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RESEARCH ARTICLE

The Effect of Psychological Resilience on Treatment Compliance and Functionality in Patients with Bipolar Disorder

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ABSTRACT

Introduction: Bipolar disorder (BD) is a serious psychiatric disorder that is common worldwide, and it is characterized by depressive and manic or hypomanic episodes. This study aimed to investigate the effect of psychological resilience on treatment adherence and functionality in patients diagnosed with BD.

Methods: The sample of the study consisted of a total of 111 patients, 56 women and 55 men, who were followed up with a diagnosis of BD. A Sociodemographic and Clinical Characteristics Form, the Young Mania Rating Scale (YMRS), the Hamilton Depression Rating Scale (HDRS), the Resilience Scale for Adults (RSA), the Functioning Assessment Short Test (FAST), and the Morisky Medication Adherence Scale (MMAS) were used as data collection tools.

Results: A significant negative relationship was found between the RSA scores and FAST scores of the patients (r_s=-0.762; p<0.001). It was observed that resilience predicted functionality and treatment adherence. It was determined that each 1-unit increase in RSA scores caused a 0.021unit decrease in functionality scores (p<0.001). It was observed that each 1-unit increase in RSA total scores increased the probability of good treatment adherence by 1.336 times (p<0.001).

Conclusion: In our study, it was observed that high psychological resilience had positive effects on functionality and treatment adherence in patients with BD.

Keywords: Bipolar disorder, functionality, psychological resilience, treatment adherence

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INTRODUCTION

Bipolar disorder (BD) is a serious psychiatric disorder that is common worldwide, and it is characterized by depressive and manic or hypomanic episodes (1). It can lead to significant disability due to its often chronic and recurrent nature that varies from person to person (2).

The etiopathogenesis in BD has yet to be fully elucidated. While many factors have been suggested, genetic and environmental factors are often emphasized. Among environmental factors, traumatic experiences and stressful life events come to the fore. Stress and traumatic experiences are very important in the onset and recurrence of the disease. It has been reported that the risk of clinical worsening and recurrence increases with increasing levels of stress. However, it has been stated that there are differences in individual physiological and psychological responses to the same stressors. This situation was associated with psychological resilience, a concept that has been frequently researched in recent years (3,4).

Psychological resilience is defined as the individual's adaptation process, power of recovery, or ability to successfully cope with change against major stress sources such as all kinds of traumatic events, interpersonal relationship difficulties, and serious health problems (5). It is also used as a personality trait in terms of overcoming difficulties, quick recovery, and flexibility (3,5). Psychological resilience is very important for patients with mental disorders in terms of coping with symptoms, adherence to treatment, and functionality. It has become a subject of study in the context of strengthening protective factors in cases of mental disorders. Previous studies have shown that resilience is associated with the onset of the disease, its clinical course, and the quality of life of the patient (6), and

Highlights

- **Psychological resilience was associated with functionality and treatment adherence in patients with BD.**
- **Psychological resilience increased functionality.**
- **Psychological resilience had positive effects on treatment adherence.**

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patients with BD have lower psychological resilience and lower quality of life than healthy individuals (7).

One of the most important issues affecting the quality of life of patients with BD is treatment adherence. Patients with BD can lead a high quality life with appropriate treatment. These patients have difficulty adapting to treatment due to reasons such as lack of insight or drug side effects. This causes delay and non-compliance with treatment. Recently, the concept of treatment adherence has been frequently discussed in the treatment of chronic diseases such as BD adherence with treatment is defined as accepting and applying the treatment deemed appropriate by the doctor, using the given drugs at the appropriate doses and times, not missing follow-ups, and paying attention to the recommended behavioral and lifestyle changes (8). Non-compliance with treatment is a situation where the recommended drug is not taken at the appropriate dose and time or not at all, or not attending follow-ups regularly. The most important and common form of treatment non-compliance is the failure to comply with recommended doses and frequency of drug use (9). In studies examining long-term treatment adherence in patients with BD, non-adherence rates were reported to be between 20% and 60% (10,11). This condition was associated with higher suicide rates, impaired functioning, more frequent hospitalizations, and increased economic costs (12,13).

One of the main goals of the treatment of patients diagnosed with BD is to increase their functionality. Functioning is defined as a person's ability to act independently, be self-sufficient, engage in creative activities, and establish romantic or social relationships with other people (9). Bipolar disorder affects the patient's well-being, as well as their social, occupational, and general functioning. It has been stated that patients with BD have difficulties at work, have reduced social interactions with family and friends, are uninterested in leisure activities, have difficulty in maintaining their duties, and display poor cognitive functionality (9). It has been reported that approximately 50% of patients with BD never reach their prior level of functioning despite significant symptomatic improvement (14). Therefore, increasing the treatment adherence of patients diagnosed with BD will positively affect their functionality and quality of life.

The identification of the factors that mediate both the etiology and course of BD is very important in terms of diagnosis and treatment approaches. Although psychological resilience has been investigated in many psychiatric disorders such as post-traumatic stress disorder, psychotic disorders, and depression, it has not been adequately investigated in patients with BD. A limited number of studies have investigated factors such as impulsivity (3), quality of life (7), and insight (15), which are thought to be related to psychological resilience in patients with BD. To our knowledge, no study has investigated the relationship between the psychological resilience of BD patients and their treatment adherence and functionality. This study was designed to assess the hypothesis that patients with BD with a high level of psychological resilience will show a better level of functionality and treatment adherence than patients with BD with a low level of psychological resilience. This study aimed to investigate the relationship between the psychological resilience levels of BD patients and their treatment adherence and functionality levels. Accordingly, it aimed to understand the role of psychological resilience in raising the treatment adherence and functionality levels of patients with BD, in addition to contributing to clinical practice.

