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Psychological state and predictors of psychiatric morbidity in COVID-19 patients six weeks after discharge

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ABSTRACT

To be able to detect possible psychological distress and long-term deterioration caused by COVID-19, following the patient, who has recovered, is crucial. Therefore, this study (i); aims to examine the ongoing fear-loss of control, the rate of anxiety, depression, and post-traumatic stress disorder levels following the 6th week after discharge; (ii) to examine the effect of post-traumatic stress disorder on anxiety, and depression and (iii) within the same context to reveal the developmental markers of psychiatric morbidity and the risk group. The study includes 180 patients who were hospitalized with COVID-19 diagnosis. Sociodemographic Data Form, the Hospital Anxiety Depression Scale and the Impact of Event Scale-Revised were used in the current study. High rates of symptoms of anxiety, depression, and PTSD were reported by the inpatients, as more than one-third scored above the anxiety and depression cut-off scores of borderline abnormal and abnormal. Also, 37.22 % of the participants reported the likely presence of PTSD symptoms. Anxiety and depression were significantly positively related to the symptoms of PTSD. The results suggest that there is psychiatric morbidity in anxiety, depression, and post-traumatic stress disorder and that especially posttraumatic stress poses a risk for other psychopathologies.

Introduction

Throughout human history, many pandemic periods have caused strong negative social, biological, and economic effects (Srivastava & Agrawal, 2020; Steardo et al., 2020). One of them, COVID-19, known as the new type of coronavirus, is a viral global disease that started in the Wuhan province of China in the last period of 2019 and spread all over the globe which then declared to be a pandemic by the World Health Organization (Dymecka et al., 2021; World Health Organization, 2020). Leading to adverse impacts on well-being and mental health and a variety of psychological problems, this disease, which is characterized by profiles ranging from mild symptoms to death; has brought about many social and biological difficulties and economic uncertainty (Gabutti et al., 2020; González-Sanguino et al., 2020; Niedzwiedz et al., 2020; Vindegaard & Benros, 2020). Some of the related disorders can be listed as anxiety, depression, post-traumatic stress disorder, panic disorder, compulsive handwashing behaviour, agoraphobia, and social media addiction (Bäuerle et al., 2020; Choi et al., 2020; Gao et al., 2020; Hyland et al., 2020; Mazza, Ricci, et al., 2020; Moreno et al., 2021; Sujarwoto et al., 2021).

Consistent with the literature review and information given above, it is noteworthy that the symptoms of depression, anxiety, acute stress disorder, post-traumatic stress disorder, and obsessive-compulsive disorder increased following the COVID-19 pandemic (Davide et al., 2020; Fardin, 2020; Forte et al., 2020; Hyland et al., 2020; Parker et al., 2021). In addition, the findings of previous studies suggest that the symptoms of

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posttraumatic stress and anxiety disorders in the first place and vulnerability to psychiatric morbidity among individuals hospitalized due to COVID-19 have been widely observed (Parker et al., 2021). However, positive emotions, psychological well-being and life satisfaction decreased (Hu et al., 2023; Li et al., 2020; Özmen et al., 2021; Qiu et al., 2020).

In light of the findings presented in the literature, pandemic processes affected the psychological health of individuals directly or indirectly in various ways (Pfefferbaum & North, 2020). Stress factors related to COVID-19 that influence mental health can be listed as loneliness, social isolation, financial losses, not being able to go to work/school, fear of infection, illness-related uncertainty, loss of loved ones, and hospitalization (Brooks et al., 2020; Dymecka et al., 2021; Chirico et al., 2022; Green et al., 2023; Moris & Schizas, 2020; Pfefferbaum & North, 2020; Usher et al., 2020). Hospitalization, among these factors, is defined by Karademas et al. (2009) as a negative event that lower and weaker the patients' resources. On the other hand, these patients also struggle with a very stressful situation due to negative conditions and risks such as uncertainty about treatment and progress, lack of social support, fear of infecting their loved ones, isolation and even death (Chua et al., 2004).

