

ASSESSMENT OF PSYCHOLOGICAL RESPONSES AND RELATED FACTORS OF DISCHARGED PATIENTS WHO HAVE BEEN HOSPITALIZED WITH COVID-19

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SUMMARY

Background: COVID-19 is the biggest pandemic of the last century. While a large number of cases and mortality rates direct the research to the clinic and prognosis of the disease, the mental health of these patients has recently become a matter of concern. This study aims to predict psychiatric morbidity and possible associated markers in COVID-19 survivors.

Subjects and methods: A total of 102 survivors with COVID-19 infection participated in this study. A questionnaire was applied to the participants to evaluate demographic variables, history of comorbid diseases, smoking, loss of a relative due to COVID-19, and environmental attitudes after the discharge. Length of hospitalization, lung findings, intensive care history and treatments were recorded. Psychiatric morbidities were evaluated with General Anxiety Disorder-7, Patient Health Questionnaire-9 and The National Stressful Events Survey PTSD Short Scale.

Results: Anxiety was found in 20.6%, depression in 13.7% based on moderate and above levels, 21.6% had significant PTSD. Female gender, history of psychiatric and comorbid diseases, smoking, perceived discrimination, and lack of long-lasting immunity posed a risk in terms of psychological response. There was a negative correlation between age and depression scores. No relation was found between the duration of hospitalization, presence of lung involvement, receiving intensive care treatment, losing a relative due to COVID-19 and psychological response.

Conclusions: On patients treated for COVID-19 infection, psychological response continue after discharge. Mental health support and efforts to reduce stigma among infected subjects can reduce the psychological impact caused by the pandemic.

Key words: COVID-19 – survivors – anxiety – depression - post-traumatic stress

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INTRODUCTION

In February 2019, a new type of coronavirus of unknown origin was detected in patients affected by pneumonia in Wuhan, China. The virus was named as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), and the associated disease was named 2019 coronavirus disease (COVID-19) (Gorbalenya et al. 2020). COVID-19 soon spread worldwide, and World Health Organization (WHO) declared the outbreak as a pandemic on March 11, 2020 (WHO 2020a). This study investigates the psychological response of people who were hospitalized with COVID-19 and later discharged.

Having a contagious disease can affect mental health. Symptoms of the disease, being isolated, complex drug treatments and side effects, being taken to intensive care or witnessing the death of a hospital roommate can cause traumatic effects (Xiao et al 2020, Xiang et al 2020, Huang et al. 2020). Fear of transmitting the disease to relatives or losing them, the anxiety of being excluded by society may cause mental impairment. (James et al. 2019). On the other hand, the virus itself may directly affect the central nervous

system, leading to the development of psychiatric disorders (Holmes et al. 2020, Sinanović et al. 2020).

Data from previous pandemic periods showed that these effects continue for many years, even if the disease is over and will have serious psychosocial consequences. For example Wing et al. showed that approximately 50 percent of the people who survived Severe Acute Respiratory Syndrome (SARS) needed psychiatric treatment even 3 years after the epidemic was brought under control (Wing et al. 2012). In the study conducted by Mak et al. on the 30th month after SARS, this rate was reported as 33.3% (Mak et al. 2009). Similarly, Park et al. found that 42.9% of those who survived Middle East Respiratory Syndrome (MERS) had post-traumatic stress disorder (PTSD) and 27.0% had depression at 12 months post-MERS (Park et al. 2020a). In a recent study, Liu et al. recorded that approximately half of the COVID-19 victims had depression and generalized anxiety disorder (GAD) (Liu et al. 2020). Considering that the number of people infected with COVID-19 worldwide exceeds 100 million (WHO, 2020b), it can be predicted that these rates will be much higher in the future.

Studies investigating the psychological response levels of COVID-19 victims are still limited (Liu et al. 2020, Zhu et al. 2020, Park et al. 2020b, Bo et al. 2020). In this study, it was aimed to investigate the prevalence of generalized anxiety disorder, depression, PTSD, and the factors that may be associated with them in patients who were hospitalized and then discharged due to COVID-19. Identifying these factors can guide the authorities about the measures to be taken to protect the mental health of the patients.

