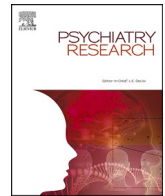




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The effect of the COVID-19 pandemic on health behavior and psychopathology in patients with psychotic disorders

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ABSTRACT

In our study we aimed to investigate the effect of the pandemic period on disease severity, medication adherence, suicidal behavior, physical health and health behavior in patients with psychotic disorders. 255 patients with any of the diagnoses of Schizophrenia, Schizoaffective Disorder, Delusional Disorder, Bipolar Disorder with psychotic features and Major Depressive Disorder with psychotic features were included, 200 were assessed by telephone and 55 face-to-face. The patient's sociodemographic status, cigarette-alcohol use, physical diseases, body weight, suicidal behaviors, and the effects of the pandemic period on general health were assessed. Clinical global impression scale (CGI) and modified medication adherence scale (MMS) were also administered. We showed that the MMS scores of the patients significantly decreased compared to the pre-pandemic period. In our study, suicidal behavior and decrease in medication adherence during the pandemic period were found to be correlated with higher scores of CGI-Severity and Improvement Scale. Our study is one of the few studies that addresses the effects of the pandemic period on patients with psychotic disorders. The results show that the pandemic period is associated with an increase in negative health behavior and clinical worsening in patients with psychotic disorders. In order to confirm these findings, more research is needed in this area.

1. Introduction

The atypical pneumonia cases that were first seen in December 2019 in Wuhan City of the Republic of China, were later named as the COVID-19 disease (Russell et al., 2020). Given the rapid spread of COVID-19 to other countries, the World Health Organization (WHO) declared COVID-19 as a pandemic (WHO, 2020). Social distancing, which was one of the most important preventive measures to curb the spread of COVID-19, also leads to some undesirable consequences (Center for Disease Control et al., 2003). Patients with psychotic disorders can experience the preventive measures such as quarantines more adversely compared to the general population (Anglin et al., 2020).

Again, compared to the general population prior to the pandemic, patients with psychotic disorders are known to demonstrate negative health behaviors and have worse physical health (Martland et al., 2021). Preventative measures for COVID-19 can adversely affect the physical health due to a decrease in physical activities, changes in eating habits, and increase in unhealthy coping methods coupled with the stress of staying at home for prolonged periods of time. The lack of priority for physical health by health providers, low health literacy rates, and

communication difficulties due to symptoms are among the barriers that limit these patients' ability to receive physical healthcare services on an ongoing basis (Melamed et al., 2020). Healthcare professionals who are not familiar with the characteristics of psychotic disorders may exacerbate the already widespread stigmatization and discrimination that hinder health-seeking behavior in this patient group (Clement et al., 2015; DeCoux, 2005). Therefore, disruptions in accessing non-psychiatric healthcare services are highly likely for patients with psychotic disorders during the pandemic period, especially when the combined effect of all these factors are taken into account (Melamed et al., 2020).

Low medication adherence being one of the biggest obstacles to maintaining the well-being of this patient group, the changes in the delivery of non-emergency health services caused by the pandemic measures may further deteriorate treatment compliance (Hasson-Ohayon and Lysaker, 2020; Kikkert and Dekker, 2017). Due to social distancing rules, the social relations of the patients may be further interrupted. As a result, individuals may become more introverted and turn to unhealthy coping methods with stress, such as smoking and alcohol use. The increase in the expressed emotions in the family

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environment due to the measures that enforce staying at home can have a negative effect on the patient (Brown et al., 2020). Furthermore, it has been observed in previous pandemics that social isolation may increase the risk of suicide in this group of patients (Cheung et al., 2008).

With the COVID-19 pandemic, significant changes have occurred in the provision of healthcare services all over the world (Lynch et al., 2020). The measures taken to prevent the spread of the virus, have brought along some difficulties which also affected the access to health services (Li et al., 2021). This change is especially critical for patients with psychotic disorders, whose need for accessing healthcare services is indispensable (Donahue et al., 2021). Systematic reviews consistently demonstrated the appropriateness of healthcare delivery through telepsychiatry for patients with psychotic disorders (Amarendran et al., 2011; Gire et al., 2017). Thus, telepsychiatry applications may be an option for ensuring the continuity of the treatment, which is vital for the patients with psychotic disorders.

Although the distinction between affective and non-affective psychosis is robust in clinical practice, increasing evidence on overlapping etiology, clinical symptoms, and long-term functionality in recent years has suggested that there may be a continuity between these disorders (Craddock and Owen, 2010; Torrent et al., 2018). Conflicting results have been obtained in studies on the comparison of long-term course differences. There are studies reporting higher severity of positive, negative, and cognitive symptoms in non-affective psychotic disorders, whereas some studies determined no significant difference between affective and non-affective psychosis groups (Martin et al., 2015; Ramain et al., 2022; Stefanopoulou et al., 2009; Torrent et al., 2018; Yen et al., 2009). Additionally, some studies reported similar controversial results in the evaluation of long-term psychosocial functionality. Even though some studies described impairments in functionality during the course of the disease in patients with affective and non-affective psychoses, other studies demonstrated that patients with affective psychoses had a higher social functioning level (Martin et al., 2015; Tarbox et al., 2012), better quality of life, and higher insight level compared to patients with non-affective psychoses. Many long-term follow-up studies report similar levels of outcomes for affective and nonaffective psychosis considering the quality of social relations, independent living skills, and general functionality levels, in contrast to the expectation that affective psychosis will fare much better especially in terms of functionality (Conus et al., 2006; Ramain et al., 2022; Torrent et al., 2018).