Some other studies demonstrate that staying in a hospital due to the pandemic, increases anxiety, depression, sadness, and psychological distress and that those stressors might cause long-term effects (Kamara et al., 2017; Kim et al., 2018). One research suggested that there was a dramatic decrease in the symptoms of anxiety during the two-week follow-up period after hospitalization because of COVID-19. Yet the symptoms of depression continued to be relatively permanent. Another result of the same study shows that 25 % of patients continue to have mild or high levels of acute stress disorder symptoms (Parker et al., 2021). On the other hand, studies focusing on the post-discharge period imply that symptoms of depression, anxiety, and post-traumatic stress disorder may persist even after the recovery (Bonazza et al., 2020; Pinkham et al., 2020; Rogers et al., 2020). In addition, high psychiatric morbidity was observed following hospitalization due to COVID-19 (Mazza, Ricci, et al., 2020; Wang et al., 2021).

Drawing upon the aforementioned literature findings, conducting follow-up assessments with recovered COVID-19 patients is important to identify potential psychological distress and long-term deterioration (Balachandar et al., 2020). Therefore, this study focuses on examining COVID-19 patients both during their hospital admission and after discharge. The primary objective is to investigate the prevalence of symptoms related to anxiety, depression, and post-traumatic stress disorder (PTSD) at the 6-week mark following discharge. Additionally, the study aims to analyse the influence of PTSD on anxiety and depression symptoms. Based on these objectives, it was hypothesized that patients would exhibit heightened levels of anxiety, depression, and PTSD symptoms. Furthermore, it was expected that increased levels of PTSD symptoms among patients would be positively correlated with elevated symptoms of anxiety and depression.

Method

Participants

A convenience sampling technique was used to recruit participants. The sample included 180 inpatient adults (67.78 % females), who have been diagnosed with symptoms of COVID-19 at a state and private hospital in Turkey. Patients ranged in age between 18 and 85 years, with a mean age of 46.58 years (SD = 16.19). Regarding demographic characteristics, participants were mostly married (67.78 %), had three children (20.56 %), completed primary school (40 %), had average monthly income (63.33 %), reported no chronic diseases (54.44 %), and traumatic experiences (73.89 %). Table 1 reports a detailed presentation of the participants.

Table 1
Demographic characteristics of participants.

Variable	Level	n	%
Gender	Female	58	32.22
	Male	122	67.78
Marital status	Single	33	18.33
	Married	122	67.78
	Widowed/ separated	11	6.11
	Unanswered	14	7.78
Number of children	No child	33	18.33
	1	15	8.33
	2	33	18.33
	3	37	20.56
	4	18	10.00
	5 and more	13	7.22
	Unanswered	31	17.22
Education level	Primary school	72	40.00
	Secondary school	18	10.00
	High school	35	19.44
	University graduate	40	22.22
	Unanswered	15	8.33
Income	Below average	44	24.44
	Average	114	63.33
	Above average	9	5.00
	Unanswered	13	7.22
Chronic diseases	No	98	54.44
	Yes	68	37.78
	Unanswered	14	7.78
Pre-determined psychiatric disorders	No	136	75.56
	Yes	31	17.22
	Unanswered	13	7.22
Pre-determined psychiatric disorders of relatives	No	128	71.11
	Yes	39	21.67
	Unanswered	13	7.22
Traumatic experiences	No	133	73.89
	Yes	33	18.33
	Unanswered	14	7.78

Measures

Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith, 1983). The HADS is commonly employed to assess the symptoms of anxiety and depression in different groups of adult patients. The HADS includes 14 items clustered into anxiety and depression subscales (7 items per subscale). Each question was based on a 4-point response category varying from 0 and 3, with possible scores varying between 0 and 21 for each subscale. The cut-off score for each subscale is as follows: normal = 0 ≤ anxiety/depression ≤ 7; borderline abnormal = 8 ≤ anxiety/depression ≤ 10; and abnormal = 11 ≤ anxiety/depression ≤ 21. Good evidence of reliability and validity has been presented in Turkish (Özer, 1998). In this study, Cronbach's alpha coefficients were found to be 0.78 for anxiety and 0.71 for depression.