METHODS

Participants

Our study, which was carried out between 01.12.2022 and 01.05.2023 using a cross-sectional research method and a correlational model, included patients who consecutively presented to the Recep Tayyip Erdoğan University Training and Research Hospital psychiatry outpatient clinic and were diagnosed with BD according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). The sample consisted of 117 cases in the euthymic phase that met the diagnostic criteria.

The criteria for euthymia were being in remission for the last 6 months (without hospitalization and treatment change in the last 6 months, not being in a clinical relapse period) and scoring ≤8 on the Hamilton Depression Rating Scale (HDRS) and ≤5 on the Young Mania Rating Scale (YMRS) at the time the scales were administered. The study included BD patients aged 18–65 who agreed to participate in the study, were literate, and had been in remission for the last 6 months. Illiterate patients, those under 18 years of age, those over 65 years of age, those with active psychotic symptoms, those with mental retardation affecting cognitive functions, those with neurodegenerative diseases, those with alcohol-substance-use disorders, and pregnant and breastfeeding women were excluded from the study. Six cases who were not found to be in the euthymic period (2 cases with HDRS >8 and 2 people with YMRS >5) and did not meet the conditions for inclusion (1 case with mental retardation and 1 case with alcohol or substance use disorder) in the study were excluded from the study. Thus, the study was conducted with 111 cases. The selection of the patient and control groups and the selection of patients not to be included in the study were carried out by a psychiatrist who is an expert in the field, after clinical interviews were conducted considering the DSM-5 diagnostic criteria and screening using SCID 5 (The Structured Clinical Interview for DSM-5). The flow diagram showing the sample selection is presented in Figure1.

Before conducting the study, ethics committee approval (No: E-40465587-050.01.04-513) was obtained from the ethics committee of Recep Tayyip Erdoğan University number 2022/187 and dated 07.11.2022. All patients included in the study were informed about the study in advance, and their written informed consent was obtained. All applicable ethical standards were complied with in this study.

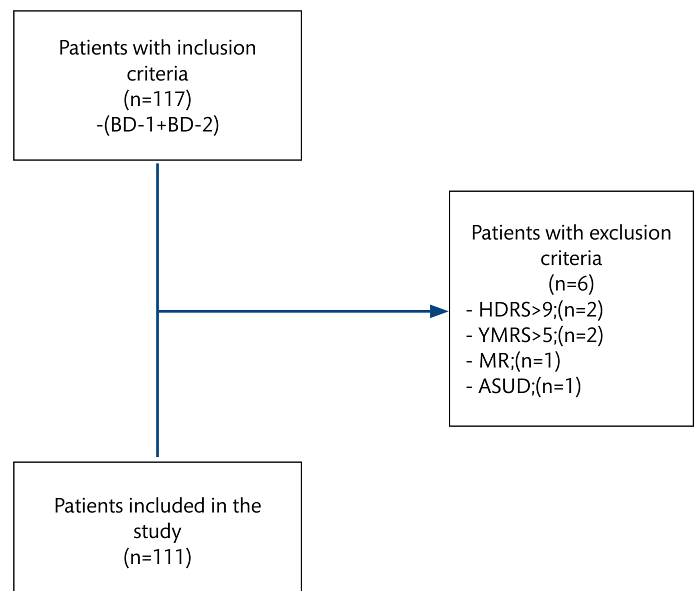

Figure 1. Flow chart of sample selection.

ASUD: alcohol-substance use disorders; BD: bipolar disorder; HDRS: Hamilton depression rating scale; MR: mental retardation; YMRS: Young mania rating scale

Data Collection Instruments

Sociodemographic and Clinical Characteristics Form

The form was created by the researcher to obtain information about the sociodemographic and clinical characteristics of the patients relevant to the objective of the study. It included questions about characteristics such as age, education level, marital status, occupation, socioeconomic level, alcohol and substance-use history, and the clinical course of the disorder.

Young Mania Rating Scale (YMRS)

The scale, which is used to evaluate the symptoms of manic episodes, was developed by Young et al (16). The score range of the Likert-type scale, which consists of a total of 11 items, is 0–44. Karadağ et al. carried out the Turkish validity and reliability study of the scale in 2011. In their validity and reliability study, they reported the Cronbach's alpha of the scale as 0.79, while this value was calculated as 0.72 for our sample (17).

Hamilton Depression Rating Scale (HDRS)

The scale was developed by Max Hamilton in 1960 to assess the severity of depressive symptoms (18). In the following years, some items were added to the scale developed by Hamilton with 17 items, and modified scales with 21 and 24 items were developed. In this study, a 17-item form was used (19). Akdemir et al. carried out the scale's Turkish validity and reliability study in 1996. In their validity and reliability study, the authors reported the Cronbach's alpha value of the scale as 0.75, while this value was calculated as 0.72 for our sample (20).

Resilience Scale for Adults (RSA)

RSA, which was developed by Friborg et al. (2003), is used to measure psychological resilience (21). The scale, which was developed as a 5-dimensional instrument in 2003, was revised in 2005 and transformed into a 6-dimensional construct, consisting of the following dimensions: Perception of Self, Perception of Future, Structural Style, Social Competence, Family Cohesion, Social Resources. The scale consists of 33 items, each scored between 1 and 5. As the RSA score of the respondent increases, their psychological resilience increases (22). Basim and Cetin carried out the scale's Turkish validity and reliability study in 2011. They reported the Cronbach's alpha value of the scale as 0.86. This value was calculated as 0.78 in our study (23).

Functioning Assessment Short Test (FAST)

Functioning Assessment Short Test (FAST) is a scale developed by Rosa et al. (2007) to evaluate the functionality levels of patients. It consists of 6 dimensions: autonomy, occupational functionality, cognitive functionality, financial issues, interpersonal relations, and leisure activities. A high score on the Likert-type scale consisting of a total of 24 items indicates that the functionality of the respondent is impaired (24). Aydemir and Uykur carried out the scale's Turkish validity and reliability study in 2012. In their validity and reliability analyses, the Cronbach's alpha value of the scale was calculated as 0.96, while the Cronbach's alpha value in our sample was 0.82 (25).