SUBJECTS AND METHODS

Study design and sample selection

The study was designed as a cross-sectional study. The approval for the study was obtained from the Health Sciences Non-invasive Ethics Committee, Malatya Inonu University (2020/1265).

This study was conducted on a total of 102 participants who were hospitalized for laboratory-confirmed COVID-19 infection and later discharged from Turgut Ozal Medical Center in Malatya, located in the eastern province of Turkey between March 1st and September 1st, 2020. The participants were treated in special inpatient services and intensive care units, which were separated from other patients, coordinated by the departments of infectious diseases, internal medicine, pulmonary medicine, and anesthesiology and reanimation. Clinical data and telephone numbers of the participants were obtained from the hospital's automation system. Data were collected between 15 and 30 November 2020. The number of patients treated between these dates was 836. Eighty-seven of the patients receiving treatment had died. Twenty-six patients were excluded because they were under 18 years old. Among the remaining patients, 250 people were selected by randomization. Sixty-eight people could not be reached. Out of 182 people reached, 102 of them agreed to participate in the study. Participants were informed by the researcher about the purpose and content of the study, and verbal consent was obtained. The questions regarding the data form and scales prepared for the study were asked to the participants on the phone, and their answers were recorded.

Data form

Participants answered the questions about their age, gender, educational status, body mass index (BMI), income level, employment status, with whom they lived, smoking status, chronic internal disease history (hypertension, diabetes, cardiovascular disease etc.), psychiatric disorder history, any infected relative and if they lost any of their relatives due to COVID-19. The participants were also asked whether their complaints continued after discharge.

In addition, participants' discrimination experiences were also investigated. In the present study, inspired by

similar study used by researchers to evaluate previous COVID-19 patients (Liu et al. 2020), a short 4-item scale of perceived discrimination was created. It included questions such as: "Have you been excluded by your family members because of your illness?", "Have you been excluded by the community or people at work?", "Have you ever felt that the people around you were afraid of you?" "Have you been subjected to insulting or ridiculing?" Each item was scored as "never" (score 0), "a little" (score 1), "moderate" (score 2), "severe" (score 3), and "very serious" (score 4). High scores indicated the height of perceived discrimination. The medical records of the participants were examined and the dates of hospitalization, duration of hospitalization, whether they received treatment in the intensive care unit, the treatment protocols applied and the findings in the chest tomography were recorded.

Evaluation of psychological response

To determine the psychological response of the participants, Generalized Anxiety Disorder Test-7 (GAD-7), Patient Health Questionnaire-9 (PHQ-9) and The National Stressful Events Survey PTSD Short Scale (NSESSS-PTSD) were used.

General Anxiety Disorder-7 (GAD-7)

GAD-7 is a 7-item self-report test developed by Spitzer et al. in compliance with the DSM-IV-TR criteria to evaluate generalized anxiety disorder (Spitzer et al. 2006). Each item is scored between 0 (not at all) and 3 (almost every day). According to the total scores that can be obtained from the scale, 5 indicates mild, ≥ 10 moderate, and ≥ 15 indicates severe anxiety. The Turkish validity and reliability of the scale was carried out by Konkan et al. (2013).

Patient Health Questionnaire-9 (PHQ-9)

PHQ-9 is a measure based on the Patient Health Questionnaire and questions 9 depression symptoms in compliance with the DSM-IV criteria (Kroenke et al. 2001). Each question is scored between 0 (not at all) and 3 (almost every day). According to the scoring system of the original questionnaire, scores between 1-4 were graded as minimal, 5-9 mild, 10-14 moderate, 15-19 moderate severe and 20-27 severe depression. The questionnaire was validated and reliably adapted to Turkish in 2016 by Sari et al. (2016).