Studies on psychotic disorders seem to decrease in pandemic periods, as it is the case in the current and previous pandemics alike. The studies conducted in these periods focus mostly on increases in cases of psychosis, relapses due to stress and social isolation, and depression-anxiety levels (Fleischmann et al., 2021; Kaskow et al., 2014). The literature on the effects of the pandemic on patients with psychotic disorders concerning their physical health, their treatment adherence, suicidal behavior, and resorting to unhealthy coping methods with stress, such as smoking and alcohol use, is not very extensive. In this context, the objective of this study is to investigate the effects of the pandemic period on disease severity, medication adherence, suicidal behavior, physical health parameters, and health behaviors in the patients with psychotic disorders. Moreover, there are considerations about whether affective and non-affective psychotic disorders are independent assessments, or whether they should be evaluated within a spectrum; thus, our study aims to compare both groups of patients in the pandemic period.

The primary hypotheses of this study were that during the pandemic period, (i) there may be worsening in suicidal behavior, medication adherence, and disease severity in patients with psychotic disorders, and (ii) there may be a deterioration in physical health linked with the increase in cigarette and/or alcohol consumption, weight gain, and worsening of physical health in patients with psychotic disorders. The secondary hypothesis of this study was that the patients with psychotic disorders group will adapt to telephone interviews to a large extent, and telephone interviews will be a suitable method for assessment.

2. Methods

2.1. Participants

This study has been designed as a cross-sectional study for evaluating the effects of the pandemic on the psychopathology and health behavior of patients with psychotic disorders. The study protocol was approved by the Human Research Ethics Committee of Ankara University, Faculty of Medicine with the decision number I3-193-21 dated February 11th, 2021.

In the study, 305 patients between the ages of 18-65, who were treated at outpatient or inpatient clinics at Ankara University Faculty of Medicine, Department of Mental Health and Diseases between 01.01.2019-31.09.2021 with at least one diagnosis of schizophrenia, schizoaffective disorder, delusional disorder, bipolar disorder with psychotic features, and major depressive disorder with psychotic features (according to ICD-10 criteria) were included. Of these patients, 65 were invited for face-to-face interviews, but 10 of them did not accept to participate in the study. Thus 55 patients were included for the face-to-face assessment group. On the other hand, randomly selected 240 patients were contacted for the telephone interview. Of these patients, 27 of them refused to participate in the study. A total of 13 were excluded; 3 for suspected mental retardation, 2 for hearing problems, 2 for substance (both for cannabis) use in the last month, and 6 for accessibility problems with the telephone. Those with accessibility problems were invited to the clinic for a face-to-face interview, but 2 of them were out of the city, and 4 of them refused the invitation due to pandemic conditions. Whether the patients had used any substances other than alcohol and cigarettes in the last month was questioned with a yes/no question, and those who answered 'yes' were asked to provide details on which substance they used. Briefly, a total of 37 patients refused to participate in face-to-face or telephone interviews. Finally, a total of 255 patients 200 of whom were interviewed by telephone and 55 through face-to-face interviews were included in the study. Patients with admission to the outpatient clinic were included in the face-to-face interview group. The patients were evaluated by a post graduate 4th year medical resident under the supervision of a consultant physician.

2.2. Data collection tools

2.2.1. Sociodemographic and clinical characteristics data form

Sociodemographic and Clinical Characteristics Data Form₇ is a self-report form to collect data about the sociodemographic characteristics, changes in physical and mental health during the pandemic, physical disease diagnoses during the pandemic, cigarette/alcohol use, weight, and suicide thoughts and attempts before and after the pandemic. Information about the pre-pandemic physical diseases, and cigarette/alcohol use was obtained from the medical records of the patients. To assess the effect of the pandemic, the participants were asked, "How was your physical health and mental health affected during the pandemic?" and they were asked to choose the most suitable option from the choices of "worsened," "unchanged," or "improved." The Sociodemographic and Clinical Characteristics Data Form can be found in the Supplementary Material.

2.2.2. Clinical global impression scale (CGI)

The CGI has been developed by Guy et al. to evaluate the clinical severity and course of mental disorders (Guy, 1976). It has three components. The first component, the severity subscale (CGI-S), is assigned a score between 1 and 7 (1: not at all ill; 2: borderline mentally ill; 3: mildly ill; 4: moderately ill; 5: markedly ill; 6: severely ill; 7: most extremely ill) according to the severity of the disease. The second component, the improvement subscale (CGI-I), evaluates to what extent and in what direction the patient's condition has changed since the beginning of the process, and it is assigned a score between 1 and 7 (1: very much improved since the initiation of treatment; 2: much improved;

3:minimally improved; 4:no change from baseline; 5:minimally worse; 6: much worse; 7:very much worse) (Guy, 1976). Both assessments were used in this study. In addition to the interview, the patient's past medical records were also considered during the evaluation of the CGI scores.