Morisky Medication Adherence Scale (MMAS)

Morisky et al. (1986) developed MMAS to evaluate drug adherence (26). The scale consists of four yes/no questions. Answers of 'no' to all questions of the scale indicate good treatment adherence. If a 'yes' answer is given to one or two questions, treatment adherence is considered to be at a moderate level. If a 'yes' answer is given to three or four questions, treatment adherence is defined as poor (26). Bahar et al. carried out the scale's Turkish validity and reliability study in 2014. They reported the Cronbach's alpha value of the scale as 0.62. The Cronbach's alpha value in our sample was 0.72 (27).

Statistical Analysis

The collected data were analyzed using IBM Statistical Package for Social Sciences (SPSS) for Windows program version 25.0 (Armonk, NY: IBM Corp). Median, minimum, maximum, mean, standard deviation, percentage, and frequency values were used as descriptive statistics. The normality of the distribution of the data was examined using visual (histogram) and analytical (Kolmogorov-Smirnov Test) methods. The Mann Whitney U test was applied to examine the mean differences of two independent groups that did not meet the normality assumption. The Kruskal-Wallis test and adjusted Bonferroni correction were used to evaluate the statistical significance of differences among groups for the variables that did not comply with normal distribution. Spearman's correlation coefficient was used to examine the relationships between continuous data. Functioning were the dependent variables; age, gender (woman), number of manic and depressive episodes, disease duration, and psychological resilience were taken as the independent variables, and multiple linear regression models were established. A forward method was used to determine the independent variables. The Enter method was used in the analyses of the models. A multinominal logistic regression model was established with age, gender (women), total number of episodes, disease duration and psychological resilience scale, total score as independent variables and adherence to treatment as dependent variables. Treatment adherence was categorized as good, moderate and poor according to the scale score. Least absolute shrinkage and selection operator (LASSO) method was used to determine the independent variables. The level of statistical significance was accepted as $p<0.05$.

RESULTS

Sociodemographic and Clinical Characteristics

Fifty-five men (49.5%) and 56 women (50.5%) diagnosed with BD were included in the study. The youngest patient was 27 years old, and the oldest was 65 years old. The distributions of the sociodemographic and clinical characteristics of the patients are given in Table 1.

The relationship between the patients' sociodemographic data and clinical characteristics and the scores they received from the psychological resilience scale was examined. A statistically significant relationship was found between the resilience-structural style and the number of hospitalizations ($r=0.239$; $p=0.012$), between the resilience-family cohesion and the total number of attacks ($r=-0.288$; $p=0.002$), between the number of manic attacks ($r=-0.259$; $p=0.006$), and between the resilience-social competence and the total number of attacks ($r=-0.202$; $p=0.033$). The relationship between the sociodemographic and clinical characteristics of the patients and RSA scores is presented in Table 2.

Comparison of Scales Applied to the Study Group

Statistically significant negative correlations were found between the RSA total and subscale scores of the patients and their FAST total and subscale scores. A strong negative correlation was observed between the RSA total and the FAST total scores of the patients ($r_s=-0.762$; $p<0.001$). The relationship between RSA and FAST scores is presented in Table 3 and Fig. 2. The scores of the patients on MMAS were classified as good, moderate, and poor, and the differences in RSA scores among these three categories were examined. Accordingly, a statistically significant difference was found among the RSA scores of the good, moderate, and poor medication adherence groups ($p<0.001$). The scale scores of the groups were presented in Table 4.

Table 1. Sociodemographic and clinical data of the patients

		patient group (n=111)	
		med (min-max)/(Mean ± SD)	
Age		45(27-65)/(45.01±11.08)	
Disease duration (years)		17(1-39)/(15.80±9.86)	
Number of hospitalizations		1(0-20)/(2.62±4.05)	
Total number of mood episodes		6(0-30)/(7.44±6.47)	
Number of manic episodes		3(0-20)/(4.27±4.30)	
Number of depressive episodes		2(0-12)/(2.54±3.04)	
		n	%
Gender	Men	55	49.5
	Women	56	50.5
Marital status	Married	31	27.9
	Single	61	55
	Divorced/widowed	19	17.1
Education	Primary-secondary school	58	52.3
	High school	30	27
	University	23	20.7
Working status	Not working	76	68.5
	Working	35	31.5
Smoker	Yes	57	51.4
	No	54	48.6
Alcohol consumption	Yes	5	4.5
	No	106	95.5
Family history of psychiatric illness	Yes	64	57.7
	No	47	42.3
History of suicide attempts	Yes	34	30.6
	No	77	69.4
Hospitalization	Yes	93	83.8
	No	18	16.2
Treatment compliance	High	54	48.6
	Low	57	51.4

Predictors of Functionality

Regarding the dependent variable, FAST total scores, a linear regression model was established with age, gender (woman), RSA total scores, duration of illness, and number of mood episodes as the independent variables, and the calculated regression model was found to be statistically significant. In the model, psychological resilience was found to be a statistically significant predictor of dependent variable, functioning (p<0.001). A 1-unit increase in RSA scores corresponded to a 0.021-unit decrease in FAST scores. The linear regression model established with the independent variables of the dependent variable of functioning is presented in Table 5.