The National Stressful Events Survey PTSD Short Scale (NSESSS-PTSD)

The National Stressful Events Survey PTSD Short Scale (NSESSS-PTSD) was developed and approved for inclusion in DSM-5 (LeBeau et al. 2014). NSESSS-PTSD consists of nine items, each assessing PTSD symptoms from four symptom clusters. The person is asked to rate the severity of symptoms that develop after a traumatic event on a 5-point scale (0 "not at all" - 4 "all the time"). The total score can range from 0 to 36.

The validity and reliability of the scale was made by Evren et al. (Evren et al. 2016). Similar to previous studies in this study (Liu et al. 2020), if at least one re-experiencing symptom, one avoidance symptom, two negative alterations in cognition or mood symptoms, and two arousal symptoms were present with a score of 2 (moderate) or higher, it was accepted as a significant level of PTSD.

Statistical analysis

The analyses were evaluated in the SPSS 22 package program (Statistical Package for Social Sciences; SPSS Inc. Chicago, IL). Descriptive data in the study were shown as n, % values in categorical data, and mean \pm standard deviation (mean \pm SD) values in continuous data. Chi-square analysis (Pearson Chi-square) was used to compare categorical variables between groups. The compliance of continuous variables to normal distribution was evaluated by Kolmogorov-Smirnov test. In comparison of paired groups, the Mann Whitney U test was used, and in comparison of more than two groups, the Kruskal Wallis test was used. Spearman correlation test was used in examining the relation of continuous variables with each other. Logistic regression analysis was used to calculate the risk of moderate and higher anxiety, depression and significant PTSD. The statistical significance level in the analyses was accepted as $p < 0.05$.

RESULTS

The relationship between demographic features, data of the disease and psychological response levels

A total of 102 participants, 45 (44.1%) female and 57 (55.9%) male, were included in the study. The average age of the participants was found as 44.4 ± 13.7 , and the mean BMI was found as 27.1 ± 3.8 . The highest level of schools completed by participants were primary school or below (42.1%), high school (27.5%), and university (30.4%). Moreover, 51% of them were employed and 86.3% were living with their spouse and child. While 35.3% of the participants had a chronic internal disease, 7.8% had a psychiatric disorder, and 15.7% of them were smoking. In the analysis performed to determine the psychiatric response levels of the participants, it was found that 20.6% of participants had moderate or above anxiety, 13.7% had moderate and above depression, and 21.6% had significant PTSD.

The median duration of hospitalization of the participants was 4 days (IQR = 1-6). Patients hospitalized in intensive care comprised 4.9% of the total, and the average length of stay in this unit was 7.4 ± 5.1 days. Also it was observed that the complaints continued in 71.6% of the patients after discharge. The PHQ-9 score of those whose complaints continued after discharge was obtained as significantly higher than the score of those without complaints ($p = 0.013$).

The lack of long-lasting immunity created anxiety in 68.6% of the patients. While any of the family members of 56.9% of the patients had been infected with COVID-19, 2.9% died due to COVID-19.

Radiological findings were observed in 77.9% of the patients who had chest CT. Cortisone was added to the treatment of 1.9% of the patients ($n = 2$), while the others (98.1%) received only antiviral treatment. This data was not included in the analysis, as the rates of cortisone treatment intake were low.

The GAD-7 ($p = 0.028$), PHQ-9 ($p = 0.029$) and PTSD ($p = 0.002$) scores of the women were found to be considerably higher than the scores of the men. The PHQ-9 score of those under 50 years of age was found significantly higher than those of the age group 50 and above ($p = 0.04$). The PTSD scale scores of those with chronic internal diseases were determined to be significantly higher than those without a chronic disease ($p = 0.01$). GAD-7 ($p < 0.001$), PHQ-9 ($p < 0.001$) and PTSD ($p < 0.001$) scores of those with psychiatric disorder were obtained significantly higher than those without psychiatric disorder. The GAD-7 ($p = 0.007$), PHQ-9 ($p < 0.001$) and PTSD ($p = 0.032$) scores of smokers were found to be significantly higher than the scores of non-smokers.