2.2.3. Modified Morisky Medication Adherence Scale (MMS)

Although the Morisky Medication Adherence Scale, which was developed by Morisky et al. to evaluate compliance with the treatment of chronic diseases, showed good psychometric properties and provided sufficient information about medication use, it is reported that this scale was inadequate in terms of evaluating the continuity of medication use (Vural et al., 2012). Therefore, the final form of the modified Morisky scale was created with additional two questions to the original four-question scale (Morisky et al., 1986; Wang et al., 2012). Vural et al. conducted the validity and reliability studies of the scale on the Turkish population (Vural et al., 2012). The scale has been used in numerous studies in Turkey (Çibik, 2016; Erdaş, 2020; Kara et al., 2017). In the present study, this scale was utilized to evaluate the drug compliance of patients before and during the pandemic, and it was scored based on patients' statements.

2.3. Statistical analysis

Analyses were carried out using the SPSS 23.0 (Statistical Package for Social Sciences for Windows, Version 23.0, IBM Corp., Armonk, NY, U.S., 2015) software package. Among the descriptive statistics, categorical variables were expressed as ratios and percentages, while numerical variables were expressed as means, standard deviations, and median values. The distribution of the numerical variables was analyzed with the Shapiro-Wilk test if $n < 50$ and with the Kolmogorov-Smirnov test if $n \geq 50$. Given that the parametric test criteria were not met, comparisons between two independent groups were made with the Mann-Whitney U test, and the comparisons between two dependent groups were performed with the Wilcoxon test. Comparisons between more than two independent groups were made with the Kruskal-Wallis test, and in the event of a significant difference, the group or groups that caused the difference was analyzed with the Dunn's Multiple Comparisons test. The relationships between numerical variables were evaluated using Spearman's rank correlation coefficient. The relationships between categorical variables were analyzed by chi-squared tests. Pearson's chi-squared test was used in the cross tables where the ratio of cells with an expected ratio below 5 did not exceed 20%, whereas Fisher's exact test was used in the cross tables where the ratio of cells with an expected ratio below 5 exceeded 20%. The relationship between the two dependent percentages was analyzed using McNemar's test. The significance level was deemed as 0.05.

3. Results

3.1. Sociodemographic and clinical characteristics

The mean age of the patients was 40.6 ± 11.6 years, and 40% of them were female. The most common diagnosis was schizophrenia (61.9%). The mean weight of the patients at the time of the assessment was 81.5 kg compared to 77.89 kg, the mean weight before the pandemic. The sociodemographic and clinical characteristics of the patients are summarized in Tables 1 and 2.

3.2. Physical health

During the pandemic period, the weights of the patients increased highly significantly ($Z: -9.315, p < 0.001, r: -0.58$). There was a significant, moderate relationship between the extent of change in weight and the extent of change in the physical health level during the pandemic period ($H: 25.271, p < 0.001, \eta^2: 0.1$). The analysis of this significant difference revealed that the group of patients who reported worsening in

Table 1
Participant demographic characteristics.

	(n)	(%)
Interview		
Telephone	200	78.4
Face-to-Face	55	21.6
Diagnosis		
Schizophrenia	158	61.9
Schizoaffective Disorder	38	15
Delusional Disorder	10	3.9
BD, Psychotic Features	40	15.6
MDD, Psychotic Features	9	3.6
Diagnosis		
Affective Psychosis	49	19.2
Non-Affective Psychosis	206	80.8
Gender		
Female	102	40
Male	153	60
Marital Status		
Married	81	31.7
Single	133	52.1
Divorced	37	14.5
Widower	4	1.7
Employment Status		
Employed	70	27.5
Retired	55	21.5
Not Employed	130	51
Loss of Income During Pandemic		
Yes	50	19.6
No	205	80.4
	Mean \pm SD	Median
Age	40.69 \pm 11.6	41
Education (years)	11.16 \pm 3.7	12

BD:Bipolar Disorder MDD: Major Depressive Disorder, SD:Standard deviation.

their physical health during the pandemic period had gained significantly more weight. The number of cigarettes and amount of alcohol consumed by the patients during the pandemic period also rose significantly, with a moderate increase for cigarette and a small increase for alcohol ($Z: -6.749, p < 0.001, r: -0.42$ for cigarette consumption, $Z: -2.943, p: 0.003, r: -0.18$ for alcohol consumption).

3.3. Suicidal behavior

While 35.6% of the patients stated that they had suicidal ideation at some time in their lives before the pandemic, 40.7% of the participants said that they had suicidal ideation during the pandemic period. In contrast, 16.4% and 11.3% of the patients attempted suicide at some time in their lives before and during the pandemic, respectively. Additionally, it was determined that 68.9% of the patients who attempted suicide during the pandemic period had suicidal ideation before the pandemic, and 37.9% had attempted suicide before the pandemic. In patients with schizophrenia, the prevalence of pre-pandemic suicidal thoughts and attempts were 34.8% (55/158) and 13.9% (22/158), while the prevalence of during pandemic suicidal thoughts and attempts were 43.7% (69/158) and 12% (19/158), respectively.

The analysis of the relationship between sociodemographic and clinical variables with suicidal ideation and suicidal attempt during the pandemic period revealed that 27 (54%) of the 50 patients who lost their income during the pandemic period reported suicidal ideation, whereas 37% of the patients who did not lose their income during the pandemic period reported suicidal ideation. Accordingly, suicidal ideation was significantly more frequent in the group with income loss during the pandemic than in the group without any income loss, but the effect size was small ($\chi^2 (1) = 4.498, p: 0.034, \Phi: 0.13$).

