ISSN 2458-8865 E-ISSN 2459-1505
www.fppc.com.tr
Family Practice & Palliative Care

Research Article

COVID-19-related anxiety, fear and biopsychosocial risk factors on functionality in euthymic bipolar disorder patients

Ötimik bipolar bozukluk hastalarında COVID-19 ile ilişkili anksiyete, korku ve biyopsikososyal risk faktörlerinin işlevselliğe etkisi

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Abstract

Introduction: This study aimed to assess the influence of COVID-19 fear, anxiety and biopsychosocial risk factors on the functionality of euthymic bipolar patients by comparing with those of a healthy control group in pandemic.

Methods: Eighty euthymic BD patients and eighty healthy controls took part in this case-control study conducted between November 2021 and August 2022. Participants were assessed using the Hamilton Depression Rating Scale (HAM-D), Young Mania Rating Scale (YMRS), Functioning Assessment Short Test (FAST), Perceptions and Attitudes towards COVID-19 Pandemic Questionnaire (PACPQ), Coronavirus Anxiety Scale-Short Form (CAS), and Coronavirus Fear Scale (CFS).

Results: Among individuals diagnosed with BD, 71.3% (n = 57) had BD-Type 1, while 28.8% (n = 23) had BD-Type 2. In comparison to healthy controls, BD patients exhibited a statistically significant increase in overall sleep, appetite, and alcohol consumption and demonstrated a statistically significant decrease in time spent on social and physical activities during the pandemic period FAST, PACPQ, CAS, Perception of Disease, Reasons, and Behaviors of Avoidance subscale scores were notably higher in BD patients ($p < 0.05$). Regression analysis indicated that the total number of BD episodes during the pandemic and the years of education were significant factors in explaining the average FAST total score (OR, respectively 0.224, -0.226; $p < 0.05$)

Conclusions: During the COVID-19 pandemic, euthymic bipolar patients showed increased avoidance behaviors and lifestyle changes. Functional impairment was predicted by the number of episodes and education level.

Keywords: Bipolar Disorder, Euthymic State, COVID-19, Anxiety, Case–Control Studies, Social Isolation

Öz

Giriş: Bu çalışmanın amacı, COVID-19 korkusu, kaygısı ve biyopsikososyal risk faktörlerinin ötimik bipolar hastaların işlevselliği üzerindeki etkisini, pandemi sırasında sağlıklı bir kontrol grubuyla karşılaştırarak değerlendirmektir.

Yöntem: Kasım 2021 ile Ağustos 2022 arasında yürütülen bu vaka-kontrol çalışmasına 80 ötimik BD hastası ve 80 sağlıklı kontrol katıldı. Katılımcılar Hamilton Depresyon Derecelendirme Ölçeği (HAM-D), Young Mani Derecelendirme Ölçeği (YMRS), Kısa İşlevsellik Değerlendirme Ölçeği (FAST), COVID-19 Pandemisine Yönelik Algılar ve Tutumlar Anketi (PACPQ), Koronavirüs Kaygı Ölçeği-Kısa Form (CAS) ve Koronavirüs Korku Ölçeği (CFS) kullanılarak değerlendirildi.

Bulgular: BD tanısı konulan bireylerin %71,3'ünde (n=57) BD-Tip 1, %28,8'inde (n=23) BD-Tip 2 saptandı. BD hastalarında sağlıklı kontrollerle karşılaştırıldığında genel uyku, iştah ve alkol tüketiminde istatistiksel olarak anlamlı artış, pandemi döneminde sosyal ve fiziksel aktivitelere harcanan sürede ise istatistiksel olarak anlamlı azalma görüldü. FAST, PACPQ, CAS Hastalık Algısı, Nedenleri ve Kaçınma Davranışları alt ölçek puanları BD hastalarında belirgin olarak daha yüksekti ($p<0,05$). Regresyon analizi, pandemi sırasındaki toplam BD atak sayısının ve eğitim yıllarının ortalama FAST toplam puanını açıklamada önemli faktörler olduğunu gösterdi (OR, sırasıyla 0,224, -0,226; $p < 0,05$)

Sonuç: COVID-19 pandemisi sırasında ötimik bipolar hastalarda kaçınma davranışları ve yaşam tarzı değişiklikleri arttı. Fonksiyonel bozulmanın atak sayısı ve eğitim düzeyi ile öngörüldüğü tespit edildi.

Anahtar kelimeler: Bipolar Bozukluk, Ötimik Durum, COVID-19, Anksiyete, Vaka-Kontrol Çalışmaları, Sosyal İzolasyon

Received	Accepted	Published Online	Corresponding Author	E-mail
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	https://doi.org/10.22391/fppc.1666743			

Key Points

1. Euthymic bipolar disorder (BD) patients exhibited statistically significant increases in overall sleep, appetite, and alcohol consumption, and a statistically significant decrease in time spent on social and physical activities during the COVID-19 pandemic compared to healthy controls.
2. Regression analysis revealed that the total number of bipolar disorder episodes during the pandemic and the years of education were significant factors in explaining the average total score on the Functioning Assessment Short Test (FAST) for individuals with bipolar disorder.
3. Bipolar disorder patients had notably higher scores on the Perception of Disease, Reasons, and Behaviors of Avoidance subscales of the Perceptions and Attitudes towards COVID-19 Pandemic Questionnaire (PACPQ) compared to healthy controls.