Scores of those who answered "yes" GAD-7 ($p = 0.003$), PHQ-9 ($p = 0.003$) and PTSD ($p = 0.009$) to the question: "Does the lack of long-lasting immunity cause you anxiety?" were observed significantly higher than of those who answered "no". Demographic features of the participants, the data of the disease and the scores of scales are given in Table 1.

Evaluation of scale scores according to hospitalization date

The hospitalization dates of the participants due to COVID-19 were respectively August (54.9%), July (19.6%), June (12.7%), April (5.9%), May (4.9%) and September (2%). There was a significant difference between the hospitalization dates of the patients in terms of GAD-7 ($p = 0.036$), PHQ-9 ($p = 0.049$) and PTSD ($p = 0.013$) scores. The lowest of the scale scores was seen in those receiving treatment in June, while the highest was seen in those receiving treatment in September. The results of the comparison of the hospitalization dates and scale scores of the patients are shown in Table 2.

Data on the perceived discrimination level experienced by the participants due to COVID-19

While 84.3% of the participants were never excluded by family members due to their illness, 4.9% were a little excluded, 4.9% moderately, 3.9% severely and 2% very seriously. The percentage of the patients who were never excluded by people in the community or workplace because of their illness was 41.2 whereas 4.9% were a little excluded, 31.4% of them moderately, 6.9% severely, and 15.7% were very seriously excluded.

Table 1. Comparison of demographic features, data of the disease and the scores of scales

	n (%)	GAD-7		PHQ-9		PTSD score	
		mean (±SD)	p	mean (±SD)	p	mean (±SD)	p
Gender			0.028		0.029		0.002
Female	45 (44.1)	6.3±6.2		5.8±5.3		9.7±10.3	
Male	57 (55.9)	3.8±4.9		3.6±5.0		4.1±7.5	
Age			0.795		0.04		0.475
<50	63 (61.8)	5.0±5.5		5.4±5.5		6.0±8.5	
≥50	39 (38.2)	4.7±5.8		3.2±4.6		7.4±10.4	
Education status			0.975		0.163		0.770
Primary	43 (42.1)	4.8±5.8		4.0±5.5		6.0±9.7	
High school	28 (27.5)	5.1±5.3		3.8±3.4		6.2±8.8	
University	31 (30.4)	4.9±5.7		6.1±6.0		7.5±9.1	
Profession			0.258		0.241		0.393
Employee	52 (51.0)	4.3±5.0		4.8±5.3		5.9±8.3	
Unemployed	37 (36.3)	6.1±6.3		5.1±5.6		8.1±10.5	
Retired	13 (12.7)	4.0±5.3		2.3±3.5		4.7±8.7	
Who do you live with?			0.918		0.151		0.564
Living alone	4 (3.9)	5.8±4.6		9.5±5.1		8.8±8.0	
Parent	10 (9.8)	4.4±6.2		4.9±4.1		3.8±7.3	
Spouse-child	88 (86.3)	4.9±5.6		4.3±5.3		6.8±9.5	
Chronic disease history			0.177		0.661		0.01
Yes	36 (35.3)	5.9±6.1		4.9±6.6		9.7±11.8	
No	66 (64.7)	4.3±5.2		4.4±4.4		4.8±7.0	
Psychiatric illness history			<0.001		<0.001		<0.001
Yes	8 (7.8)	13.3±5.9		11.1±8.7		20.4±12.7	
No	94 (92.2)	4.2±5.0		4.0±4.5		5.4±7.9	
Smoking			0.007		<0.001		0.032
Yes	16 (15.7)	8.3±7.0		8.9±8.0		11.1±12.2	
No	86 (84.3)	4.3±5.1		3.8±4.2		5.7±8.4	
CT finding			0.979		0.802		0.056
Yes	67 (77.9)	4.9±5.4		4.2±4.9		7.4±9.5	
No	19 (22.1)	4.9±5.5		4.3±3.9		3.9±7.1	
Intensive care history due to COVID-19			0.655		0.292		0.193
Yes	5 (4.9)	6.0±6.8		7.0±4.9		11.8±14.0	
No	97 (95.1)	4.8±5.6		4.5±5.2		6.3±8.9	
Do you have any complaints after discharge?			0.115		0.013		0.051
Yes	73 (71.6)	5.5±6.1		5.4±5.6		7.7±10.4	
No	29 (28.4)	3.5±3.8		2.6±3.3		3.7±4.5	
Does the lack of long-lasting immunity cause you anxiety?			0.003		0.003		0.009
Yes	70 (68.6)	6.0±5.9		5.6±5.7		8.2±10.1	
No	32 (31.4)	2.5±3.8		2.3±3.2		3.0±5.5	
Has any relative been infected with COVID-19?			0.991		0.278		0.750
Yes	58 (56.9)	4.9±5.7		4.1±4.7		6.3±8.9	
No	44 (43.1)	4.9±5.5		5.2±5.9		6.9±9.7	
Did any family member die due to COVID-19?			0.387		0.419		0.982
Yes	99 (97.1)	7.7±6.0		7.0±3.0		6.7±7.6	
No	3 (2.9)	4.8±5.6		4.5±5.3		6.5±9.3	