Impact of Event Scale-Revised (IES-R; Horowitz et al., 1979). The IES-R includes 22 items that assess three common post-traumatic stress disorder symptoms (namely intrusion, avoidance and numbing, and hyperarousal) related to a specific life-threatening event. Each item is rated on a 5-point Likert scale varying between 0 (not at all) and 4 (extremely). For this study, we computed a total score, with a high score representing greater symptoms of post-traumatic stress disorder. A cut-off score of IES-R ≤ 29 refers to normal while a cut-off score of IES-R ≥ 30 shows the likely presence of post-traumatic stress disorder. Turkish translation of the IES-R produced satisfactory evidence of reliability and validity (Çorapçioğlu et al., 2006). In this study, Cronbach's alpha coefficient was found to be 0.93.

Procedure

The study was conducted on patients hospitalized with the symptoms of COVID-19 at Süreyyepaşa Chest Diseases and Thoracic Surgery

Training-Research Hospital and Ümraniye Training and Research Hospital between 15 May 2021 and 1 August 2021. Patients over the age of 18 who did not have any disease (e.g., mental retardation, dementia, deafness, and psychosis) that would prevent them from participating in the study, and who gave consent to participate in the study were included. The scales used in the study were applied to the patients who accepted to participate in the study, by telephone during the hospitalization and in the 6th week after discharge. All patients were ensured regarding the anonymity and confidentiality of responses.

Ethical statement

Informed consent was obtained from all the individual participants included in the current study. Ethical approval was obtained from the authors' university (University of Health Sciences, Istanbul; Approval Number: 116.2017.158-Dated 04.06.2020) before the data collection took place.

Data analysis

Cut-off scores were calculated for anxiety, depression, and PTSD, according to the previously reported literature to identify their frequencies. Descriptive statistics were reported to present participants' profiles. Four participants were removed from the dataset due to leaving most of the questions unanswered. No serious problems were determined concerning the distribution of the data, as skewness and kurtosis statistics varied between ±1, representing a very good normal distribution (West et al., 1995). Correlations between the variables were estimated by Pearson's correlation coefficients. Hierarchical multiple regression was carried out to examine the impact of PTSD on anxiety and depression scores. The data were analysed using IBM SPSS for Windows 25.0.

Results

The clinical description of the subjects is reported in Table 2. Nearly half of the sample (47.78 %) reported that their relatives had treatment for COVID-19. 8.89 % of the participants reported deaths of relatives due to COVID-19. The majority of them reported no need for intubation (98.89 %), or psychiatric consultation (96.11 %), and stayed at the hospital for five days (22.78 %). The most frequently observed clinical symptoms of the COVID-19 patients were cough (50.56 %), temperature (37.78 %), shortness of breath (36.67 %), fatigue (36.11 %), myalgic (23.89 %), back pain (10.56 %), headache (16.11 %), throat ache (8.89 %), headache (16.11 %), anosmia (7.78 %), backache (6.67 %), chest pain (6.67 %), and anosmia (7.78 %).

High rates of depression, anxiety, and PTSD symptoms were given by the inpatients, as more than one-third scored above the anxiety and depression cut-off scores of borderline abnormal and abnormal. Also, 37.22 % of the participants reported the likely presence of PTSD symptoms. Compared to males, females reported more common mental health problems and symptoms of PTSD. The results are reported in Table 3.

Table 4 presents descriptive statistics and correlation coefficients between the study variables. The values of skewness (0.61–0.82) and kurtosis (0.15–0.36) fell within the very good range of normal distribution. A Pearson correlation was carried out to explore the correlation between anxiety, depression, and PTSD. Depression and anxiety were significantly positively related to the symptoms of PTSD. The size of correlation coefficients ranged between 0.26 and 0.67.