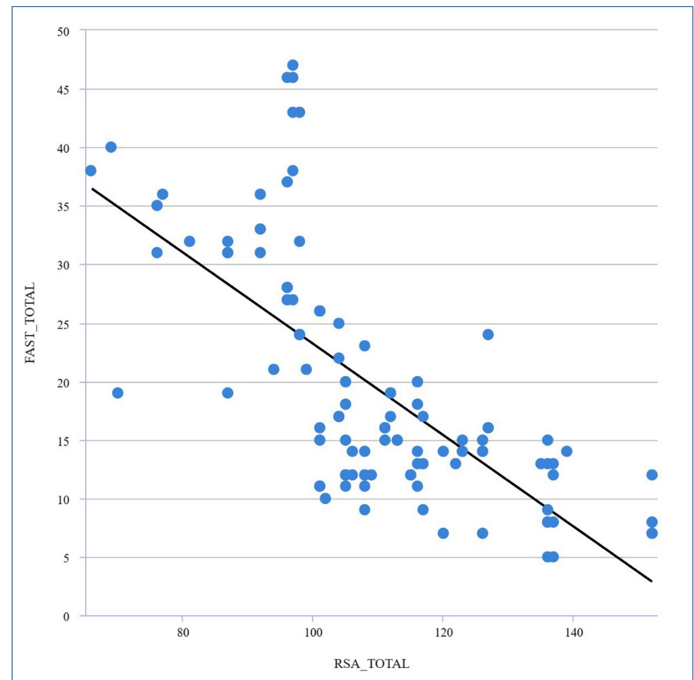

Figure 2. Graphical Representation of the Relationship between RSA Scores and FAST Scores

Predictors of Treatment Adherence

Treatment adherence was divided into two categories as good and poor as dependent variables, and the reference category was taken as poor treatment adherence. A multinominal logistic regression model was established with age, gender (woman), RSA total scores, duration of illness, and number of total mood episodes as the independent variables. only RSA total scores were found to be effective on treatment adherence. A 1-unit increase in RSA total score increases the probability of good treatment adherence by 1.336 times and the probability of moderate treatment adherence by 1.198 times (p<0.001). The multinominal logistic regression model of the factors affecting treatment adherence is presented in Table 6.

DISCUSSION

The aim of this study was to investigate the effect of psychological resilience on treatment compliance and functionality in patients with BD. The results of this study showed a strong relationship between psychological resilience and functionality in patients with BD, and when psychological resilience increased, functionality and treatment adherence also increased. According to the model we established, it was determined that the increase in psychological resilience predicted functionality and treatment adherence positively.

No statistically significant relationship was found between psychological resilience and sociodemographic variables. However, some clinical characteristics were found to be associated with psychological resilience. There are a limited number of studies investigating the relationship between sociodemographic variables and psychological resilience in patients with bipolar disorder. In a study examining the relationship between psychological resilience and sociodemographic variables such as age, gender, occupation, marital status and level of education in patients with BD in the euthymic period, no statistically significant relationship was found between sociodemographic variables and psychological resilience (28). This result was compatible with the result of our study.

Table 2. The relationship between patients' sociodemographic data and clinical characteristics and psychological resilience

		RSA-SS		RSA-PF		RSA-FC		RSA-PS		RSA-SC		RSA-SC		RSA-TOTAL	
r		p	r	p	r	p	r	p	r	p	r	p	r	p	
Age		-0.113	0.24	-0.07	0.47	0.041	0.67	0.017	0.86	0.155	0.11	0.1	0.29	0.025	0.79
DD		0.111	0.25	0.06	0.53	0.027	0.78	0.08	0.41	0.04	0.68	0.029	0.76	0.068	0.48
NTH		0.239	0.012*	0.063	0.51	-0.023	0.81	0.146	0.13	0.043	0.65	-0.036	0.71	0.111	0.25
NTE		0.111	0.25	-0.158	0.1	-0.288	0.002*	0.075	0.44	-0.202	0.033*	-0.085	0.37	-0.146	0.13
NME		0.104	0.28	-0.079	0.41	-0.259	0.006*	0.133	0.16	-0.069	0.47	-0.046	0.63	-0.056	0.56
NDE		0.174	0.07	-0.081	0.4	-0.1	0.3	-0.047	0.63	-0.166	0.08	0.017	0.86	-0.063	0.51
		med (IQR) Mean ± SD	**p**	**med (IQR) Mean ± SD**	**p**	**med (IQR) Mean ± SD**	**p**	**med (IQR) Mean±SD**	**p**	**med (IQR) Mean ± SD**	**p**	**med (IQR) Mean ± SD**	**p**	**med (IQR) Mean ± SD**	**p**
Gender	**Men**	12(5) 11.38±3.43	0.05	12(5) 11.71±3.10	0.11	20(6) 21.38±4.39	0.51	21(9) 19.37±5.66	0.49	18(8) 20.17±5.09	0.78	24(3) 24.25±3.40	0.09	105(26) 108.21±16.54	0.18
	Women	12(6) 12.52±3.57		13(3) 12.65±3.55		24(9) 21.6±5.56		18(11) 18.69±6.16		22(12) 20.31±5.61		25(5) 24.92±4.26		111.5(23) 110.69±20.35	
SA	**yes**	12(4) 11.76±3.62	0.22	12(3) 12.36±3.43	0.23	20.5(8) 22.10±4.87	0.11	18.5(10) 19.14±5.80	0.96	19.5(10) 21.07±5.07	0.05	25(5) 24.71±3.79	0.99	108(26) 111.10±18.70	0.57
	no	12(5) 12.33±3.32		13(6) 11.70±3.14		21(7) 20.07±4.96		19(9) 18.80±6.18		21(8) 18.30±5.46		25(5) 24.23±3.97		105(18) 105.43±17.37	

DD: disease duration; FC: family cohesion; NDE: Number depressive episodes; NME: number manic episodes; NTE: number total episodes; NTH: Number total hospitalisation; PF: perception of the future; PS: perception of self; RSA: resilience scale for adults; SA: suicide attempt; SC: social competence; SR: social resources; SS: structural style.
Spearman correlation. Mann-Whitney U; *p<0.05.