Mann Whitney U test was used in variables with two categories, and Kruskal Wallis test was used in more than two categories. Significance of $p < 0.05$ was accepted.

Table 2. Comparison of the scale scores according to the hospitalization dates of the survivors

	N (%)	GAD-7		PHQ-9		PTSD score	
		mean (±SD)	p	mean (±SD)	p	mean (±SD)	p
April	6 (5.9)	4.8±5.7		8.0±8.7		10.7±13.0	
May	5 (4.9)	9.4±6.4		4.4±4.0		3.6±4.8	
June	13 (12.7)	2.6±4.4	0.036	2.6±3.8	0.049	1.8±4.9	0.013
July	20 (19.6)	3.1±4.3		3.0±3.6		3.7±6.4	
August	56 (54.9)	5.4±5.7		4.7±4.9		7.9±9.7	
September	2 (2.0)	13.0±7.1		18.0±8.5		23.5±10.6	

Whereas 36.3% of the patients never felt that the people around them were afraid of them, 4.9% felt this a little bit, 34.3% moderately, 6.9% severely and 19.6% felt very seriously. Meanwhile 64.7% of the patients were never subjected to insulting and ridiculing, 15.7% of them were subjected very seriously. Data on the perceptions of discrimination experienced by the participants due to COVID-19 are shown in Table 3.

Risk factors leading to moderate and higher psychological response

When GAD-7 scale scores analysis was done by categorizing as moderate and above; the rate of women having moderate and above anxiety (31.1%) was significantly higher than the rate of men having moderate and above anxiety (12.3%) ($p=0.02$). The rate of those with psychiatric disorder having moderate and above anxiety (87.5%) was considerably higher than the rate of those without psychiatric disorder (14.9%) ($p<0.001$).

Similarly, when the PHQ-9 scores was categorized and analyzed, the rate of those with psychiatric illnesses moderate and above depression (50.0%) was found to be significantly higher than the rate of (10.6%) those without psychiatric illness ($p=0.012$).

The moderate and above rate of anxiety of smokers (43.8%) was determined significantly higher than the rate of non-smokers (16.3%) ($p=0.02$). The moderate and above rate of depression (43.8%) of smokers was

observed as significantly higher than the rate of non-smokers (8.1%) ($p=0.001$). The rate of those who experienced anxiety due to the lack of long-lasting immunity having moderate and above anxiety (90.5%) was found significantly higher than the rate of those who did not cause anxiety (9.5%) ($p=0.015$).

When the PTSD scale scores were categorized as significant and insignificant, the rate of women having significant PTSD (33.2%) was found to be significantly higher than that of men (12.3%) ($p=0.01$). Significant PTSDs of those with psychiatric disorder (75%) was found to be significantly higher than the rate of those without psychiatric disorder (17%) ($p=0.001$). Data on the analysis of risk factors that cause moderate and higher psychological response are shown in Table 4.

