%)	134 (52.8%)	375 (42.9%)	0.005	143 (53.8%)	366 (42.4%)	0.001	123 (53.7%)	386 (42.9%)	0.003
Job type, n(%)										
Physician	308 (27.3%)	67 (26.4%)	241 (27.6%)	0.714	52 (19.5%)	256 (29.7%)	0.001	51 (22.3%)	257 (28.6%)	0.057
Nurse	274 (24.2%)	87 (34.3%)	187 (21.3%)	<0.001	96 (36.1%)	178 (20.6%)	<0.001	86 (37.6%)	188 (20.9%)	<0.001
Other medical staff	159 (14.1%)	34 (13.4%)	125 (14.3%)	0.717	42 (15.8%)	117 (13.6%)	0.360	37 (16.2%)	122 (13.6%)	0.312
Non-medical staff	388 (34.3%)	66 (26%)	322 (36.8%)	0.001	76 (28.6%)	312 (36.2%)	0.023	55 (24%)	333 (37%)	<0.001
Working time, n(%)										
Shift	723 (64%)	155 (61%)	568 (64.8%)	0.255	164 (61.7%)	559 (64.8%)	0.354	139 (60.7%)	584 (64.9%)	0.238
Daytime	354 (31.4%)	87 (34.3%)	267 (30.6%)	0.258	91 (34.2%)	263 (30.5%)	0.251	78 (34.1%)	276 (30.7%)	0.323
Not actively working	52 (4.6%)	12 (4.7%)	40 (4.6%)	0.918	11 (4.1%)	41 (4.8%)	0.675	12 (5.2%)	40 (4.4%)	0.608
Working area, n(%)										
Non-COVID	772 (68.4%)	177 (69.7%)	595 (68%)	0.611	194 (72.9%)	578 (67%)	0.068	158 (69%)	614 (68.2%)	0.822
COVID	198 (17.5%)	49 (19.3%)	149 (17%)	0.404	44 (16.5%)	154 (17.8%)	0.625	46 (20.1%)	152 (16.9%)	0.256
ED	159 (14.1%)	28 (11%)	131 (15%)	0.111	28 (10.5%)	131 (15.2%)	0.056	25 (10.9%)	134 (14.9%)	0.123
To receive in-hospital training for COVID-19, n(%)	677 (60%)	148 (58.3%)	529 (60.5%)	0.531	160 (60.2%)	517 (59.9%)	0.944	136 (59.4%)	541 (60.1%)	0.842
Contact with COVID-19 suspected patient in the hospital, n(%)	320 (28.3%)	91 (%35.8)	229 (26.1%)	0.003	78 (29.3%)	241 (27.9%)	0.658	78 (34.1%)	241 (26.8%)	0.029
Psychological support during the pandemic period, n(%)										
Received	17 (1.5%)	4 (1.6%)	13 (1.6%)	0.918	7 (2.6%)	10 (1.2%)	0.091	8 (3.5%)	9 (1%)	0.011
Requesting	316 (28%)	143 (56.3%)	173 (19.7%)	<0.001	149 (56%)	167 (19.4%)	<0.001	132 (57.6%)	184 (20.4%)	<0.001
Not requesting	796 (70.4%)	107 (42.1%)	689 (78.7%)	<0.001	110 (41.4%)	686 (79.5%)	<0.001	89 (38.9%)	707 (78.6%)	<0.001

DM, diabetes mellitus; HT, hypertension; COPD, chronic obstructive pulmonary disease; CAD, coronary artery disease; ED, emergency department. The Mann-Whitney U and the Pearson x2 tests were used for analyses.