Table 3. Relationship between RSA scores and FAST scores

		FAST -total	FAST -A	FAST -OF	FAST -CF	FAST -FI	FAST -IR	FAST -LA
RSA -Total	r_s	-0.762	-0.643	-0.526	-0.714	-0.116	-0.614	-0.394
	p	<0.001	<0.001	<0.001	<0.001	0.227	<0.001	<0.001
RSA -SS	r_s	-0.267	-0.297	-0.317	-0.192	0.11	-0.137	-0.217
	p	0.005	0.002	<0.001	0.043	0.251	0.151	0.022
RSA -PF	r_s	-0.585	-0.48	-0.343	-0.514	-0.313	-0.456	-0.34
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RSA -FC	r_s	-0.575	-0.499	-0.366	-0.537	-0.229	-0.424	-0.305
	p	<0.001	<0.001	<0.001	<0.001	0.016	<0.001	<0.001
RSA -PS	r_s	-0.623	-0.428	-0.338	-0.576	-0.079	-0.622	-0.245
	p	<0.001	<0.001	<0.001	<0.001	0.412	<0.001	0.001
RSA -SC	r_s	-0.408	-0.393	-0.329	-0.394	0.002	-0.314	-0.204
	p	<0.001	<0.001	<0.001	<0.001	0.986	<0.001	0.031
RSA -SR	r_s	-0.37	-0.326	-0.03	-0.393	-0.011	-0.162	-0.289
	p	<0.001	<0.001	<0.001	<0.001	0.912	0.089	0.002

A: autonomy; CF: cognitive functionality; FAST: functioning assessment short test; FC: family cohesion; FI: financial issues; IR: interpersonal relations; LA: leisure activities; OF: occupational functionality; PF: perception of the future; PS: perception of self ; RSA: resilience scale for adults; r_s: Spearman's correlation coefficient; SC: social competence; SR: social resources; SS: structural style.

Table 4. Differences in RSA total and subscale scores based on MMAS scores

	Treatment compliance				
	Good (n=54)	Moderate (n=42)	Poor (n=15)		
	med (min-max)/(mean ± SD)	med (min-max)/(mean ± SD)	med (min-max)/(mean ± SD)	p	post hoc p
RSA-SS	12(4-20)/(13.13±3.73)	12(8-16)/(11.45±2.33)	8(4-16)/(9.60±4.22)	0.004*	0.005¥
RSA-FP	13(8-20)/(14.00±3.10)	12(6-15)/(11.45±2.38)	8(6-16)/(8.53±2.58)	<0.001*	<0.001¥#
RSA-FC	25(14-30)/(23.93±4.56)	19(14-30)/(19.72±3.82)	19(9-26)/(18.87±5.74)	<0.001*	<0.001¥α
RSA-PS	21.5(12-28)/(21.60±4.75)	18.5(10-29)/(19.28±5.07)	10(8-18)/(10.73±2.76)	<0.001*	<0.001¥#
RSA-SC	25.5(12-30)/(23.49±4.30)	18(11-27)/(18.10±4.28)	14(9-26)/(16.20±5.15)	<0.001*	<0.001¥α
RSA-SR	26(19-32)/(26.22±3.50)	24(15-32)/(23.75±3.28)	24(15-25)/(21.80±4.02)	<0.001*	<0.001¥α
RSA-total	122.5(96-152)/(122.31±15.55)	105(81-136)/(103.75±9.15)	87(66-112)/(85.73±13.31)	<0.001*	<0.001¥#α

FC: family cohesion; FP: future perception; PS: perception of self; RSA: resilience scale for adults; SC: social competence; SR: social resources; SS: structural style.
Kruskal-Wallis test, adjusted Bonferroni test.
*p<0.05 significant difference among all groups.
¥p<0.05 significant difference between good and poor.
#p<0.05 significant difference between moderate and poor.
αp<0.05 significant difference between good and moderate.

Table 5. Linear regression model established with independent variables for functionality as the dependent variable

	β (95% CI)	SE	t	p
(Constant)	5.227(4.744-5.709)	0.243	21.491	<0.001
Age	0.001(-0.006-0.008)	0.003	0.329	0.743
Gender (women)	-0.031(-0.168-0.107)	0.069	-0.441	0.660
NME	-0.01(-0.027-0.006)	0.008	-1.238	0.219
NDE	-0.022(-0.047-0.002)	0.012	-1.806	0.074
DD	0.002(-0.007-0.011)	0.005	0.385	0.701
RSA-Total	-0.021(-0.025-0.018)	0.002	-11.871	**<0.001***

F=24.626; Model p= <0.001; Adj. R^2=0.563; Durbin-Watson=1.948
DD: disease duration; NDE: number of depressive episodes; NME: number of manic episodes; RSA: resilience scale for adults; SE: standard error.
* p<0.001

Table 6. Multinominal logistic regression model of factors affecting treatment adherence

Moderate-poor				
	S. E.	B	OR (95% CI)	p
Gender (women)	1.111	-0.962	0.344(0.039-3.031)	0.336
Age	0.048	0.529	1.026(0.933-1.128)	0.597
NTE	0.074	0.265	1.020(0.882-1.179)	0.791
DD	0.066	1.015	1.069(0.940-1.216)	0.310
RSA-Total	0.056	3.243	1.198(1.074-1.337)	**0.001**
Good-poor				
Gender (women)	1.182	-1.579	0.155(0.015-1.568)	0.114
Age	0.052	-0.502	0.974(0.879-1.079)	0.616
NTE	0.083	-0.473	0.962(0.817-1.131)	0.636
DD	0.072	1.689	1.128(0.981-1.298)	0.091
RSA-Total	0.061	4.755	1.336(1.185-1.505)	**<0.001***

DD: disease duration; NTE: number of total episodes; RSA: resilience scale for adults; SE: standard error.
Cox-Snell R^2=0.550; Nagelkerke R^2=0.638; *p<0.001

It has been reported that psychological resilience negatively affects the clinical course in patients with BD (28). In particular, it has been stated that past suicide history and increased mood attacks are associated with weak psychological resilience (28,15). In a study conducted with 125 patients with BD, a negative relationship was reported between insomnia, impulsivity, increased mood attacks and resilience (29). In this study, a similar negative relationship was found between mood attacks and psychological resilience. It was observed that individuals with high psychological resilience experienced fewer mood attacks. This situation can be associated with the protective role of the environment and the family.