Additionally, suicidal ideation and suicide attempt during the pandemic period were found to be significantly higher in the patient group who had a significantly higher decrease in the MMS score (whose medication adherence decreased more), and the effect sizes were moderate for suicidal ideation and small for suicidal attempt ($Z: -7.763,$

Table 2
Participant clinical characteristics.

	(n)	(%)
Physical Comorbidity		
Yes	82	32.1
No	173	67.9
During Pandemic Diagnosed with a New Physical Disease		
Yes	37	14.5
No	218	85.5
Cigarette Use		
Yes	152	59.6
No	103	40.4
Pre-Pandemic Cigarette Use		
Yes	145	56.8
No	110	43.2
Alcohol Use		
Yes	31	12.1
No	224	87.9
Pre-Pandemic Alcohol Use		
Yes	28	10.9
No	227	89.1
The effects of the pandemic period on physical health		
Worsened	84	33
Unchanged	156	61.1
Improved	15	5.9
The effects of the pandemic period on mental health		
Worsened	110	43.1
Unchanged	119	46.7
Improved	26	10.2
	Mean ± SD	Median
Weight	81.5 ± 14.1	80
Pre-Pandemic Weight	77.89 ± 13.1	77
Daily cigarette consumption	15.03 ± 16.2	10
Pre-Pandemic Daily cigarette consumption	11.14 ± 13.7	5
Number of Standard Drinks per week	1.18 ± 4.6	0
Pre-Pandemic Number of Standard Drinks per week	0.78 ± 3.3	0
CGI-Severity (CGI-S) Score	4.39 ± 1.2	5
CGI-Improvement (CGI-I) Score	4.48 ± 1.1	4

CGI: Clinical Global Impressions Scale SD:Standart deviation
One Standard Drink: The Drinks containing 12-14 grams of ethyl alcohol (330 ml beer, 1 glass (140 ml) wine, 1 single (40 ml) vodka-whisky-gin-raki) (Buzrul, 2016).

$p < 0.001$, r : -0.48 and Z : -4.214, $p < 0.001$, r : -0.26, respectively) (Table 3).

3.4. Medication adherence

MMS scores of 115 (45%) patients, decreased during the pandemic

Table 3
The relationship between changes in medication adherence and suicidal behaviors during the pandemic period.

	Changes in the MMS score		
	Mean ± SD	Median	Statistics, p-values
During Pandemic Suicidal Ideation			
Yes	-1.66 ± 1.2	-2	Z : -7.763 r : -0.480 $p < 0.001^a$
No	-0.49 ± 1.3	0	
During Pandemic Suicide Attempt			
Yes	-2.26 ± 1.9	-2	Z : -4.214 r : -0.260 $p < 0.001^a$
No	-0.38 ± 1.2	0	

MMS: Modified Medication Adherence Scale a: Mann-Whitney U Test SD. Standart deviation.

period compared to the pre-pandemic period. On the other hand, there was no significant change in the MMS scores of 109 (42.7%) patients. A comparison of the MMS scores before and during the pandemic revealed a significant, moderate decrease in patients' medication adherence during the pandemic period (Z : -6.717 $p < 0.001$, r : -0.42).

3.5. Mental health during the pandemic period

Of all patients, 46.7% stated that there was no change in their mental health during the pandemic period, whereas 43.1% of the patients declared that their mental health worsened. A highly significant correlation was found between decreased medication adherence during the pandemic and the level of worsening in mental health (H : 87.071, $p < 0.001$, η^2 : 0.34) (Table 4).

3.6. CGI-severity and CGI-improvement scores

A moderately significant and positive relationship was found between decreased medication adherence and CGI-S scores during the pandemic period ($p < 0.001$, r : 0.498). Patients with suicidal ideation and suicidal attempt during the pandemic period had significantly higher CGI-S scores than those who did not have suicidal ideation and suicidal attempt during the same period, and the effect sizes were large for suicidal ideation and small for suicidal attempt (Z : -9.143, $p < 0.001$, r : -0.57 and Z : -4.107, $p < 0.001$, r : -0.26, respectively).

Additionally, CGI Improvement Subscale (CGI-I) scores revealed that the number of patients whose condition deteriorated (patients with a CGI-I score of 5 and above) during the pandemic period was 124 (48.6%), whereas that the number of patients whose condition did not change (patients with a CGI-I score of 4) was 95 (37.3%).

The CGI-I scores of the patient groups with suicidal ideation and suicide attempt during the pandemic period were significantly higher than those of the patient groups without suicidal ideation and suicide attempt during the same period, and the effect sizes were large for suicidal ideation and moderate for suicidal attempt (Z : -10.281, $p < 0.001$, r : -0.64 and Z : -7.002, $p < 0.001$, r : -0.44, respectively). There was a highly significant and positive correlation between the decrease in the medication adherence scores during the pandemic period and the CGI-I scores ($p < 0.001$, r : 0.704).

3.7. Differences between affective and non-affective psychoses

Of the 255 patients included in the study, 49 (19.2%) had affective psychosis (psychotic bipolar disorder and psychotic major depressive disorder), and 206 (80.8%) had non-affective psychosis (schizophrenia, schizoaffective disorder, and delusional disorder). The ratios of females were 55.1% in the affective and 36.4% in the non-affective psychosis groups. While married patients constituted 44.9% of the affective psychosis group, 28.6% of the non-affective psychosis groups were married.