Introduction

In Wuhan, China, a novel coronavirus was initially discovered to be the causative agent in pneumonia cases with unclear origins in 2019. The virus spread rapidly throughout the world, causing a pandemic whose effects are still being felt to some extent presently [1]. Social isolation and quarantine policies were put in place all over the world during the pandemic to stop the COVID-19 virus from spreading quickly. As a result, people were less able to communicate with friends and family, get access to healthcare, and participate in meaningful social and physical activities. The COVID-19 pandemic had a negative impact on society's mental health upon its debut due to rising public knowledge, fear, and anxieties [2].

Individuals suffering from serious mental illnesses were among the most susceptible groups impacted by the COVID-19 pandemic. Stigma, limited access to physical health treatments, low financial status, poor quality of life, insecure housing, and inadequate social contacts are among the disadvantages faced by this population during the pandemic [3]. This approach inevitably had a deleterious impact on people suffering from bipolar disorder (BD), a severe and persistent mental illness [4]. Research revealed that patients with mood disorders were more likely than healthy individuals to experience a wide range of issues, including symptoms of depression and anxiety, increased alcohol consumption, financial difficulties, difficulties adjusting to social isolation, cognitive impairment, suicide risk, hospitalization, and death from COVID-19 infection during the pandemic [5, 6].

The capacity to carry out several aspects of life, including getting education and employment, making independent decisions, choosing social activities and interests, and establishing and sustaining interpersonal connections, is known as functioning [7]. Becoming a severe and chronic condition with an early beginning makes BD one of the most incapacitating diseases. Research has demonstrated that, in comparison to healthy controls, there is reduced functioning even in the euthymic phase of BD [8]. People with BD may have experienced more functional impairments from all the limitations and challenges during the epidemic than healthy individuals. It is yet unclear, despite evidence suggesting the dread and anxiety brought on by COVID-19 can set off a variety of psychopathologies.

This study aimed to assess the influence of COVID-19 fear, anxiety and psychological, environmental, individual risk factors on the functionality of euthymic bipolar patients by comparing with those of a healthy control group in the pandemic.

Methods

Study Design

Patients who fulfilled the inclusion criteria, were followed up with a diagnosis of BD, applied to the psychiatric outpatient clinic, and provided both written and verbal agreement to participate in the study were comprised of the patient group. Individuals who fulfilled the inclusion criteria provided written or verbal consent to be included in the study, hospital employees, and companions of patients admitted to other hospital departments comprised of the control group. A total of 80 euthymic patients with BD and 80 healthy controls, who were matched with the patients in terms of socio-demographic characteristics, were enrolled in this study.

Verbal and written informed consent was obtained from participants after detailed explanation of the study. The Structured Clinical Interview for DSM-5 (SCID 5) was administered to patients diagnosed with BD according to DSM-5 diagnostic criteria. Sociodemographic data form, Hamilton depression rating scale (HAM-D), young mania rating scale (YMDRS) and Functioning Assessment Short Test (FAST) were applied. Self-report scales, the coronavirus fear scale (CFS), the coronavirus anxiety scale - short form (CAS), and Perceptions and Attitudes towards COVID-19 Pandemic Questionnaire (PACPQ) were given to the participants.

Sociodemographic data form, HAM-D, young mania rating scale YMDRS and FAST were administered to healthy controls who participated in the study. Self-report scales, the CFS, CAS, PACPQ.

Inclusion criteria for BD patients'

1. BD patients in the euthymic period
2. Hamilton Depression Rating Scale score <7
3. Young Mania Rating Scale <6
4. Participants aged 18-65 years

Inclusion criteria for controls'

1. Individuals who do not currently suffer from or have never had a mental illness
2. Participants aged 18-65 years

Exclusion criteria for all participants

1. The presence of mental retardation or neurological disease that impairs functioning, which would prevent the application of the scales in the participants.
2. Participants have not given written consent to participate in the study.
3. Over 65 years old and under 18 years old.

Data Collection Tools

Sociodemographic Data Form:

Hamilton Depression Rating Scale (HAM-D): The Hamilton Depression Rating Scale is a 17-question, clinician-completed test used to measure the level and severity of depression [9].

Young Mania Rating Scale (YMDRS): It is a scale developed by Young et al. in 1978 to measure the severity and change of the manic period [10].

COVID- 19 Fear Scale (CFS): It is a Likert-type scale designed by Aharsu et al. in 2020 with 717 Iranian participants as a sample and 7 items to measure the fear of COVID-19. [11].