We performed two hierarchical regression analyses with anxiety and depression being the dependent variables, while PTSD was entered into the model as an independent variable in Step 2. Age and gender were also added as covariates in Step 1. A summary of the results is given in Table 5. Gender ($\beta = -0.20$, $p < 0.05$) significantly predicted anxiety in Step 1 by explaining 5 % of the total variance, with females tending to experience greater symptoms of anxiety. The inclusion of PTSD ($\beta = 0.48$, $p < 0.01$) in the model resulted in a significant prediction of anxiety by explaining an additional 23 % of the total variance. Concerning depression, no significant result was observed regarding the role of age and gender in Step 1. PTSD significantly predicted symptoms of depression ($\beta = 0.26$, $p < 0.01$) by accounting for an additional 7 % of

Table 2
Experiences and observed clinical symptoms of the COVID-19.

Variable	Level	n	%
Relative treatment of COVID-19	No	79	43.89
	Yes	86	47.78
	Unanswered	15	8.33
Death of relatives due to COVID-19	No	148	82.22
	Yes	16	8.89
	Unanswered	16	8.89
Need for intubation	No	178	98.89
	Unanswered	2	1.11
Psychiatric consultation	No	173	96.11
	Yes	5	2.78
	Unanswered	2	1.11
Length of staying at the hospital	1	1	0.56
	2	7	3.89
	3	6	3.33
	4	21	11.67
	5	41	22.78
	6	17	9.44
	7	15	8.33
	8	23	12.78
	9	10	5.56
	10	5	2.78
	11	5	2.78
	12	7	3.89
	13	5	2.78
	14 and more	15	8.33
	Unanswered	2	1.11
Symptoms of COVID-19			
Temperature	No	110	61.11
	Yes	68	37.78
Cough	No	87	48.33
	Yes	91	50.56
	Unanswered	2	1.11
Phlegm	No	172	95.56
	Yes	6	3.33
	Unanswered	2	1.11
Fatigue	No	113	62.78
	Yes	65	36.11
	Unanswered	2	1.11
Headache	No	149	82.78
	Yes	29	16.11
	Unanswered	2	1.11
Myalgia	No	135	75.00
	Yes	43	23.89
	Unanswered	2	1.11
Backache	No	166	92.22
	Yes	12	6.67
	Unanswered	2	1.11
Backpain	No	159	88.33
	Yes	19	10.56
	Unanswered	2	1.11
Throat ache	No	162	90.00
	Yes	16	8.89
	Unanswered	2	1.11
Anosmia	No	164	91.11
	Yes	14	7.78
	Unanswered	2	1.11
Chest pain	No	166	92.22
	Yes	12	6.67
	Unanswered	2	1.11
Nausea vomiting	No	164	91.11
	Yes	14	7.78
	Unanswered	2	1.11
Shortness of breath	No	112	62.22
	Yes	66	36.67
	Unanswered	2	1.11

Table 3
Rates of anxiety, depression, and PTSD.

			Overall		Males		Females	
Variable	Cut-off score	Label	n	%	n	%	n	%
Anxiety	0 ≤ Anxiety ≤ 7	Normal	120	66.67	84	68.85	36	62.07
	8 ≤ Anxiety ≤ 10	Borderline abnormal	36	20.00	26	21.31	10	17.24
	11 ≤ Anxiety ≤ 21	Abnormal	24	13.33	12	9.84	12	20.69
Depression	0 ≤ Depression ≤ 7	Normal	111	61.67	79	64.75	32	55.17
	8 ≤ Depression ≤ 10	Borderline abnormal	37	20.56	23	18.85	14	24.14
	11 ≤ Depression ≤ 21	Abnormal	32	17.78	20	16.39	12	20.69
PTSD	IES-R ≤ 29	Normal	113	62.78	80	65.57	33	56.90
	IES-R ≥ 30	Likely presence of PTSD	67	37.22	42	34.43	25	43.10

Table 4
Descriptive statistics and correlation analysis.