Table 2. The comparison of 18 situations related to the COVID-19 pandemic between the groups with and without depression, anxiety, and stress

Situations	Depression at any level n=254	Depression absent n=875	P	Anxiety at any level n=266	Anxiety absent n=863	P	Stress at any level n=229	Stress absent n=900	P
Health of myself/others									
S1. Worried about being infected.	3 (3-4)	3 (2-3)	<0.001	3 (3-4)	3 (2-3)	<0.001	3 (3-4)	3 (2-3)	<0.001
S2. Thinking I already got the infection.	2 (2-2)	1 (1-2)	<0.001	2 (2-3)	1 (1-2)	<0.001	2 (2-2)	1 (1-2)	<0.001
S3. Worried about my/my family's other health problems.	3 (3-4)	3 (2-3)	<0.001	3 (3-4)	3 (2-3)	<0.001	4 (3-4)	3 (2-3)	<0.001
S4. Afraid of spreading the infection to my family or others.	4 (3-4)	3 (2-4)	<0.001	4 (3-4)	3 (2-4)	<0.001	4 (3-4)	3 (2-4)	<0.001
S5. Afraid of my parents being infected.	4 (3-4)	3 (3-4)	<0.001	4 (3-4)	3 (3-4)	<0.001	4 (3-4)	3 (3-4)	<0.001
Vulnerability									
S6. Thinking the virus spread cannot be controlled.	3 (2-3)	2 (1-3)	<0.001	3 (2-3)	2 (1-3)	<0.001	3 (2-3)	2 (1-3)	<0.001
S7. Don't feel safe myself.	3 (2-4)	2 (1-3)	<0.001	3 (2-4)	2 (1-3)	<0.001	3 (3-4)	2 (1-3)	<0.001
S8. Feeling my life is under a threat.	3 (2-4)	2 (1-2)	<0.001	3 (2-4)	2 (1-2)	<0.001	3 (2-4)	2 (1-2)	<0.001
S9. Feeling I lost control of my life.	3 (2-3)	1 (0-2)	<0.001	2 (2-3)	1 (0-2)	<0.001	3 (2-3)	1 (0-2)	<0.001
Work									
S10. Feeling stressed because of the increase in my workload.	3 (2-4)	1 (0-2)	<0.001	3 (2-3)	1 (1-2)	<0.001	3 (2-4)	2 (1-2)	<0.001
S11. Afraid of transferring to COVID-19 related units.	3 (1-4)	1 (0-2)	<0.001	3 (1-4)	1 (0-2)	<0.001	3 (1-4)	1 (0-2)	<0.001
S12. Afraid of doing my job.	2 (1-3)	0 (0-2)	<0.001	2 (1-3)	0 (0-2)	<0.001	2 (1-3)	0 (0-2)	<0.001
S13. Thinking there is not enough equipment in the hospital to prevent contamination and to be protected.	2 (1-3)	1 (0-2)	<0.001	2 (1-3)	1 (0-2)	<0.001	2 (1-3)	1 (0-2)	<0.001
Isolation									
S14. Thinking I have been excluded by my relatives and other people because of my job.	2 (1-3)	1 (0-2)	<0.001	2 (1-3)	1 (0-2)	<0.001	2 (1-3)	1 (0-2)	<0.001
S16. Afraid of being isolated or restricting my activities.	3 (2-4)	2 (1-2)	<0.001	3 (2-4)	2 (1-2)	<0.001	3 (2-4)	2 (1-2)	<0.001
Income									
S15. Thinking if I get an infection, I will suffer financially.	2 (1-3)	1 (0-2)	<0.001	2 (1-3)	1 (0-2)	<0.001	2 (1-3)	1 (0-2)	<0.001
Knowledge									
S17. Thinking I have a lack of information about preventing the epidemic and protecting myself.	2 (1-3)	1 (0-2)	<0.001	2 (1-3)	1 (0-2)	<0.001	2 (1-3)	1 (0-2)	<0.001
Media									
S18. TV / Social media increases my stress level.	3 (3-4)	2 (1-3)	<0.001	3 (3-4)	2 (1-3)	<0.001	3 (3-4)	2 (1-3)	<0.001

Scores ranged between 0 (never) and 4 (always). Scores were stated as median (interquartile ranges). The Mann-Whitney U test was used for analyses.