Coronavirus Anxiety Scale - Short Form (CAS): It was a self-report scale developed by Lee et al. to identify possible cases of dysfunctional anxiety associated with COVID-19. It consists of four subscales: disease, reasons, controls, and avoidance [12].

Perceptions and Attitudes towards COVID-19 Pandemic Questionnaire (PACPQ): It is a self-report scale whose validity and reliability was applied in our country by Artan et al. [13]. It consists of 4 subscales: general perception, perception of reasons, avoidance behaviors and perception of control.

Functioning Assessment Short Test (FAST): This clinician-administered scale was developed by Rosa et al. in 2007. It is a 24-item, 4-point Likert-type scale with 6 subscales: autonomy, cognitive functioning, financial, occupational, interpersonal and leisure [14].

Ethical approval, informed consent and permissions

Approval of this study was obtained from the Ministry of Health by our application to the Scientific Research Platform of the Ministry of Health of Türkiye on 08.11.2021. The approval of the ethics committee for our study was obtained from the Ethics Committee for Non-Interventional Clinical Research of Çanakkale Onsekiz Mart University Faculty of Medicine on 24.11.2021 - 2021-09.

Statistical analysis

SPSS (SPSS Inc., Chicago, IL, USA) version 20.0 was used for data analysis. Categorical data were expressed as numbers and percentages, and continuous variables were expressed as means ± standard deviations. The chi-squared test was used to compare categorical data. Normality analyses were performed using the Kolmogorov-Smirnov goodness-of-fit test in the between-group analysis of continuous variables. The Mann-Whitney U test was used for between-group comparisons of data that did not follow a normal distribution. The significance of the difference between two means test was used for two-group comparisons of data that fit the normal distribution. Pearson correlation analysis was used for correlation analysis of normally distributed variables. Correlation coefficient 0.00-0.24: weak, 0.25-0.49: moderate, 0.50-0.74: strong and 0.75-1.00: very strong correlation. Linear regression analysis was used to assess whether the significant findings in the correlation analysis were predictive factors. The level of statistical significance was considered to be $p < 0.05$.

Results

Sociodemographic and clinical characteristics

In the patients diagnosed with bipolar disorder (BD), 60 % (n=48) and 32 % (n=40) were male, while 61.2 % (n=49) and 38.8 % (n=31) of the healthy control group were female and male, respectively. No statistically significant difference was found between the BD and healthy control groups in terms of gender, age, education level, years of education, marital status and occupation ($p>0.05$) (Table 1).

Based on the BD types, 71.3% (n=57) of the total, were classified as having BD type 1, and 28.8% (n=23), were classified as having BD type 2. BD type 1 patients experienced a statistically significant greater mean number of hospitalizations during the pandemic than did BD type 2 patients ($p=0.001$). During the pandemic, patients diagnosed with BD type 2 experienced more depressed episodes than patients diagnosed with BD type 1 ($p=0.019$) (Table 1).

Increased alcohol consumption was found in 52.9% (n=9) of the BD group and 14.3% (n=3) of the control group, and alcohol use disorder (AUD) was found in 6 patients in the BD group during the pandemic ($p=0.011$, $p=0.003$, respectively). BD patients had statistically significant higher scores than healthy controls for increased appetite and total sleep, difficulty falling asleep, worsening sexual life and mood, dismissal from work and financial loss during the pandemic ($p=0.006$, $p=0.046$, $p=0.007$, $p<0.001$, $p=0.017$, $p=0.04$, $p=0.043$, respectively). Statistically significant differences were found in the BD group regarding less time spent on physical and social activity ($p=0.007$, $p=0.001$, respectively) (Table 1).

Table 1. Comparison of sociodemographic data of bipolar disorder and healthy controls and individual factors affected during the pandemic period

	Bipolar Disorder, n(%)	Healthy Control, n(%)	p
Gender			0.871
Female	48 (60)	49 (61.2)	
Male	32(40)	31 (38.8)	
Age (years)	43.1 ± 13.2	43.7 ± 12.6	0.751
Education Status			1.000
Primary school	27 (33.8)	27 (33.8)	
High School	23 (28.8)	23 (28.8)	
University	30 (37.5)	30 (37.5)	
Year of education	12.1 ± 3.4	12.1 ± 3.4	1.000
Marital Status			0.426
Married	44 (55)	52 (65)	
Single	29 (36.2)	22 (27.5)	
Widowed/Divorced	7 (8.8)	6 (7.5)	
Occupation			0.264
Employed	35 (43.8)	41 (51.2)	
Unemployed	39 (48.8)	37 (46.2)	
Student	4 (5)	2 (2.5)	
Smoking	39 (48.8)	33 (41.2)	0.34