	Descriptive statistics						Correlations		
Variable	Min	Max	Mean	SD	Skewness	Kurtosis	1.	2.	3.
1. Anxiety	0	20	6.23	4.07	0.61	0.15	–	0.67**	0.50**
2. Depression	0	19	7.00	4.14	0.82	0.36		–	0.26**
3. PTSD	0	74	27.28	16.23	0.70	0.18			–

** $p < 0.01$.

Table 5
Hierarchical regression analysis predicting mental health problems from the PTSD.

	Anxiety					Depression				
Variable	B	SE	β	t	*p*	B	SE	β	t	*p*
Step 1	$F(2, 165) = 4.13$, $p < 0.05$, $R = 0.22$, $R^2 = 0.05$					$F(2, 165) = 1.05$, $p > 0.05$, $R = 0.11$, $R^2 = 0.01$				
Age	−0.03	0.02	−0.10	−1.29	0.20	−0.02	0.02	−0.07	−0.96	0.34
Gender	−1.72	0.67	−0.20	−2.58	0.01	−0.76	0.69	−0.09	−1.10	0.27
Step 2	$F(3, 165) = 20.37$, $p < 0.01$, $R = 0.52$, $R^2 = 0.27$, $\Delta R^2 = 0.23$					$F(3, 165) = 4.53$, $p < 0.01$, $R = 0.28$, $R^2 = 0.08$, $\Delta R^2 = 0.07$				
Age	−0.02	0.02	−0.07	−1.09	0.28	−0.02	0.02	−0.06	−0.78	0.44
Gender	−1.40	0.59	−0.16	−2.39	0.02	−0.58	0.67	−0.06	−0.85	0.40
PTSD	0.12	0.02	0.48	7.09	0.00	0.06	0.02	0.26	3.37	0.00

the total variance. These findings suggest that those who experience symptoms of PTSD are more likely to suffer from the symptoms of depression and anxiety.

Discussion

This research aims to explore the prevalence of anxiety, depression, and PTSD among COVID-19 patients both at hospital admission and after 6 weeks of discharge. Additionally, it analysed the effect of PTSD on depression and anxiety. The results typically supported the hypotheses of this study.

Analysis of the patient's clinical characteristics indicated that nearly half of them and their relatives received COVID-19 treatment, with most staying in the hospital for approximately five days and reporting psychiatry consultations, which are consistent with previous research findings (Faes et al., 2020; Gold et al., 2020). Common clinical symptoms such as cough, fever, fatigue, and shortness of breath align with previous studies (Alimohamadi et al., 2020; Pullen et al., 2020). However, the demand for psychiatric consultation during hospitalization due to COVID-19 remains controversial (Balestrieri et al., 2021; Pignon et al., 2020). Despite this, considering the significant increase in psychiatric problems associated with the pandemic, it is essential to address the psychiatric treatment needs of COVID-19 patients (Choi et al., 2020; González-Sanguino et al., 2020; Hyland et al., 2020; Mazza, Ricci, et al., 2020; Niedzwiedz et al., 2020).

Psychiatric diagnoses of the inpatients indicated a high prevalence of symptoms related to PTSD, depression, and anxiety. Previous studies have similarly reported elevated rates of anxiety, depression, psychological distress, PTSD and other mental health problems in the early stages following hospital treatment (Gecer et al., 2023; Mazza, Ricci, et al., 2020; Parker et al., 2021). Earlier research documented that emotional reactions vary throughout the COVID-19 pandemic, with various negative feelings (e.g., fear of COVID-19, loneliness, psychological distress, and burnout) dominating in the early stages (Ekingen et al., 2023; Moroń et al., 2021; Yıldırım, 2021; Yıldırım & Ashraf, 2023; Yıldırım & Şanlı, 2023).

The gender-related findings of the current study indicated that women experienced higher levels of anxiety, depression and PTSD symptoms compared to men, consistent with existing literature (Bonazza et al., 2020; Dorri et al., 2021; Ustun, 2020). Women's vulnerability to anxiety-provoking situations and heightened emotional responses contribute to their increased mental health concerns during the COVID-19 pandemic (Hess et al., 2000; Li & Graham, 2017).