Depression

According to DASS-21 scale, 22.5% of the participants had various levels of depression, which were mild depression at 10.7%, moderate depression at 11.2%, and severe depression at 0.5%. Following the univariate analysis, 11 demographics and 18 situations (S) prepared by the authors were used for the multivariate regression analysis associated with the presence of depression at any level (Table 1-2). Female gender (OR: 1.67 %95 CI 1.06-2.64), previously diagnosed psychiatric disease (OR: 2.61 %95 CI 1.36-4.97), request for psychological support (OR: 2.20 %95 CI 1.49-3.24), "S2. Thinking I already got the infection" (OR: 1.35 %95 CI 1.07-1.71), "S3. Worried about my/my family's other health problems" (OR: 1.26 %95 CI 1.02-1.55), "S9. Feeling I lost control of my life" (OR: 2.25 %95 CI 1.86-2.73), "S13. Thinking there is not enough equipment in the hospital to prevent contamination and be protected" (OR: 1.26 %95 CI 1.08-1.46), "S15. Thinking if I get an infection, I will suffer financially" (OR: 1.40 %95 CI 1.21-1.62), and "S18. TV / Social media increases my stress level" (OR: 1.51 %95 CI 1.25-1.82) were related factors (Table 3).

Table 3. Multiple regression analyses of factors associated with depression at any level during the COVID-19 pandemic

	Variables	OR	95% CI	P
Depression	Female gender	1.67	1.06-2.64	0.027
	Psychiatric, comorbidity	2.61	1.36-4.97	0.004
	Request for psychological support	2.20	1.49-3.24	<0.001
	S2. Thinking I already got the infection	1.35	1.07-1.71	0.010
	S3. Worried about my/my family's other health problems	1.26	1.02-1.55	0.029
	S9. Feeling I lost control of my life	2.25	1.86-2.73	<0.001
	S13. Thinking there is not enough equipment in the hospital to prevent contamination and to be protected	1.26	1.08-1.46	0.003
	S15. Thinking if I get an infection, I will suffer financially	1.40	1.21-1.62	<0.001
	S18. TV / Social media increases my stress level	1.51	1.25-1.82	<0.001

OR, odds ratio; CI, confidence interval

Anxiety

Various levels of anxiety were detected in 23.6% of participants. The frequency of mild anxiety was 13.1%, moderate anxiety 8.8%, severe anxiety 1.2%, and extremely severe anxiety 0.5%. Following the univariate analysis, 13 demographics and 18 questions were analyzed by a multivariate analysis associated with the presence of anxiety at any level (Table 1-2). Female gender (OR: 1.79 95% CI 1.18-2.71), previously diagnosed psychiatric disease (OR: 4.30 %95 CI 2.31-7.99), Asthma/COPD patient (OR: 2.89 %95 Cl 1.38-6.00), no request for psychological support (OR: 0.44 %95 Cl 0.30-0.64), "S2. Thinking I already got the infection" (OR: 1.83 %95 Cl 1.45-2.32), "S4. Afraid of spreading the infection to my family or others" (OR: 1.35 %95 Cl 1.05-1.73), "S9. Feeling I lost control of my life" (OR: 1.95 %95 Cl 1.63-2.33), "S11. Afraid of transferring to COVID-19 related units" (OR: 1.20 %95 Cl 1.04-1.38), "S14. Thinking I have been excluded by my relatives and other people because of my job" (OR: 1.28 %95 Cl 1.08-1.51), "S15. Thinking if I get an infection, I will suffer financially" (OR: 1.16 %95 Cl 1.00-1.33), and "S18. TV / Social media increases my stress level" (OR: 1.29 %95 Cl 1.08-1.53) were related factors (Table 4).