Increased smoking	25 (64.1)	17 (53.1)	0.349
Alcohol use	17 (21.2)	21 (26.2)	0.457
Alcohol use disorders in alcohol users	6 (35.3)	0 (0)	**0.003**
Increased alcohol use	9 (52.9)	3 (14.3)	**0.011**
Purpose of alcohol use			**0.003**
Sleeping	2 (11.8)	0 (0)	
Pleasure	4 (23.5)	17 (81)	
To reduce anxiety	11 (64.7)	4 (19)	
Substance use	2 (2.5)	1(1.2)	0.556
Medical illness	30 (37.5)	15 (18.8)	**0.008**
Individuals tested for COVID-19 via PCR	50 (62.5)	65 (81.2)	0.748
COVID-19 (+)	21 (26.2)	24 (30)	0.598
Appetite			**0.006**
Increase	37 (46.2)	21 (26.2)	
Decrease	9 (11.2)	5 (6.2)	
No change	34 (42.5)	54 (67.5)	
Total hours of sleep			**0.046**
Increase	22 (27.5)	12 (15)	
Decrease	16 (20)	11 (13.8)	
No change	42 (52.5)	57 (52)	
Difficulty falling asleep			**0.007**
Yes	34 (42.5)	18 (22.5)	
No	46 (57.5)	62 (67.5)	
Frequent waking up at night			0.268
Yes	25 (31.2)	19 (23.8)	
No	54 (67.5)	61 (76.2)	
Waking Up Early in Morning			0.246
Yes	20 (25)	14 (17.5)	
No	60 (75)	66 (82.5)	
Perceived Change in Sexual Life			**<0.001**
Better	0 (0)	4 (5)	
Worse	22 (27.5)	6 (7.5)	
No change	58 (72.5)	70 (87.5)	
Perceived Mood Change			**0.017**
Better	8 (10)	9 (3.8)	
Worse	16 (20)	3 (11.2)	
Variable	29 (36.2)	22 (27.5)	
No change	27 (33.8)	46 (57.5)	
Layoff during pandemic	3 (3.8)	0 (0)	**0.04**
Financial loss during the pandemic	10 (12.5)	20 (25)	**0.043**
Working hours			0.405
Increase	2 (5.7)	2 (4.9)	
Decrease	17 (48.6)	14 (34.1)	
No change	16 (45.7)	25 (61.0)	
Physical Activity			**<0.001**
Increase	9 (11.2)	10 (12.5)	
Decrease	42 (52.5)	23 (28.8)	
No change	29 (36.2)	47 (58.8)	
Social Activity			**<0.001**
Increase	4 (5)	13 (16.2)	
Decrease	55 (68.8)	31 (38.8)	
No change	21 (26.2)	36 (45)	

p: chi-square test, statistical significance value= $p < 0.05$, $p < 0.001$

Results related to clinical scale scores

Statistically significant differences were found between the FAST total scores and all subscales of the FAST in the BD and healthy individuals in the control group ($p<0.001$). In addition, statistically significant differences were found between the PACPQ total mean scores and subscales of contagiousness, perception of causes, conspiracy, environment and avoidance of physical contact in the BD and healthy ones in the control group (Table 2).

Table 2. Comparison of scale scores, mean ± standard deviation

		Bipolar Disorder	Healthy Controls	p*
COVID- 19 Fear Scale (CFS)		13.6 ± 5.7	14.35 ± 7.0	0.489
Coronavirus Anxiety Scale - Short Form (CAS), Total		0.75 ± 1.8	1.16 ± 2.4	0.228
The Perception of Disease Scale (**CAS/PDS**)	Total	3.55 ± 0.5	3.37 ± 0.5	0.05
	Contagiousness	3.98 ± 0.6	3.73 ± 0.9	**0.044**
	Dangerousness	3.28 ± 0.7	3.17 ± 0.7	0.334
The Perception of Reasons Scale (**CAS/PRS**)	Total	2.81 ± 0.6	2.56 ± 0.7	**0.023**
	Conspiracy	3.34 ± 0.8	2.91 ± 1	**0.004**
	Environment	2.89 ± 0.4	2.73 ± 0.4	**0.009**
	Belief	2.32 ± 0.9	2.06 ± 0.9	0.061
The Perception of Controls Scale (**CAS/PCS**)	Total	2.97 ± 0.5	3.08 ± 0.5	0.154
	Macro control	3.11 ± 0.8	3.20 ± 1.1	0.539
	Personal Control	3.03 ± 0.8	3.18 ± 0.9	0.279
	Inevitability	2.73 ± 0.8	2.86 ± 0.9	0.346
The Behaviors of Avoidance Scale (**CAS/BAS**)	Total	2.55 ± 0.7	2.28 ± 0.8	**0.034**
	Cognitive	2.05 ± 0.8	1.86 ± 0.9	0.177
	Communal Area	2.47 ± 1.1	2.40 ± 1.2	0.714
	Physical Contact	3.82 ± 1.2	3.05 ± 1.5	**0.001**
PACPQ, Total		2.89 ± 3.8	2.73 ± 0.4	**0.009**
Functioning Assessment Short Test (FAST), Total (FT)		22.73 ± 11.6	7.47 ± 8.1	**<0.001**
FAST/ Autonomy (**FA**)		2.87 ± 2.5	0.53 ± 1	**<0.001**
FAST/ Occupational Functioning (**FO**)		5.0 ± 3.3	2.45 ± 3.2	**<0.001**
FAST/ Cognitive Functioning (**FC**)		5.56 ± 3.1	2.06 ± 2.1	**<0.001**
FAST/ Financial Issues (**FF**)		1.45 ± 1.6	0.23 ± 0.6	**<0.001**
FAST/ Interpersonal Relations (**FI**)		5.48 ± 3.4	1.61 ± 2.6	**<0.001**
FAST/ Leisure Time Activity (**FL**)		2.35 ± 1.6	0.57 ± 1.0	**<0.001**