Bivariate correlation analysis demonstrates significant positive relationships between anxiety, depression, and PTSD, which are consistent with previous studies (Abramowitz et al., 2007). Hospitalization in isolation, uncertainty, and the fear of death contribute to anxiety symptoms, which, in turn, can lead to depression. The shared symptoms between depression and PTSD and their comorbidity further support the emerging relationships between the analysed variables (Horesh et al., 2017).

More importantly, the predictive analysis indicated that PTSD was a significant predictor for anxiety and depression, suggesting that individuals with PTSD are more likely to experience these comorbid negative conditions. Stressors such as lack of knowledge about the virus, hospital isolation, and fear contribute to this relationship, making the

challenging illness process a traumatic experience (Bonazza et al., 2020; Lazarus & Folkman, 1984). PTSD increases negative emotional difficulties, hopelessness, worries about the virus, and anxiety related to a distressing situation, consistent with the criteria for major depressive and general anxiety disorders (American Psychiatric Association, 2013; Horesh et al., 2017).

Hospitalized COVID-19 patients face a high risk of developing psychiatric symptoms due to factors such as isolation, severity of illness, treatment uncertainty, and iatrogenic effects (Karademas et al., 2009; Chua et al., 2004; Parker et al., 2021). Negative psychological effects stemming from reduced social support and loneliness during hospital stays also contribute to mental health challenges (Groarke et al., 2020; Li & Wang, 2020). All these factors seem to be associated with the emergence of mental health problems such as depression, hopelessness, and loss of interest and pleasure (American Psychological Association, 2013). The uncertainty and perceived life threat associated with COVID-19 can lead to depressive symptoms, while anxiety is heightened by the traumatic aspects of the virus and the helplessness experienced (American Psychiatric Association, 2013; Horesh et al., 2017).

Implications for practice

The findings of this study provide valuable insights into the impact of COVID-19 on various psychopathologies and highlight the persistence of these effects even after recovery. Specifically, our research reveals that COVID-19 patients are at risk for experiencing the symptoms of anxiety, depression, and PTSD, with post-traumatic stress being particularly influential in the development of other psychopathologies. Additionally, our results indicate that women may be more vulnerable to mental disorder symptoms compared to male participants. Given these findings, it is crucial for clinicians to be aware of the risk factors and psychiatric morbidity associated with patients experiencing COVID-19 symptoms. We recommend that healthcare professionals consider personalized psychological interventions to enhance the well-being of these patients and mitigate the continuation and long-term effects of mental health problems. Acknowledging these implications can improve the overall care and support provided to individuals affected by COVID-19.

Strengths and limitations

This study assesses the psychological state of COVID-19 patients after being discharged from the hospital. Therefore, the research is unique and, in this regard, differs from many other studies regarding the same debates. More importantly, because the study is the first to determine the fear-loss of control, anxiety-depression levels, the frequency of post-traumatic stress disorder and the risk group developing psychiatric morbidity as of the 6th week after discharge, it will highly contribute to the literature related to COVID-19 psychiatric symptoms and disorders. Yet another strength is that the participant group consists of individuals between the ages of 18–85 which suggest the strongness of the data we collected despite the difficulties of the pandemic.

However, although we studied with a wide age range group, the majority of the participants are women, their education level is at primary school level, and the scales are based on self-report. These issues are limitations of the study we should mention. To be able to generalize the findings to the population, future studies should work after equalizing the demographic variables. Furthermore, although there were participants with pre-determined psychiatric diagnoses in the study, their number was lower compared to the undiagnosed group. Therefore, it is difficult to generalize the data obtained from this clinical sample to COVID-19 patients, who were diagnosed with major depressive disorder, anxiety disorders, and post-traumatic stress disorder.

Declaration of competing interest

The authors declared no conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data availability

The data for this study are available from the corresponding author upon reasonable request.

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Ethical approval

Ethical approval was obtained from the authors' university (University of Health Sciences, Istanbul; Approval Number: 116.2017.158-Dated 04.06.2020) before the data collection took place. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent

Consent was obtained from all participants included in the study.

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