Table 4
The relationship between changes in medication adherence during the pandemic period and the effects of the pandemic period on mental health.

	Changes in the MMS score		
	Mean ± SD	Median	Statistics, p-values
The effects of the pandemic period on mental health			
Worsened	-1.41 ± 1.2	-2	H :87.071
Unchanged	-0.26 ± 0.9	0	η^2 : 0.34
Improved	1.04 ± 1.2	1	$p < 0.001^a$

MMS: Modified Medication Adherence Scale
^a : Kruskal-Wallis Test, SD. Standart deviation

In this respect, female and married patients were found to be significantly more common in the affective psychosis group than in the non-affective psychosis group, but the effect sizes were small ($\chi^2(1) = 5.764, p:0.016, \Phi:0.15$ and $\chi^2(1) = 4.827, p:0.028, \Phi:0.14$, respectively).

The comparative analysis of the affective and non-affective psychosis in terms of clinical variables, on the other hand, revealed a significant difference between the groups in the rate and amount of alcohol consumption during the pandemic period. According to the results, both the number of patients using alcohol and the amount of alcoholic drinks consumed per week were found to be significantly higher in the affective group compared to the non-affective group, and the effect sizes were small in the affective group and large in the non-affective group ($\chi^2(2) = 5.102, p:0.037, \Phi:0.14$ and $Z: -8.544, p < 0.001, r: -0.53$, respectively). Comparisons of the two groups in terms of other sociodemographic and clinical characteristics are presented in Table 5.

3.8. Differences between the patients who participated in the study by telephone interviews and face-to-face interviews

The rate of suicide attempts and CGI-I scores during the pandemic period were significantly higher in patients who were assessed by face-to-face interviews compared to the telephone interview group, but the effect sizes were small ($\chi^2(1): 17.589, p < 0.001, \Phi:0.26$ and $Z: -2.437,$

Table 5
Sociodemographic and clinical characteristics of affective and non-affective psychoses.

	Diagnosis		Statistics, p-values
	Affective Psychoses (n=49)	Non-affective Psychoses (n=206)	
During Pandemic Loss of Income, n / %			
Yes	8 / 16.3%	42 / 20.4%	$\chi^2(1) = 0.414$ $p:0.520^a$
No	41 / 83.7%	164 / 79.6%	
During Pandemic Suicidal Ideation, n / %			
Yes	18 / 36.7%	86 / 41.7%	$\chi^2(1) = 0.412$ $p:0.521^a$
No	31 / 63.3%	120 / 58.3%	
During Pandemic Suicide Attempt, n / %			
Yes	7 / 14.3%	22 / 10.7%	$\chi^2(1) = 0.511$ $p:0.475^a$
No	42 / 85.7%	184 / 89.3%	
The effects of the pandemic period on mental health, n / %			
Worsened	25 / 51%	85 / 41.3%	$\chi^2(1) = 1.683$ $p:0.431^a$
Unchanged	19 / 38.8%	100 / 48.5%	
Improved	5 / 19.2%	21 / 10.2%	
Variables	Mean ± SD [Median]	Mean ± SD [Median]	
Age	41.06 ± 9.8 [42]	40.60 ± 12 [40]	$Z: -0.527$ $p:0.598^b$
Education(years)	11.53 ± 3.8 [12]	11.07 ± 3.7 [12]	$Z: -0.750$ $p:0.453^b$
CGI-Severity (CGI-S) Score	4.14 ± 1.2 [4]	4.45 ± 1.2 [5]	$Z: -1.670$ $p:0.095^b$
CGI-Improvement (CGI-I) Score	4.45 ± 1.2 [4]	4.49 ± 1.1 [4]	$Z: -0.029$ $p:0.977^b$
During Pandemic MMS Score	4.63 ± 1.6 [5]	4.36 ± 1.7 [5]	$Z: -0.982$ $p:0.326^b$
Changes in the MMS score	-0.67 ± 1.1 [0]	-0.61 ± 1.4 [0]	$Z: -0.005$ $p:0.996^b$

CGI: Clinical Global Impressions Scale MMS: Modified Medication Adherence Scale

^a : Chi-squared Test

^b : Mann-Whitney U Test, SD. Standard deviation

$p:0.016, r: -0.15$ respectively). The rate of those whose mental health deteriorated during the pandemic period was found to be significantly higher in the face-to-face interviews group (60%) compared to the telephone interviews group (38.5%) ($p:0.015$). Comparisons of the two groups in terms of other sociodemographic and clinical characteristics are demonstrated in Table 6.

4. Discussion

There are a few studies in the literature in which one or more of the factors of disease severity, medication adherence, health behavior, and suicidal behavior in patients with psychotic disorders during the pandemic period have been investigated. However, none of these studies except for the present study addressed all these factors together. Additionally, there is no other study in the literature that comparatively addressed the effect of the pandemic on patients with affective and non-affective psychotic disorders. Furthermore, the participation of the patients in the study, by telephone and face-to-face interviews, allowed us to compare the interview methods. In this study, it was shown that there was an increase in negative health behaviors such as weight gain and cigarette-alcohol consumption, deterioration in medication adherence, increase in disease severity and clinical worsening in patients with psychotic disorders during the pandemic. In addition, the fact that most of the patients who were contacted by telephone agreed to participate in the study and the majority of these patients were able to adapt to the interview process demonstrated that telephone-based approaches could

Table 6
Participant sociodemographic and clinical characteristics according to interview method.