*: Student-t test. **PACPQ**: Perceptions and Attitudes towards COVID-19 Pandemic Questionnaire. **SD**: Standard deviation

Correlation analyses

The analyses of correlations are presented in Tables 3 and 4.

Table 3. Pearson correlation analysis of scale scores

	FT	FA	FC	FO	FF	FI	FL	CFS	CAS
Pre-PTA	**0.256***	0.029	**0.303***	**0.281***	0.054	0.146	0.089		
Pre-PDA	0.222	0.165	**0.376****	0.236	-0.020	0.098	0.037		
Pre-PMA	0.174	0.102	0.090	0.201	0.107	0.130	0.103		
PTA	**0.224***	0.121	0.138	**0.320****	0.175	0.173	-0.007		
Disease Year	0.028	-0.092	0.121	0.141	-0.206	-0.019	0.064		
TNH	0.087	0.035	0.021	0.196	0.016	0.065	-0.013		
Age	0.143	0.132	0.161	0.100	-0.167	0.072	**0.297****		
CFS	-0.058	-0.115	-0.004	-0.047	-0.058	-0.036	0.005		
CAS	-0.003	-0.117	0.067	-0.006	-0.043	0.016	0.059		
Education	**-0.236***	-0.139	**-0.230***	**-0.316****	0.181	-0.103	**-0.318****		
CAS/PDS	0.115	0.049	0.149	0.005	-0.115	-0.036	0.005	**0.252***	-0.026
Dangerousness	0.072	0.004	0.127	-0.039	-0.051	0.128	0.116	0.203	-0.020
Contagiousness	0.137	0.091	0.119	0.079	-0.166	0.171	**0.253***	0.166	-0.013
CAS/PRS	0.038	-0.038	0.013	-0.003	0.075	0.067	0.066	0.038	-0.031
Conspiracy	-0.148	-0.102	-0.105	0.030	0.040	**-0.248***	**-0.266***	-0.005	0.056
Environment	0.133	0.051	0.156	0.036	0.048	0.127	0.130	0.191	0.126
Belief	0.104	0.043	0.035	0.004	0.066	0.190	**0.238***	0.043	-0.028
CAS/PCS	0.119	0.106	0.050	0.083	0.131	0.066	0.110	0.065	0.061
Macro Control	0.070	0.095	0.091	0.027	0.011	-0.001	0.111	-0.020	0.031
Personal Control	0.027	-0.004	0.010	0.014	-0.063	-0.024	0.121	0.001	0.086
Inevitability	0.112	0.075	0.104	-0.005	**0.337****	0.082	-0.030	0.162	-0.003
CAS/BAS	0.077	0.035	0.168	0.017	-0.029	0.053	0.190	0.183	**0.255***
Cognitive	0.110	0.097	0.081	-0.054	0.36	0.26	-0.119	-0.034	0.165
Communal Area	0.032	-0.074	0.090	0.070	-0.076	0.007	0.067	**0.303****	**0.289****
Physical Contact	0.180	0.135	**0.246***	0.075	-0.23	0.135	0.155	**0.258***	0.169
PACPQ	0.133	0.127	0.156	0.036	0.048	0.127	0.130	0.191	0.126

Pre-PTA: Pre- Pandemic Period – Total Attacks, **Pre-PDA:** Pre- Pandemic Period – Total Depressive Attacks, **Pre-PMA:** Pre- Pandemic Period – Total Manic Attacks, **PTA:** Pandemic Period – Total Attack, **TNH:** Total Number of Hospitalizations, **CFS:** COVID- 19 Fear Scale, **CAS:** Coronavirus Anxiety Scale Short Form, **PACPQ:** Perceptions and Attitudes towards COVID-19 Pandemic Questionnaire, **CAS/PDS**: Coronavirus Anxiety Scale - Short Form / The Perception of Disease Scale, **CAS/PRS:** Coronavirus Anxiety Scale - Short Form / Perception of Reasons Scale, **CAS/PCS:** Coronavirus Anxiety Scale - Short Form / Perception of Control Scale, **CAS/BAS:** Coronavirus Anxiety Scale - Short Form / The Behaviors of Avoidance Scale, **PACPQ:** Perceptions and Attitudes Towards COVID-19 Pandemic Questionnaire, **FT**: FAST/ Total Score, **FA:** FAST/ Autonomy, **FC:** FAST/ Cognitive Functioning, **FO:** FAST/ Occupational Functioning, **FF:** Financial Issues, **FI:** Interpersonal Relationships, **FL:** Leisure Time Activities, **p<0.001 *p<0.05