Table 4. Multiple regression analyses of factors associated with anxiety at any level during the COVID-19 pandemic

	Variables	OR	95% CI	P
Anxiety	Female gender	1.79	1.18-2.71	0.005
	Asthma/COPD, comorbidity	2.89	1.38-6.00	0.005
	Psychiatric, comorbidity	4.30	2.31-7.99	<0.001
	No request for psychological support	0.44	0.30-0.64	<0.001
	S2. Thinking I already got the infection	1.83	1.45-2.32	<0.001
	S4. Afraid of spreading the infection to my family or others	1.35	1.05-1.73	0.016
	S9. Feeling I lost control of my life	1.95	1.63-2.33	<0.001
	S11. Afraid of transferring to COVID-19 related units	1.20	1.04-1.38	0.009
	S14. Thinking I have been excluded by my relatives and other people because of my job	1.28	1.08-1.51	0.003
	S15. Thinking if I get an infection, I will suffer financially	1.16	1.00-1.33	0.037
	S18. TV / Social media increases my stress level	1.29	1.08-1.53	0.005

OR, odds ratio; CI, confidence interval; COPD, chronic obstructive pulmonary disease;

Stress

Various levels of stress were detected in 20.3% of the participants. The frequency of mild stress was 19.5%, and moderate stress was 0.8%. For the multivariate analysis, 11 demographics and 18 questions were analyzed associated with the presence of any level of stress according to the DASS-21 scale (Table 1-2). Female gender (OR: 1.92 %95 Cl 1.18-3.11), previously diagnosed psychiatric disease (OR: 3.22 %95 Cl 1.67-6.20), non-medical staff (OR: 0.53 %95 Cl 0.33-0.86), no request for psychological support (OR: 0.41 %95 Cl 0.28-0.61), "S2. Thinking I already got the infection" (OR: 1.32 %95 Cl 1.03-1.68), "S3. Worried about my/my family's other health problems" (OR: 1.33 %95 Cl 1.06-1.67), "S7. Don't feel safe myself" (OR: 1.46 %95 Cl 1.17-1.83), "S9. Feeling I lost control of my life" (OR: 1.92 %95 Cl 1.57-2.34), "S15. Thinking if I get an infection, I will suffer financially" (OR: 1.30 %95 Cl 1.11-1.93), and "S18. TV / Social media increases my stress level" (OR: 1.57 %95 Cl 1.28-1.93) were related factors (Table 5).

When participants with previously diagnosed psychiatric disease were excluded from the multivariate analysis, depression, anxiety, and stress-related factors still included female gender, request for psychological support, S2, S9, S15, and S18 (Appendix 1).

Table 5. Multiple regression analyses of factors associated with stress at any level during the COVID-19 pandemic

	Variables	OR	95% CI	P
Stress	Female gender	1.92	1.18-3.11	0.008
	Psychiatric, comorbidity	3.22	1.67-6.20	<0.001
	Non-medical staff	0.53	0.33-0.86	0.011
	No request for psychological support	0.41	0.28-0.61	<0.001
	S2. Thinking I already got the infection	1.32	1.03-1.68	0.025
	S3. Worried about my/my family's other health problems	1.33	1.06-1.67	0.011
	S7. Don't feel safe myself	1.46	1.17-1.83	0.001
	S9. Feeling I lost control of my life	1.92	1.57-2.34	<0.001
	S15. Thinking if I get an infection, I will suffer financially	1.30	1.11-1.93	0.001
	S18. TV / Social media increases my stress level	1.57	1.28-1.93	<0.001

OR, odds ratio; CI, confidence interval

DISCUSSION

The COVID-19 pandemic is a global threat, and the riskiest group is hospital workers. Apart from preventing the spread of infection and treating patients, it is crucial for hospital workers to maintain their physical and psychological states. Previous studies have shown that healthcare staff working during the SARS and H1N1 outbreaks had depression, anxiety, stress, and posttraumatic stress disorders. This study is one of the first studies to assess the psychological status of hospital workers in Turkey during the early spreading period of the COVID-19 pandemic. In total, 1,129 participants completed the survey, and this number was well above the calculated sample size. The results demonstrated that more than 20% of hospital workers had different levels of depression, anxiety, and stress in relation to the COVID-19 pandemic in a tertiary care institution.