	Interview Method		Statistics, p-values
	Telephone	Face-to-face	
Marital Status			
Married	59 / 29.5%	22 / 40%	$\chi^2(3) = 2.283$ $p:0.524^a$
Single	141 / 71.5%	33 / 60%	
Gender			
Female	77 / 38.5%	25 / 45.5%	$\chi^2(1) = 0.869$ $p:0.351^a$
Male	123 / 61.5%	30 / 54.5%	
During Pandemic Suicidal Ideation			
Yes	77 / 38.5%	27 / 49.1%	$\chi^2(1) = 2.003$ $p:0.157^a$
No	123 / 61.5%	28 / 50.9%	
During Pandemic Suicide Attempt			
Yes	14 / 7%	15 / 27.3%	$\chi^2(1) = 17.589,$ $\Phi:0.26$ $p < 0.001^a$
No	186 / 93%	40 / 72.7%	
The effects of the pandemic period on mental health			
Worsened	77 / 38.5%	33 / 60%	$\chi^2(1) = 8.438,$ $\Phi:0.18$ $p:0.015^a$
Unchanged	102 / 51%	17 / 30.9%	
Improved	21 / 10.5%	5 / 21.6%	
Variables	Mean ± SD [Median]	Mean ± SD [Median]	
Age	41.37 ± 11.6 [39.5]	41.85 ± 11.4 [42]	$Z: -0.882$ $p:0.378^b$
Education(years)	11.20 ± 3.8 [12]	11.02 ± 3.4 [12]	$Z: -0.536$ $p:0.592^b$
CGI-Severity (CGI-S) Score	4.33 ± 1.2 [5]	4.60 ± 1.3 [5]	$Z: -1.782$ $p:0.075^b$
CGI-Improvement (CGI-I) Score	4.39 ± 1.1 [4]	4.82 ± 1.2 [5]	$Z: -2.437$ $r: -0.15$ $p:0.016^b$
During Pandemic MMS Score	4.49 ± 1.6 [5]	4.16 ± 1.7 [4]	$Z: -1.320$ $p:0.187^b$

CGI: Clinical Global Impressions Scale MMS: Modified Medication Adherence Scale.

^a Chi-squared Test.

^b Mann-Whitney U Test, SD. Standard deviation.

be used easily in patients with psychotic disorders, especially in times such as pandemic periods when it is difficult to access mental health services.

The results of the studies in the literature on the effects of the COVID-19 pandemic on patients with psychotic disorders are contradictory. Some studies reported higher levels of depression, anxiety, and stress compared to the healthy controls, whereas others reported little or no change in the mental health of patients with psychotic disorders (Fleischmann et al., 2021). The results of the studies on the changes in the psychotic symptoms and relapsed cases are also contradictory. Some studies reported that the symptoms remained stable and the recurrence rate did not change during the pandemic period (Mutlu and Anil Yağcıoğlu, 2021; Pinkham et al., 2020; Riblet et al., 2021), while others reported increases in the symptoms and recurrence rates (Caldirola et al., 2022; Fleischmann et al., 2021; Muruganandam et al., 2020).

Many community-based studies have been conducted to investigate the effects of the COVID-19 pandemic on lifestyles and health behavior. These studies reported increases in weight gain, unhealthy eating habits, cigarette and alcohol use, and decreases in the frequency of physical exercise and physical activities (Catucci et al., 2021; Christofaro et al., 2021; Lopez-Moreno et al., 2020; Stanton et al., 2020). However, the number of studies that investigated the physical health parameters and health behavior of the patients with psychotic disorders group during the pandemic is quite limited. In one of these studies, the time that was spent sedentarily during the day and cigarette consumption has increased in patients with schizophrenia during the lockdowns (Bivia-Roig et al., 2022). In another study, which investigated the change in the mental and physical health of people with serious mental disorders, it has been found that approximately 30% of the patients did not experience any change in their physical and mental health, but approximately one-fourth of the patients worsened during the pandemic (Peckham et al., 2021).

In our study, participants had an average weight gain of 3,6 kg during the pandemic, which was highly significant. This period covers approximately 1-1.5 years, depending on the person, considering the date of data collection. To assume that the weight gain was because of the pandemic, it may be useful to make a comparison with the studies conducted in the pre-pandemic periods. Godin et al. reported that the average weight gain of patients was 2.1 kg in a 1-year follow-up study (Godin et al., 2017). In another study examining the change in body weight of patients who were switched from typical antipsychotics to olanzapine, the patients gained an average of 2.3 kg within 1 year (Ye et al., 2012). In the 3-year follow-up study of patients on monotherapy, the average weight gain in 3 years was 1.8 kg for amisulpride (lowest increase) and 4.2 kg for olanzapine (highest increase) (Bushe et al., 2012). Continuity of drug use is obligatory in all these studies. Therefore, there is a limitation to compare our findings with other studies based on different study designs since, the type of treatments and their doses received by the patients were not considered as a variable in our study, but only the impairment in drug compliance of patients during the pandemic was our focus. The average weight gain in our study was slightly higher compared to other studies. In our study, 14.5% of the participants were diagnosed with a new disease during the pandemic period (diabetes is the most common disease). In this respect, it can be said that the pandemic period created an additional burden for our patient group. Increase in hypothalamic-pituitary-adrenal axis activity due to the high stress levels, changes in nutritional habits and decreased physical activity due to stay-at-home precautions can be some possible causes of these negativities. The significant increase in cigarette and/or alcohol consumption during the pandemic can be explained with the tendency of these patients to choose unhealthy coping methods with stress; however, more studies are needed to confirm these speculations.