Table 4. Pearson correlation analysis of scale scores

	Age	TNH	Diagnosis Year	Pre-PTA	Pre-PDA	Pre-PMA	PTA	PMA	PDA
CAS/PDS	0.094	0.111	-0.005	-0.044	0.034	-0.105	-0.025	-0192	0.091
Dangerousness	0.087	0.107	0.063	0.051	0.061	0.017	-0.111	**-0.224***	-0.002
Contagiousness	0.092	-0.020	-0.107	-0.144	-0.011	-0.234	0.109	-0.032	0.166
CAS/PRS	0.183	0.062	0.105	0.062	0.042	0.054	0.101	-0.044	0.164
Conspiracy	0.107	-0.150	-0.111	-0.096	-0.083	-0.066	0.132	0.090	0.118
Environment	0.142	-0.039	0.005	0.022	-0.074	0.042	0.139	-0.018	0.197
Belief	0.074	-1.29	0.092	0.037	0.0001	0.060	-0003	-0.030	0.015
CAS/PCS	0.045	-0.009	-0.034	-0.038	-0.163	0.109	-0.004	0.010	-0.012
Macro Control	0.137	0.025	0.012	-0.039	-0.214	0.161	**-0.250***	0.055	**-0.297****
Personal Control	0.187	0.061	0.077	-0.017	-0.108	0.085	0.128	0.061	0.131
Inevitability	**0.263***	0.059	-0.164	-0.027	-0.018	-0.025	0.045	-0.019	0.072
CAS/BAS	0.82	0.033	0.070	-0.074	-0.103	-0.011	0.168	0.088	0.166
Cognitive	0.97	0.030	-0.156	-0.088	-0.221	0.091	0.159	0.213	0.073
Communal Area	0.158	0.002	0.078	-0.075	-0.049	-0.068	0.050	-0.076	0.116
Physical Contact	**0.258***	0.038	-0.047	-0.010	0.104	-0.093	0.127	0.010	0.162
PACPQ	**0.142***	0.009	0.005	-0.022	-0.074	0.042	0.139	-0.018	0.197

CAS/PDS: Coronavirus Anxiety Scale - Short Form / The Perception of Disease Scale, **CAS/PRS:** Coronavirus Anxiety Scale - Short Form / Perception of Reasons Scale, **CAS/PCS:** Coronavirus Anxiety Scale - Short Form / Perception of Control Scale, **CAS/BAS:** Coronavirus Anxiety Scale - Short Form / The Behaviors of Avoidance Scale, **PACPQ:** Perceptions and Attitudes Towards COVID-19 Pandemic Questionnaire, **NOH:** Total Number of Hospitalizations, **Pre-PTA:** Pre-Pandemic Period-Total Number of Attack, **Pre-PDA:** Pre-Pandemic Period-Total Number of Depressive Attacks, **Pre-PMA:** Pre- Pandemic Period-Total Number of Manic Attacks, **PTA:** the Pandemic Period-Total Number of Attacks, **PMA:** the Pandemic Period-Total Number of Manic Attacks, **PDA:** the Pandemic Period-Total Number of Depressive Attacks **p<0.001 *p<0.05

Regression analysis

The total number of attacks in the pandemic (PTA) and the year of education variables were found to be important factors in this model in explaining the mean total score of the FAST, which is the dependent variable (p<0.05) (Table 5).

In explaining the total number of attacks experienced during the pandemic period (PTA), which is the dependent variable, age, occupational functionality (FAST/ FO) and the CAS/PCS macro control subscale variables were found to be important factors in this model (p<0.05) (Table 5).

In explaining the total number of manic episodes experienced during the pandemic period (PMA), which is the dependent variable, total number of hospitalizations, the number of manic episodes experienced before the pandemic (Pre-PMA), the FAST occupational functioning and CA/PDS dangerousness subscale variables were found to be important factors in this model (p<0.05) (Table 5).

The CAS/PCS macro control subscale variable was found to be an important factor in this model in explaining the total number of depressive episodes experienced during the pandemic period, which is the dependent variable. (p<0.05) (Table 5).