In a study on healthcare workers in China during the early period of the COVID-19 outbreak, the frequency of depression was found to be 50.4%, anxiety 44.6%, and distress 71.5% [14]. In another survey study conducted on the general population in China, depression was detected to be 30.3%, anxiety 36.3%, and stress 32.2% during the beginning of the epidemic [23]. In a study performed among 906 hospital workers in Singapore and India, the rate of anxiety was 15.7%, depression was 10.6%, stress was 5.2%, and posttraumatic stress disorder was 7.4% during the pandemic. At the time of this study, the number of cases in these two countries was low, and the rate of the increase in cases was very slow [24]. In our study, depression symptoms were detected in 22.5% of participants, anxiety in 23.6%, and stress in 20.3%. These different rates could be related to the relatively late arrival or slow spreading rate of the virus to different countries, more scientific data collection over time, in-hospital trainings given before the infection spread, and previous pandemic experiences.

Based on the multiple regression analysis in our study, female gender, previously diagnosed psychiatric disease, and request for psychological support were associated with the presence of depression, anxiety, and stress. In a study using the DASS-21 conducted in the general population during the COVID-19 outbreak in China, female gender, student status, and specific physical symptoms were associated with higher depression, anxiety, and stress scores [23]. In another study conducted among healthcare workers in China, being a woman, working in a secondary care hospital, having an intermediate technical title, and working in frontline areas were found to be associated with severe anxiety, depression, and distress [14]. During the COVID-19 pandemic in a study conducted on physicians in Turkey, female gender, being younger, working in frontline, previously diagnosed psychiatric disease were predictors for higher depression, anxiety and stress levels [25]. In another study in Turkey, it was reported that female gender, use of social media, having a comorbid disease, or a psychiatric disorder were found to be independently associated with psychiatric symptoms in study population [26].

Many factors have been identified that have an impact on psychological outcomes. In this study, 18 questions were created by the authors to determine the effect of the pandemic, and these questions were also included in the regression analysis. Among these questions, "Thinking I already got the infection," "Worried about my/my family's other health problems" (health of myself/others as a main theme), "Feeling I lost control of my life" (vulnerability as a main theme), "Thinking if I get an infection, I will suffer financially" (income as a main theme), and "TV / Social media increases my stress level" (media as a main theme) were associated with depression, anxiety, and stress. In a study conducted in the emergency department during SARS, the most important factors related to the level of distress were spread of virus, vulnerability/loss of control, and health of self [19]. In another study, the mediating factors for psychological stress were health fear, job stress, and social isolation/avoidance among healthcare workers during SARS [27].

For many of the survey studies conducted on outbreaks, psychological influence was higher among the healthcare professionals working on the frontline [14, 27, 28]. In this study, it was observed that working in the emergency department and COVID-19 related units did not make a significant difference in depression, anxiety, and stress levels. Similarly, in a study on health workers in Hong Kong during the SARS epidemic, it was found that working in a frontline area did not make a significant difference in the psychological morbidity measured by the General Health Questionnaire-12. In this study, it was assumed that the hospital staff did not consider themselves exempt from danger because there may be SARS cases with an atypical presentation in other parts of the hospital, and the perceptions of the risk of the staff were the main determinants [29]. Similar factors may have had an effect in this study.

In a study on health workers related to the SARS outbreak, the stress levels measured during the outbreak were found to be the same between those working on the frontline and those not; however, in the measurements made for similar groups a year later, while the stress levels of those working at the frontline increased, the level of stress of those not decreased [30]. Because the pandemic process is still continuing during our study period in Turkey, the future results of current hospital staff are unknown.