The relationship between measurable variables and levels of psychological response

There was a significant positive correlation among age, BMI and duration of hospitalization; and a significant negative relationship between age and PHQ-9. There was a significant positive correlation among GAD-7, PHQ-9 and PTSD. Likewise, a significant positive correlation was found between PHQ-9 and PTSD. There was a significant positive correlation between perceived discrimination scores and all scale scores. The relationship between measurable variables and psychological response levels is shown in Table 5.

Table 3. Perceived discrimination levels experienced by the participants due to COVID-19

	never	a little	moderate	severe	very serious
Have you been excluded by family members because of your illness?	86 (84.3)	5 (4.9)	5 (4.9)	4 (3.9)	2 (2.0)
Have you been excluded by the community or people at work?	42 (41.2)	5 (4.9)	32 (31.4)	7 (6.9)	16 (15.7)
Have you ever felt that the people around you are afraid of you?	37 (36.3)	5 (4.9)	35 (34.3)	5 (4.9)	20 (19.6)
Have you been subjected to insulting or ridiculing?	66 (64.7)	4 (3.9)	16 (15.7)	-	16 (15.7)

*Line percentage is used

Table 4. Analysis of the factors that lead to moderate and above psychological responses

	GAD-7				P	PHQ-9				P	PTSD score				P
	<10 (mild)		≥10 (moderate to severe)			<10 (mild)		≥10 (moderate to severe)			mild		severe		
	n	%	n	%		n	%	n	%		n	%	n	%	
Gender					0.020					0.291					0.010
Female	31	68.9	14	31.1		37	82.2	8	17.8		30	66.7	15	33.3	
Male	50	87.7	7	12.3		51	89.5	6	10.5		50	87.7	7	12.3	
Psychiatric illness history					<0.001					0.012					0.001
Yes	1	12.5	7	87.5		4	50.0	4	50.0		2	25.0	6	75.0	
No	80	85.1	14	14.9		84	89.4	10	10.6		78	83.0	16	17.0	
Smoking					0.020					0.001					0.106
Yes	9	56.3	7	43.8		9	56.3	7	43.8		10	62.5	6	37.5	
No	72	83.7	14	16.3		79	91.9	7	8.1		70	81.4	16	18.6	
Does the lack of long-lasting immunity cause you anxiety?					0.015					0.215					0.132
Yes	51	72.9	19	27.1		58	82.9	12	17.1		52	74.3	18	25.7	
No	30	93.8	2	6.3		30	93.8	2	6.3		28	87.5	4	12.5	

Spearman correlation analysis was performed. * $p<0.05$ ** $p<0.01$

Table 5. Correlation between age, BMI, duration of hospitalization and scale scores

		Age	BMI	Dur-of-hosp	GAD-7	PHQ-9	PTSD score
BMI	r	0.389**					
	p	0.000					
Dur-of-hosp	r	0.372**	0.026				
	p	0.000	0.794				
GAD-7	r	-0.099	0.057	-0.030			
	p	0.320	0.567	0.764			
PHQ-9	r	-0.198*	-0.054	-0.055	0.725**		
	p	0.046	0.589	0.584	0.000		
PTSD score	r	0.064	0.072	0.057	0.736**	0.790**	
	p	0.521	0.473	0.571	0.000	0.000	
Discrimination	r	0.143	0.132	0.144	0.290**	0.223*	0.253*
	p	0.152	0.187	0.150	0.003	0.025	0.010

Dur-of-hosp: Duration of hospitalization; Spearman correlation analysis was performed, * p<0.05; ** p<0.01

Table 6. Factors Related to Psychological Response Determined by Multivariate Logistic Regression Analysis