Table 5. Regression analysis for Bipolar Disorder

	Independent Variable	Mean ± SD	OR	p
FAST	Pandemic Period – Total Attacks (PTA)	1.62 ± 1.6	0.224	0.046
	Education	12.1 ± 3.4	-0.226	0.042
PTA	Age	43.1 ± 13.2	-0.277	0.023
	FAST/ Occupational Functioning	5.0 ± 3.3	0.377	0.020
	CAS/PCS Macro Control	3.11 ± 0.8	-0.281	<0.001
PMA	Pre-PMA	2.64 ± 2.5	0.477	<0.001
	FAST/ Occupational Functioning	5.0 ± 3.3	0.271	<0.001
	CAS/PDS Dangerousness	3.28 ± 0.7	-0.208	0.037
	Total Number of Hospitalizations	2.3 ± 2.5	0.201	<0.001
PDA	CAS/PCS Macro Control	3.11 ± 0.8	0.297	<0.001

OR: Odds Ratio, **p:** linear regression enter model, **Mean ± SD**: Mean ± standard deviation, **FAST:** Functioning Assessment Short Scale, **PTA:** the Pandemic Period-Total Number of Attacks , **PMA:** the Pandemic Period-Total Number of Manic Attacks, **PDA:** the Pandemic Period-Total Number of Depressive Attacks, **Pre-PMA:** Pre- Pandemic Period-Total Number of Manic Attacks, **CAS/PCS:** Coronavirus Anxiety Scale - Short Form / Perception of Control Scale, **CAS/PDS**: Coronavirus Anxiety Scale - Short Form / The Perception of Disease Scale, significance value p= <0.05

Discussion

This is a significant study that evaluates a wide range of COVID-19 pandemic parameters together with the level of functionality, which has been shown to be an important consideration in treatment and prognosis for individuals with chronic medical and mental disorders in recent years.

Our research revealed that six BD patients also had ACD, and that alcohol intake increased among BD patients during the pandemic. The primary motivation for alcohol consumption was enjoyment among healthy controls and anxiety reduction among patients with bipolar disorder (BD). According to a review research published in 2021, receiving treatment for a mental illness and experiencing stress were linked to higher use of

alcohol [15]. An additional review revealed that psychological distress associated with COVID-19, high anxiety, loneliness, sleep disturbances, cyberbullying, and reduced physical activity were risk factors for increased alcohol consumption during the pandemic [16]. Our research indicates that patients with BD who consumed more alcohol during the pandemic period did so primarily due to poor coping mechanisms for unexpectedly high-stress situations like pandemics, even though patients themselves stated that self-medication to lessen anxiety was the primary cause. Our research indicates that patients with BD who consumed more alcohol during the pandemic period did so primarily due to poor coping mechanisms for unexpectedly high-stress situations like pandemics, even though patients themselves stated that self-medication to lessen anxiety was the primary cause.

In the current study, individuals with BD reported having more problems than healthy people in terms of eating and sleeping difficulties, sexual concerns, and decreased physical and social activities. A study published in 2020 that examined the impact of social isolation and challenges on eating behaviors discovered that during the pandemic, unhealthy food consumption, the amount of main meals, and uncontrolled eating attacks increased [17, 18]. Many studies evaluating patients with BD during the pandemic had shown that they had difficulty falling asleep, staying asleep, increasing or decreasing total sleep time, and decreasing sleep quality [19, 20].

Fear of illness, anxiety, stress, and social isolation experienced during the pandemic period may all have an impact on the sleep quality of individuals with BD. They may also have trouble falling asleep. Due to the restriction in physical and social activities caused by quarantine, time spent in bed throughout the day and total number of hours slept may increase. There are cross-sectional research in the literature on how the general population's sexual activity was altered during the pandemic phase. There has been no study exploring how BD sufferers' sexual lives were affected during the pandemic. When analyzing the research that have been completed, there are findings showing there was a drop in sexual desire, frequency, satisfaction, and function in the general population during the pandemic time, and conclusions suggesting the pandemic period negatively affects sexual life prevail [21, 22]. The fact that patients with BD experienced high levels of stress and anxiety during the pandemic period and, as a diagnostic group with difficulties maintaining interpersonal relationships, had to spend time in the same house with their partners due to social restrictions may have had a negative impact on their sexual life.

The number of hospitalizations for BD Type 1 patients was higher than for BD Type 2 patients in the pandemic. The stress-related symptoms of six patients with BD Type-1 and four patients with BD Type-2 worsened and even relapsed during the pandemic period, according to a study that looked at how 83 patients with BD Type-1 and 111 patients with BD Type-2, who had been diagnosed prior to the pandemic [23]. Another study comparing 35 patients diagnosed with BD to 40 healthy controls found that Beck depression inventory ratings of patients diagnosed with BD were considerably higher than healthy controls. Loneliness, stress, poor coping abilities, and a lack of social support during the pandemic era may cause attacks in people with BD.

According to the results of the FAST scale examination of patients with BD and healthy controls, patients with BD exhibited inferior functioning characteristics in total and in all subcategories of functioning. These data support our preliminary hypothesis, indicating that individuals with BD had more impairment in psychosocial functioning than healthy controls. BD patients, even while in the euthymic period, have lower functioning levels than healthy people, according to studies. Low years of schooling, a large number of hospitalizations, the existence of residual depressive symptoms, impulsivity, low cognitive skills, unemployment, a history of psychotic disease, and being single were all related to reduced functionality [24, 25]. Unemployment, financial difficulties, social isolation, sleep, appetite, poor mood, and anxiety symptoms that occur throughout the pandemic era can all be regarded as significant variables that may affect functionality.