Although the prevalence of patients with suicidal thoughts increased during the pandemic, and the prevalence of patients with suicide attempts is lower than of the pre-pandemic period; it is important to consider that while the pre-pandemic period covers a phase of 17-64

years depending on the age of the patients, the pandemic period covers only a period of approximately 1-1.5 years. Therefore, a direct comparison of the prevalence of suicidal behavior before and during the pandemic may not be statistically appropriate. At this point, the comparison of the data we obtained from the study with the studies in the literature investigating the prevalence of suicidal behavior in patients with schizophrenia can be a guide in understanding whether the pandemic period creates an additional negativity. In a recent meta-analysis in patients with schizophrenia, lifetime and point prevalence of suicide thoughts were 34.5% and 29.9%, respectively (Bai et al., 2021). Tourino et al. also reported that 1-year prevalence of suicide thoughts was 16.2% in these patients (Tourino et al., 2018). In another study, the lifetime prevalence of suicidal ideation was found to be 31.6% in the Turkish population (Hocaoglu, 2009). It has been reported that the prevalence of 1-year suicide attempts was between 1.9% and 7.5% (Lee et al., 2012; Tang et al., 2007). In our study, the frequencies of suicidal thoughts and attempts during the pandemic period in patients with schizophrenia was 43.7% and 12%, respectively. The data collection time for our study was 1-1.5 years depending on patient follow-up dates. In comparison with recent studies, the patients with schizophrenia have a high tendency of suicidal thoughts and attempts during this period in our study. This can be explained by various negativities brought by the pandemic, such as the increasing social isolation, decrease in treatment compliance, increasing economic difficulties, disruption of emergency health services, health anxiety, and fear of virus exposure.

It is reported that there was an increase in suicide attempts and completed suicides in previous pandemics (Banerjee et al., 2021; Benedictow and Benedictow, 2004). In a meta-analysis on suicidal ideations and suicidal attempts during the COVID-19 pandemic, the rates of suicidal ideation and suicide attempts were found to be 10.8% and 4.6%, respectively (Dubé et al., 2021). Nevertheless, none of the studies reviewed within the scope of this meta-analysis addressed the suicidal behavior in psychotic disorders. In a study in which the relationship between suicide attempts and being infected with COVID-19 in veterans with schizophrenia and schizoaffective disorder was investigated, the rate of suicide attempts during the pandemic was reported as 2.7% (Okusaga et al., 2021). In comparison, in this study, the rates of patients with suicidal ideation during the pandemic period was found as 40.7%, and patients who attempted suicide during the pandemic period were found as 11.3%, and the rates were higher than those reported in the literature. The fact that the economic difficulties brought by the pandemic were felt severely in our country and the inadequate telepsychiatry practices in this period due to the insufficient health system can explain this negative consequence.

Although the effect sizes of the relationships were small, factors such as loss of income and impaired medication adherence during the pandemic period were found to be associated with suicidal ideation and suicidal attempt. Furthermore, 68.9% of the patients who attempted suicide during the pandemic period had suicidal ideation in the pre-pandemic period. Therefore, it is necessary to be more careful during stressful events and periods such as pandemics and natural disasters in the management of patients with previous suicidal thoughts.

Perhaps the most significant difficulty encountered in the treatment of psychotic disorders is low medication adherence (García et al., 2016). Low medication adherence may cause the exacerbation of psychotic symptoms and psychotic relapses (Higashi et al., 2013). In one of the studies that evaluated the medication adherence in patients with psychotic disorders during the pandemic period in Turkey, it was reported that 4.5% of the patients had medication non-adherence, and psychotic relapse was significantly higher in patients with medication non-adherence (Kahve et al., 2021). In another study, it was reported that the relapse rate in patients with severe mental disorders was 11% in the first trimester of the pandemic period and that the most common factor associated with relapse was the non-adherence to the antipsychotic medications (Mutlu and Anil Yağcıoğlu, 2021).

In comparison to the studies in the literature, we found a significant, moderate decrease in the medication adherence of patients with psychotic disorders during the pandemic period. The fact that more than half of the patients in this study were found to have medication adherence issues to some extent both before and during the pandemic period validates the concerns put forth in the literature about medication adherence in the patients with psychotic disorders group. Reduction in non-emergency health services during the pandemic period might lead to difficulties in accessing medications and limitations in the intervention of physicians in medication non-compliance. The association of low drug compliance with increased symptom severity and recurrence of diseases is well-known. At the same time, social isolation, economic difficulties, restrictions to stay at home, and the increased expression of negative emotions in the family can cause stress on the patient and cause deterioration in well-being. It will be familiar to physicians that patients have decreased insight into their disease during the acute exacerbation period. There is a possibility of decline in their adherence to treatment in patients, along with the decreased insight to their diseases. These factors may explain the lessened treatment compliance during the pandemic period.