Impairment in functionality is a frequently encountered condition in BD (9). In many studies, impairments in functionality have been shown in patients with BD, and these impairments have been reported to continue even in euthymic periods (14,30). The causes of functional deterioration in BD have yet to be fully elucidated. It has been shown that a number of factors, such as clinical characteristics, sociodemographic variables, and stressors, may be influential (14,31). It was predicted that psychological resilience, which is defined as the ability to cope with stressful events in recent studies, may be related to functionality in BD (32). Studies have shown that reduced resilience may be associated with impulsivity, decreased functionality, and deterioration in quality of life (3,33). To date, no study has been conducted to directly investigate the relationship between psychological resilience and functionality in patients with BD. In a few studies, the relationship between psychological resilience and cognitive and social functionality in BD with patients was emphasized, and it was reported that functionality deteriorated when psychological resilience weakened (34,35). In this study, there was a significant negative relationship between RSA and FAST scores, supporting the results of other studies on the subject. We observed that increased psychological resilience resulted in increased functionality. This may have stemmed from the positive effects of improving resilience, which is a protective mechanism against stress and distress, on the clinical course of the disease. This positive clinical course contributed to the increase in functionality.

Treatment adherence problems are a common issue in patients with BD. Studies reported that the rate of non-compliance with long-term treatment is between 12% and 64% for patients with BD, and the average non-compliance rate was around 41% (9). A study conducted in eight different European countries showed that this rate was around 57% (36). Col et al. obtained similar results in their study which evaluated outpatients with Bipolar I disorder in 2014 and reported the non-compliance rate as 42.3% (37). Similarly, in Mert et al.'s study, non-compliance was reported in 45.5% of patients with BD (38). Another study reported the rate of non-compliance with treatment in patients with BD as 55.3% (10). The high rates of treatment non-compliance in patients with BD are striking. The rate of non-compliance with treatment obtained in our study was 51.4%, which was similar to the results in the literature.

The first choice in the treatment of BD is the pharmacological approach. Bipolar disorder patients can lead a qualified life with appropriate treatment. These patients have difficulty adapting to their treatment due to reasons such as lack of insight or drug side effects. This causes delay and non-compliance with treatment (8). Increasing non-compliance is associated with worsening clinical outcomes (high suicide rates, frequent hospitalizations), impaired functionality, and decreased quality of life (12,13). During the literature review, no study was found to date investigating the relationship between psychological resilience and treatment adherence in patients diagnosed with BD. In this study, in which we evaluated resilience and treatment adherence, we observed that total RSA scores were the highest in the group with good drug adherence. This supports the view that increased psychological resilience, which is presented as an adaptive mechanism, can positively affect the treatment adherence process.

In the linear regression model we created to explain the effect of psychological resilience on functionality, sociodemographic variables and clinical characteristics, we found that psychological resilience predicted functionality. We observed that increases in psychological resilience scores were associated with functional recovery. This finding is consistent with the results of previous studies suggesting that psychological resilience, which increases individuals' capacity to cope with challenging life events, provides more effective and independent functioning in daily life (39,40). This situation is also consistent with the results of a limited number of other studies examining patients with BD in terms of psychological resilience, recovery, quality of life and functionality (34,35,41). One of these studies reported that psychological resilience increased functionality in patients with bipolar disorder (41). The other two studies reported that individuals with high psychological resilience had better results in terms of both cognitive and social functions than those with low psychological resilience (34,35). In the model we have established, the effect of psychological resilience on gender, age and mood attacks has also been examined. As a result of the analysis, we observed that gender, age and the number of attacks had no significant effect on functionality. We interpreted this situation as psychological resilience can play a more effective role in the face of sociodemographic variables such as age and gender in order to increase functionality. At the same time, this finding is important in terms of revealing the need for interventions that will increase psychological resilience in order to improve functionality.

In the multinomial logistic regression model created to explain the effect of psychological resilience on treatment compliance, sociodemographic variables and clinical characteristics, we found that only increased psychological resilience predicted treatment compliance. We observed that increases in psychological resilience scores were associated with improvements in treatment compliance. This finding is consistent with the results of previous studies suggesting that high resilience may increase treatment compliance in individuals with chronic mental disorders such as BD (42,43). This finding is also consistent with the results of few studies that have indirectly examined the relationship between psychological resilience and treatment adherence in BD patients. These studies, which used different methods, have indicated that high psychological resilience may increase treatment adherence by providing greater resistance to stress and mood swings (44,45). The established model also examined the effect of treatment compliance on gender, age and total number of attacks. As a result of the analysis, we determined that age, gender and total number of attacks were not related to treatment compliance. This finding was interpreted as internal resources such as psychological resilience being more decisive on treatment compliance than sociodemographic variables. In addition, this situation can be interpreted as individuals with high psychological resilience being more motivated to use their medications and manage their treatments. Considering the problems related to treatment compliance in patients diagnosed with BD, strategies aimed at increasing psychological resilience gain importance.

Our study has some limitations and strengths. The fact that the age of onset of the disease and the treatments used by the patients were not taken into account and that no distinction was made according to BD subtypes are among the limitations of the study. Although psychological resilience has been studied in many mental disorders, it has been addressed in a limited number of studies for BD. In these studies, the relationship between psychological resilience and quality of life and impulsivity was examined. Our study is important as it is the first study to examine the effects of psychological resilience on functionality and treatment adherence in patients with BD.