Variables	b coefficient (SE)	Odds ratio (95% CI)	p
Anxiety			
Gender (female)	1.171 (0.516)	3.2 (1.2-3.2)	0.023
Psychiatric illness history	3.689 (1.108)	40 (4.5-350.6)	0.001
Smoking	1.386 (0.582)	4 (1.2-12.5)	0.017
Lack of long-lasting immunity	1.721 (0.778)	5.6 (1.2-25.7)	0.027
Discrimination	0.141 (0.055)	1.2 (1.1-1.3)	0.01
Depression			
Psychiatric illness history	1.128 (0.782)	8.4 (1.8-38.9)	0.007
Smoking	2.172 (0.640)	8.8 (2.5-30.8)	0.001
Discrimination	1.120 (0.686)	1.2 (1.1-1.3)	0.049
PTSD			
Gender (female)	1.273 (0.513)	3.6 (1.3-9.7)	0.013
Psychiatric illness history	2.683 (0.861)	14.6 (2.7-79)	0.002
Discrimination	0.131 (0.053)	1.1 (1.05-1.2)	0.02

Logistic regression analysis was applied. Significance of p <0.05 was accepted

Risk factors determined by logistic regression analysis

According to the logistic regression analysis, being a woman (OR, 3.2, 95% CI [1.2-3.2]), having a psychiatric illness (OR, 40, 95% CI [4.5-350.6]), smoking (OR, 4, 95% CI [1.2-12.5]), anxiety caused by lack of long-lasting immunity (OR, 5.6, 95% CI [1.2-25.7]), and experiencing discrimination (OR, 1.2, 95% CI [1.1-1.3]) posed a risk for moderate and above anxiety.

Having a psychiatric illness (OR, 8.4, 95% CI [1.8-38.9]), smoking (OR, 8.8 95% CI [2.5-30.8]) and experiencing discrimination (OR, 1.2, 95% CI [1.1-1.3]) posed a risk for moderate and above depression.

Likewise, being a woman (OR, 3.6, 95% CI [1.3-9.7]), having a psychiatric illness (OR, 14.6, 95% CI [2.7-79]), and experiencing discrimination (OR, 1.1, 95% CI [1.05-1.2]) were found to be the risk factors for PTSD. Risk factors determined by multivariate logistic regression analysis are shown in Table 6.

DISCUSSION

In this study, significant results were obtained for determining psychological response and related factors

in discharged patients who were infected with COVID-19 within the first 6-month period of the pandemic.

In our study, based on the moderate and above psychological response rates, anxiety was found in 20.6% and depression in 13.7% of the patients although a period of at least 2 months after discharge passed. Even though this result is consistent with studies related to the pandemic, it was a high result in terms of the prevalence of mental illness among the general Turkish population as the prevalence for any anxiety disorder is 7.4%, and 7.3% for any mood disorder (Kılıç 1998). In addition, significant PTSD was detected in 21.6% of the participants. Bo et al. found the rate of PTSD to be 96.2% (Bo et al. 2020), and Liu et al. found 12.4% (Liu et al. 2020). Bo et al. conducted their studies in the pre-discharge period (severe symptoms, intensive treatment and isolation period), which was an expected result of high trauma rates during this period. On the other hand, Liu et al. conducted their studies in the first month after discharge, but in this study, only 32% of the patients had ongoing symptoms. This was considerably lower than the rates we achieved (71.6%). This difference may be due to the severity of the disease and the presence of ongoing symptoms as well as the time of

the research. We also found that PTSD rates could change over time, but did not disappear completely over the 6-month period. Considering that PTSD symptoms persist for many years and may impair the quality of life, this result indicates the need to pay attention to psychiatric follow-up of patients for a long time (Ahmed et al. 2020, Park et al. 2020b).

Another aim of our study was to identify the factors that lead to psychological response. In this study, as in the pre-pandemic studies (Lim et al. 2018, Olff 2017) it was observed that the psychological response levels of women were higher than men. Also, the presence of comorbid physical and psychiatric disorder were found to be factors associated with increased psychological response (COVID-19 Response Team 2020, Mei et al. 2021). In addition, the presence of ongoing symptoms was associated with depression.