In the present study a correlation was found between the deterioration in medication adherence with suicidal behavior, worsening of mental health, and an increase in CGI disease severity and improvement scores during the pandemic period for the possible consequences of the decrease in treatment compliance. Additionally, we would like to emphasize that the relationship between deterioration in medication adherence with increasing CGI-improvement scores and worsening of mental health showed high correlation and large effect size. These results are consistent with the findings reported in the literature, which indicate that low medication adherence is associated with worse clinical outcomes.

Although the effect sizes were small; it is noteworthy that the rate of married and female patients among the patients with affective psychosis and the rate of male and unmarried patients among the patients with non-affective psychosis were significantly higher. These are compatible with the findings reported in the literature. Alcohol consumption rates and the amount of alcohol consumption were found to have increased significantly in patients with affective psychosis during the pandemic period. This might have resulted from patients with bipolar disorder with frequent impulsivity, mood swings, and comorbid anxiety disorders.

There are some studies in the literature that addressed the effects of the pandemic on patients with psychotic and affective disorders; however, none of these studies specifically investigated the effects of the pandemic on patients who have mood disorders with psychotic features (Fleischmann et al., 2021). The patients with or without affective disorders included in this study were similarly affected by the pandemic in the negative direction. It is a known fact that the predominance of psychotic features in the course of the disease adversely affects the prognosis of mood disorders in general (Keck et al., 2003). Independent of the patient's underlying diagnosis, considering that the detection of psychotic symptoms requires special clinical attention, it is not unexpected that patients with affective psychotic disorder were also adversely affected by the pandemic, similar to patients with non-affective psychotic disorders, but more studies are needed in this area.

In this study, 200 of the 211 patients were able to complete the telephone interview; that is, nearly 95% of the patients were able to adapt to the mental health interviews conducted over the phone at a satisfactory level. This is consistent with the findings reported in the literature supporting the applicability of telepsychiatry applications in patients with psychotic disorders (Bonet et al., 2017). The provision of health services via telepsychiatry in patients with psychotic disorders is promising, and thus the telepsychiatry applications should be increased in these patients.

The mental health of the patients who participated in this study by

face-to-face interviews had deteriorated significantly during pandemic. Although the effect sizes were small, they had higher CGI-I scores and attempted suicide more frequently compared to the patients interviewed by phone. All these parameters are associated with clinical worsening during the pandemic period. Several factors might have led to this difference between the groups.

First, all of the participants interviewed face-to-face consisted of patients who applied for an outpatient clinic appointment at the hospital. Although some of these patients visited the clinic for routine control purposes, it is possible that despite the warnings about not going to the hospitals during the pandemic unless it is urgent, some patients applied to the hospital since they were more adversely affected by the pandemic. Another factor may be that the non-verbal part of the psychiatric assessment might be missing in the patients interviewed by telephone. As a result of that, they might have been evaluated better than they actually were. Moreover, it is likely that some of the patients interviewed on the phone might have been absorbed in insecure and paranoid thoughts and thus might not have reflected some of the disease symptoms to the interviewer by masking them, thinking that the other party is not actually a physician or may have intentions other than research.

The present study has several strengths. Our study is one of the few studies examining the effects of the COVID-19 pandemic on suicidal behavior, medication compliance and health behavior in psychotic patients. To the best of our knowledge, this is the first study in the literature to examine health behaviors such as weight gain and new physical illnesses diagnosed during the pandemic in patients with psychosis. Patients with both affective and non-affective psychotic disorders were included in our study, and to our knowledge, the present study is the first in the literature to examine the effect of the COVID-19 pandemic on patients with affective psychotic disorders. The importance and strengths of this study stem from the fact that it has addressed specific aspects of the pandemic in the context of patients with psychotic disorders, which have been mentioned on a little, if any, in the literature before.

The most important limitations of this study were that its cross-sectional design did not allow the investigation of the causality and that the memory factor could not be excluded since most of the information obtained from the pre-pandemic period was obtained from the file notes, yet some of it had to be deduced from the patient statements. Additionally, as mentioned earlier, the sensitivity of the assessments made over the phone might have been low.

Some patients with severe psychopathology were not included in the study due to the exclusion criteria and their inability to cooperate in interviews. In addition, some patients might have avoided participating in the study due to their psychotic symptoms. Although many of these limitations might have possibly caused some of the patients to be assessed better than they actually were, these limitations do not make the findings of this study less valuable since the study determined that the conditions of the patients worsened in many aspects during the pandemic period.

5. Conclusions

In the simplest terms, the findings of this study indicated that the pandemic worsened the physical and mental health of the patients with psychotic disorders. Determination of the factors which can predict this deterioration is essential in identifying patients at risk and planning healthcare services accordingly.

In order to reduce the negative effects of the pandemic on patients with psychotic disorders, there is a need to implement various programs aimed at eliminating inequalities in the provision of healthcare services, reducing stigmatization, and eliminating the psychosocial disadvantages of these patients. Further studies are needed, given the shallowness of the literature in this field.

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CRedit authorship contribution statement

Serkan Yazıcı: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Writing – original draft, Writing – review & editing. **Ezgi Sıla Ahi:** Conceptualization, Methodology, Investigation, Resources. **Rıfat Serav İlhan:** Writing – review & editing, Visualization. **Meram Can Saka:** Conceptualization, Methodology, Validation, Formal analysis, Resources, Writing – original draft, Writing – review & editing, Supervision, Project administration.

Declaration of Competing Interest

None.

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Supplementary materials

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