As a result, sychological resilience is a protective factor that can be increased by various factors, and it can play an important role in both mitigating the severity of BD and as a factor that prevents or delays the onset of the disease, as well as increasing treatment adherence. Our study revealed a strong relationship between resilience and functionality in patients with BD, and increased resilience was found to positively affect functionality and treatment adherence. Improving psychological resilience, which is an important mechanism in terms of both the onset of BD and the course of BD, and increasing the number of strategies focusing on this area are very important for future treatment targets. In the follow-up of patients with BD who have low levels of functionality and poor treatment adherence, clinicians' awareness of psychological resilience may positively affect the course of the disease. There is a need for better-designed studies in this area in the future. In particular, studies with large samples examining BD subtypes and the treatments used by patients will contribute to a better understanding of the subject.

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Ethical Declaration: All procedures were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Declaration of Helsinki in 1975, as revised in 2008. Ethics committee approval was granted by our institution (Ethics Committee Approval No: E-40465587-050.01.04-513). Informed consent was obtained from all participants.

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REFERENCES

1. American Psychiatric Association. DSM-5 diagnostic classification. In: Diagnostic and Statistical Manual of Mental Disorders, 5th ed. Arlington: 2013. [Crossref]
2. Bolton S, Joyce DW, Gordon-Smith K, Jones L, Jones I, Geddes J, et al. Psychosocial markers of age at onset in bipolar disorder: a machine learning approach. BJPsych Open. 2022;8(4):1–9. [Crossref]
3. Choi JW, Cha B, Jang J, Park CS, Kim BJ, Lee CS, et al. Resilience and impulsivity in euthymic patients with bipolar disorder. J Affect Disord. 2015;170:172–177. [Crossref]
4. Lex C, Bazner E, Meyer TD. Does stress play a significant role in bipolar disorder? A meta-analysis. J Affect Disord. 2017;208:298–308. [Crossref]
5. Cam O, Buyukbayram A. Nurses' resilience and effective factors. J Psychiatric Nursing. 2017;8(2):118–126. [Crossref]
6. Perlman D, Taylor E, Molloy L, Brighton R, Patterson C, Moxham L. A path analysis of self-determination and resiliency for consumers living with mental illness. Community Ment Health J. 2018;54(8):1239–1244. [Crossref]
7. Lee D, Cha B, Park CS, Kim BJ, Lee CS, Lee SJ, et al. Effects of resilience on quality of life in patients with bipolar disorder. J Affect Disord. 2017;207:434–441. [Crossref]
8. Karaytug MO, Tamam L, Demirkol ME, Namlı Z. Bipolar bozukluk tanılı hastalarda tedaviye uyum ve ilişkili faktörler. Arşiv Kaynak Tarama Derg. 2022;31(1):21–27. [Crossref]
9. Baskaya E, Demir S. Effect of treatment adherence training given to patients with bipolar disorder on treatment adherence, social functioning and quality of life: a pilot study. Complement Ther Clin Pract. 2022;46:1–8. [Crossref]
10. Aksoy A, Kelleci M. Relationship between drug compliance, coping with stress, and social support in patients with bipolar disorder. Dusunen Adam. The Journal of Psychiatry and Neurological Sciences. 2016;29(3):210–218. [Crossref]
11. Crowe M, Wilson L, Inder M. Patients' reports of the factors influencing medication adherence in bipolar disorder - an integrative review of the literature. Int J Nurs Stud. 2011;48(7):894–903. [Crossref]
12. Averous P, Charbonnier E, Lagouanelle-Simeoni MC, Prosperi A, Dany L. Illness perceptions and adherence in bipolar disorder: an exploratory study. Compr Psychiatry. 2018;80:109–115. [Crossref]
13. Uygun E, Kucukgoncu S. Treatment adherence in patients with bipolar disorder and beliefs related to non-compliance. Psychiatry and Behavioral Sciences. 2020;10(4):192–198. [Crossref]
14. Jimenez-Lopez E, Sanchez-Morla EM, Aparicio AI, Lopez-Villarreal A, Martinez-Vizcaino V, Rodriguez-Jimenez R, et al. Psychosocial functioning in patients with psychotic and non-psychotic bipolar I disorder. A comparative study with individuals with schizophrenia. J Affect Disord. 2018;229:177–185. [Crossref]
15. Şenormancı G, Güçlü O, Özben İ, Karakaya FN, Şenormancı Ö. Resilience and insight in euthymic patients with bipolar disorder. J Affect Disord. 2020;266:402–412. [Crossref]
16. Young RC, Biggs JT, Ziegler VE, Meyer DA. A rating scale for mania: reliability, validity and sensitivity. Br J Psychiatry. 1978;133:429–435. [Crossref]
17. Karadag F, Oral T, Yalcin FA, Erten E. Reliability and validity of Turkish translation of young mania rating scale. Turk Psikiyatri Derg. 2002;13(2):107–114.
18. Hamilton M. A rating scale for depression. J Neurol Neurosurg Psychiatry. 1960;23(1):56–62. [Crossref]
19. Williams JB. A structured interview guide for the Hamilton Depression Rating Scale. Arch Gen Psychiatry. 1988;45(8):742–747. [Crossref]
20. Akdemir A, Turkçapar MH, Orsel SD, Demirergi N, Dag I, Ozbay MH. Reliability and validity of the Turkish version of the Hamilton Depression Rating Scale. Compr Psychiatry. 2001;42(2):161–165. [Crossref]
21. Friborg O, Hjemdal O, Rosenvinge JH, Martinussen M. A new rating scale for adult resilience: what are the central protective resources behind healthy adjustment? Int J Methods Psychiatr Res. 2003;12(2):65–76. [Crossref]
22. Friborg O, Barlaug D, Martinussen M, Rosenvinge JH, Hjemdal O. Resilience in relation to personality and intelligence. Int J Methods Psychiatr Res. 2005;14(1):29–42. [Crossref]
23. Basim HN, Cetin F. The reliability and validity of the resilience scale for adults –Turkish version. Turk Psikiyatri Derg. 2011;22(2):104–114.
24. Rosa AR, Sanchez-Moreno J, Martinez-Aran A, Salamero M, Torrent C, Reinares M, et al. Validity and reliability of the functioning assessment short test (FAST) in bipolar disorder. Clin Pract Epidemiol Ment Health. 2007;3(5):1–8. [Crossref]
25. Aydemir O, Uykur B. Reliability and validity study of the Turkish version of functioning assessment short test in bipolar disorder. Turk Psikiyatri Derg. 2012;23(3):193–200.
26. Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self-reported measure of medication adherence. Med Care. 1986;24(1):67–74. [Crossref]
27. Bahar G, Savas HA, Unal A, Savas E, Kaya H, Bahar A. Reliability and validity of the Morisky medication adherence scale for bipolar mood disorder. Anadolu Psikiyatri Derg. 2014;15(2):141–149. [Crossref]
28. Uygun E, Koseoğlu A, Kuçukgoncu S, Erkoc SN. Psychologic resilience and related factors in the euthymic bipolar patients. J Cogn Behav Psychother Res. 2018;7(3):120–126. [Crossref]
29. Echezarraga A, Las Hayas C, Gonzalez-Pinto AM, Lobban F, Jones S. Resilience in bipolar disorder: a qualitative study of the viewpoints of patients and health professionals. Manuscript submitted for publication; 2016.
30. Tohen M, Zarate CA Jr, Hennen J, Khalsa HM, Strakowski SM, Gebre-Medhin P, et al. The McLean-Harvard first-episode mania study: prediction of recovery and first recurrence. Am J Psychiatry. 2003;160(12):2099–2107. [Crossref]
31. Ilhan RS, Senturk Cankorur V. Clinical and cognitive predictors of psychosocial functioning during the euthymic period in bipolar disorder Type II. Turk Psikiyatri Derg. 2015;26:13–20. [Crossref]
32. Dou W, Yu X, Fang H, Lu D, Cai L, Zhu C, et al. Family and psychosocial functioning in bipolar disorder: the mediating effects of social support, resilience and suicidal ideation. Front Psychol. 2022;12:1–12. [Crossref]
33. Hofer A, Mizuno Y, Wartelsteiner F, Wolfgang Fleischhacker W, Frajo-Apor B, Kemmler G, et al. Quality of life in schizophrenia and bipolar disorder: the impact of symptomatic remission and resilience. Eur Psychiatry. 2017;46:42–47. [Crossref]
34. Bozikas VP, Parlapani E, Ntouros E, Bargiota SI, Floros G, Nazlidou EI, et al. Resilience predicts social functioning in clinically stable patients with bipolar disorder. J Nerv Ment Dis. 2018;206(7):567–574. [Crossref]
35. Deng M, Pan Y, Zhou L, Chen X, Liu C, Huang X, et al. Resilience and cognitive function in patients with schizophrenia and bipolar disorder, and healthy controls. Front Psychiatry. 2018;9:1–7. [Crossref]
36. Vieta E, Azorin JM, Bauer M, Frangou S, Perugi G, Martinez G, et al. Psychiatrists' perceptions of potential reasons for non- and partial adherence to medication: results of a survey in bipolar disorder from eight European countries. J Affect Disord. 2012;143(1-3):125–130. [Crossref]
37. Col SE, Caykoylu A, Karakas Ugurlu G, Ugurlu M. Factors affecting treatment