Furthermore, when compared to healthy controls, the subscale scores of contagiousness, conspiracy, environment, avoidance of personal contact, perception of causes, and inevitability in attitudes regarding COVID-19 infection were considerably higher in BD patients. Patients with BD may experience more COVID-19 anxiety than the general population, and they may use cognitive distortions such as catastrophizing more dominantly with residual anxiety symptoms [26].

When the correlation between age, education level, number of attacks before and during the pandemic, which are crucial characteristics in terms of functioning in patients with BD, and functioning was assessed, significant correlations were found. Significant relationships have been observed between the total number of episodes prior to and during the pandemic and functional levels in BD patients. Consistent with the literature, these findings show that as the frequency of episodes increases, it also impacts psychosocial functioning. Functional studies in BD patients have yielded comparable results, with vocational and cognitive functioning being particularly related to the frequency of episodes. [25, 27, 28]. At the same time, the linear regression analysis conducted in this study revealed that an increase in the overall number of episodes experienced during the pandemic period was a major predictor linked with reduced functioning. The linear regression analysis conducted in the present research revealed that a low number of years of education suggested a decline in functioning. Low years of education may be associated with poor functioning in individuals with BD due to a lack of proper information about their disease, poor medication adherence, and limited socioeconomic options.

This study found that patients with bipolar disorder (BD) had significantly higher rates of job dismissal during the pandemic compared to healthy controls (3.8% vs. 0%; p=0.04). This finding aligns with prior research emphasizing the impact of job loss on functionality and psychopathology in BD. For instance, Van Rheenen et al. (2020) demonstrated that COVID-19-related job loss exacerbated depressive symptoms and financial stress in BD patients, subsequently increasing hospitalization risk [19]. Similarly, Samalin et al. (2017) highlighted unemployment as a correlate of reduced cognitive functioning and social isolation in this population [28]. Furthermore, the hypothesis that job loss may trigger manic episodes is supported by Marangoni et al. (2016), who proposed that economic uncertainty could exacerbate manic symptoms through stress-induced dysregulation of dopaminergic pathways [29]. These findings underscore job loss not only as an economic stressor but also as a biological and psychological risk factor in BD. However, the current study did not integrate job dismissal into regression analyses exploring its relationship with episode frequency or FAST scores. This gap highlights the need for future research to model environmental stressors more comprehensively in BD progression.

A higher PACPQ macro-control subscale score (i.e., the perception that COVID-19 preventive measures in Türkiye and worldwide were insufficient) was associated with an increased number of total attacks during the pandemic. Interestingly, the regression analysis also revealed that this perception predicted a greater number of depressive episodes ($\beta = 0.297$, $p < 0.01$), suggesting that patients who viewed preventive measures as ineffective may have experienced heightened stress, exacerbating depressive symptoms. Patients with high anxiety levels, who perceived COVID-19 as a major stressor and felt unsafe despite preventive efforts, were more vulnerable to depression. Conversely, a low score on the PACPQ dangerousness subscale (i.e., believing the disease is not hazardous) predicted the number of manic episodes during the pandemic. This finding aligns with the hypothesis that BD-Type 1 patients, who often exhibit impaired risk perception, might underestimate COVID-19-related threats, potentially triggering manic episodes.

Limitations

The fact that this current study was not conducted during the first phase of the pandemic, when social isolation measures were implemented and stress exposure was more severe, can be viewed as a limitation. The effects of the pandemic period on patients with BD and healthy control groups were assessed using present and former self-report questionnaires, and there may have been inadequacies due to participants' inability to recollect some data. Furthermore, since the study we conducted did not include a follow-up period, it may have been insufficient to assess the long-term impacts of patients' functioning before and after the pandemic.

Conclusion

During the COVID-19 pandemic, euthymic bipolar disorder patients exhibited significant increases in overall sleep, appetite, and alcohol consumption alongside reductions in social and physical activities and markedly higher PACPQ Perception of Disease, Reasons, and Avoidance Behaviors subscale scores compared to healthy controls. Regression analysis identified the total number of bipolar episodes during the pandemic and years of education as significant predictors of the average total FAST score in this population.

Conflict of interest: The authors declare no conflict of interest related to this article.

Author Contributions		Author Initials
SCD	Study Conception and Design	İAÇ, HE
AD	Acquisition of Data	İAÇ, HE
AID	Analysis and Interpretation of Data	İAÇ, HE
DM	Drafting of Manuscript	İAÇ, HE
CR	Critical Revision	İAÇ, HE

Financial support : None.
Acknowledgments : None.
Prior publication: The study has not been presented and/or published in whole or in part anywhere else.

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