Surprisingly, while increasing age led to prolonged hospital stays, it was a preventative factor, especially in terms of developing depression. The present finding was consistent with studies suggesting that older adults tend to have less negative emotions, better mental health, and less responsiveness to daily stress factors, and therefore experience less depression (Bruine 2021). Despite being shown as the target population for the COVID-19 pandemic (Surveillances 2020), this situation in older adults has led to the idea that these people can regulate their emotions by focusing on the positive and choosing activities and interactions that reduce stress (Carstensen et al. 2000, Neubauer et al. 2020, Neupert & Bellingier 2019). On the other hand, this result made us think about the possibility that elderly people may display inappropriate behaviors by ignoring the risk. Therefore, we believe that the follow-up of these people should not be neglected.

Although smoking is a particularly risky behavior for COVID-19 (Lohia et al. 2021) and quitting has been shown to be associated with many positive health effects, including improvement in lung function and respiratory symptoms (Rojnić et al. 2020), interestingly 16% of our participants continued to smoke. In addition, smoking was found to be associated with increased psychological response. Previous studies have also found a relationship between smoking and psychiatric disorders, but the mechanisms underlying this relationship have not been fully elucidated (Firth et al. 2020, Ho et al. 2019). The general view is that smoking is not a causal factor for anxiety and depression, the "self-medication" hypothesis seems more reasonable (Bjørngaard et al. 2013). Perhaps these people used smoking to relax while dealing with the pandemic or they did not want to quit smoking, thinking that their distress would be intensified. Although our study does not have a design to explain this causality, it may serve as a guide for future researches.

The lack of long-lasting immunity against COVID-19 has been found to be associated with high anxiety

scores in patients. It seems reasonable that the possibility of re-catching a disease for which there is no effective treatment yet and what complications it will cause in the future is a cause for concern.

Another result of our study was that the majority of the participants stated that they were more or less excluded by their environment, which was also a factor that determined both the occurrence and severity of all three psychiatric disorders. Indeed, considering that the stigma and discrimination are associated with psychological trauma that continues for many years (Park et al. 2020b, Liu et al. 2020), this result could determine the direction of the measures to be taken to protect the mental health of the patients. Because the exclusion of people by their environment even after their discharge will cause these people to regress in their social and professional areas and the feeling of shame, guilt, or worthlessness may lead to the deterioration of their mental health (Dar et al. 2020). On the other hand, stigma may cause patients to hide their disease, restrict their search for healthcare services, and display unhealthy behaviors (UNICEF 2020). This can pose a significant risk not only for personal health but also for public health.

Additionally, unlike the literature (Theano et al. 2020), in our study, no relationship was found between the duration of hospitalization, the presence of lung involvement, and intensive care treatment and psychological response. Although our working in a relatively small number of patient groups seems to have caused this difference, this result once again showed that the effect of COVID-19 on mental health surpasses physical illness (Torales et al. 2020).

This study has some limitations such as the low rate of intensive care patients, the fact that clinical severity is not classified, and the psychiatric evaluation is based on self-reporting. In addition, the results may not reflect the general population, as the study only covered patients in a particular region.

CONCLUSION

The psychological effects of COVID-19 continue after discharge and may cause significant mental illness in survivors. More than half of the patients, who were relatively severe enough to require hospitalization, had moderate and higher levels of anxiety, depression and PTSD after an average of 2 months after discharge. A history of psychiatric disorder and high discrimination perception were associated with all three mental illnesses. In addition, female gender, presence of comorbid diseases, smoking, and lack of long-lasting immunity of the disease were risk factors in terms of psychological response. Ensuring that these COVID-19 survivors receive psychological support and informing the public about stigmatization will benefit the long-term mental health of the society.

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Contribution of individual authors:

Neslihan Cansel: concept and design of the article; literature searches; writing and manuscript; approval of the final version.

Burcu Kayhan Tetik & Gülsüm Hilal Demir: collected the data, manuscript preparation.

Osman Kurt: performed the statistical analysis,

Bahri Evren & Aytac Yücel: literature research, manuscript preparation.

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