Limitations

Although the number of participants was high according to the sample size, the main limitation of the study was the inability to reach all the hospital staff where the study was conducted. Another situation was that the previously diagnosed psychiatric disorders of the participants were also specifically questioned and analyzed in this study, but DASS-21 scores before pandemic were unknown. This makes it difficult to precisely determine whether the depression, anxiety, and stress levels detected were all caused by the pandemic. Participants were analyzed only during the acute period. Therefore, the extent to which these results will be permanent, such as post-traumatic stress disorders, is not known. In addition, the single-centered study limits the generalization of the data to all hospital workers.

CONCLUSION

In this study, about one in every five hospital staff members had different levels of depression, anxiety, and stress related to the COVID-19 pandemic. Common factors associated with these psychological conditions were female gender, previous diagnosed psychiatric disease and request for psychological support. In addition, health status, vulnerability, income, and media were other related factors. These factors remained even when those with previous psychiatric disease were excluded. Finally, it should be taken into consideration by hospital and health care administrators to protect the psychological status of healthcare professionals, who play a crucial role in a pandemic.

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Appendix 1. Multiple regression analyses of factors associated with depression, anxiety and stress among participants without previously diagnosed psychiatric disease

	Variables	OR	95% CI	P
Depression	Female gender	1.66	1.05-2.61	0.028
	Contact with COVID-19 suspected patient in the hospital	1.58	1.04-2.40	0.031
	Request for psychological support	2.19	1.46-3.27	<0.001
	S2. Thinking I already got the infection	1.35	1.05-1.74	0.018
	S9. Feeling I lost control of my life	2.25	1.84-2.74	<0.001
	S12. Afraid of doing my job	1.20	1.01-1.43	0.037
	S13. Thinking there is not enough equipment in the hospital to prevent contamination and to be protected	1.21	1.03-1.43	0.022
	S15. Thinking if I get an infection, I will suffer financially	1.33	1.14-1.54	<0.001
	S18. TV / Social media increases my stress level	1.49	1.20-1.80	<0.001
Anxiety	Female gender	1.86	1.19-2.90	0.006
	Asthma/COPD, comorbidity	3.15	1.47-6.74	0.003
	Request for psychological support	2.28	1.53-3.40	<0.001
	S1. Worried about being infected	0.72	0.55-0.95	0.021
	S2. Thinking I already got the infection	1.84	1.43-2.38	<0.001
	S4. Afraid of spreading the infection to my family or others	1.53	1.03-2.25	0.031
	S9. Feeling I lost control of my life	1.95	1.60-2.37	<0.001
	S11. Afraid of transferring to COVID-19 related units	1.20	1.03-1.39	0.014
	S14. Thinking I have been excluded by my relatives and other people because of my job	1.28	1.04-1.39	0.014
	S15. Thinking if I get an infection, I will suffer financially	1.17	1.01-1.36	0.033
	S18. TV / Social media increases my stress level	1.26	1.04-1.52	0.019
Stress	Female gender	1.66	0.99-2.79	0.052
	Non-medical staff	0.47	0.28-0.79	0.005
	Request for psychological support	2.28	1.49-3.47	<0.001
	S2. Thinking I already got the infection	1.39	1.07-1.82	0.013
	S5. Afraid of my parents being infected	1.48	1.02-2.13	0.035
	S7. Don't feel safe myself	1.73	1.32-2.27	<0.001
	S9. Feeling I lost control of my life	2.12	1.68-2.67	<0.001
	S14. Thinking I have been excluded by my relatives and other people because of my job	1.30	1.07-1.57	0.007
	S15. Thinking if I get an infection, I will suffer financially	1.26	1.06-1.48	0.006
	S18. TV / Social media increases my stress level	1.68	1.34-2.10	<0.001

OR, odds ratio; CI, confidence interval