compliance in patients with bipolar I disorder during prophylaxis: a study from Turkey. Gen Hosp Psychiatry. 2014;36(2):208–213. [Crossref]

38. Mert DG, Turgut NH, Kelleci M, Semiz M. Perspectives on reasons of medication nonadherence in psychiatric patients. Patient Prefer Adherence. 2015;9:87–93. [Crossref]
39. Nunes KG, da Rocha NS. Resilience in severe mental disorders: correlations to clinical measures and quality of life in hospitalized patients with major depression, bipolar disorder, and schizophrenia. Qual Life Res. 2022;31(2):507–516. [Crossref]
40. Chuang SP, Wu JYW, Wang CS. Resilience and quality of life in people with mental illness: a systematic review and meta-analysis. Neuropsychiatr Dis Treat. 2023;19:507–514. [Crossref]
41. Lee J, Altshuler L, Glahn DC, Miklowitz DJ, Ochsner K, Green MF. Social and nonsocial cognition in bipolar disorder and schizophrenia-relative levels of impairment. Am J Psychiatry. 2013;170:334–341. [Crossref]
42. Echezarraga A, Las Hayas C, Lopez de Arroyabe E, Jones SH. Resilience and recovery in the context of psychological disorders. Journal of Humanistic Psychology. 2024;64(3):465–488. [Crossref]
43. Mizuno Y, Hofer A, Suzuki T, Frajo-Apor B, Wartelsteiner F, Kemmler G, et al. Clinical and biological correlates of resilience in patients with schizophrenia and bipolar disorder: A cross-sectional study. Schizophr Res. 2016;175(1-3):148–153. [Crossref]
44. Chiang K, di Scalea TL, Smith T, Spelber D, Siegel-Ramsay J, Nemeroff CB, et al. The effect of resilience on bipolar mood during specialty clinic treatment. J Affect Disord. 2024;347:314–319. [Crossref]
45. Echezarraga A, Calvete E, Gonzalez-Pinto AM, Las Hayas C. Resilience dimensions and mental health outcomes in bipolar disorder in a follow-up study. Stress Health. 2018;34(1):115–126. [Crossref]