



ORIGINAL ARTICLE

# Correlation of Autistic Symptoms With Depression and Mania Severity in Bipolar Disorder

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## ABSTRACT

**Objective:** There is an association between bipolar disorder and autism spectrum disorders. The aim of the current study is to examine the autistic characteristics of bipolar patients and to determine their relationship with the clinical features of the disease

**Methods:** Using a cross-sectional design, 148 patients with bipolar disorder (BD) were recruited to the study. The patients' clinical status were assessed by using Montgomery-Asberg Depression Rating Scale and Young Mania Rating Scale. Autistic like traits/symptoms were measured using the Autism-Spectrum Quotient (AQ).

**Results:** Within the whole group 26.4 % of the participants were classified as demonstrating higher levels of autistic traits. There was a weak positive correlation between communication/mind reading subscale of the AQ, and depression and mania severity. No significant correlations were observed between the autistic traits, and other demographic and clinical variables

**Conclusions:** We found a low rate of autistic traits/symptoms in patients with BD compared to other studies. There were weak positive correlations between the autistic features and depression and mania severity. Identification of autistic features in bipolar patients may help to better understand the etiology and clinical manifestation of the disorder.

**Keywords:** Bipolar disorder, autism spectrum disorder, clinical severity

## INTRODUCTION

Bipolar disorder (BD) is a chronic, relapsing disorder characterized by recurrent episodes of manic or depressive symptoms with intervening periods that are relatively symptom-free (1). The etiology of BD remains uncertain; both genetics, biochemical, environmental, infections, immune system disturbances, and inflammatory processes are related to the risk of

development of BD (2). Autism is characterised by a triad of impairments in the domains of social behavior, communication, and imagination (3). Patients with autism spectrum disorders (ASD) often have co-occurring psychiatric disorders (4). Clinical researches on adult ASD have shown a comorbid BD ranging from 6% to 21.4% of the cases (5). Familial studies also confirm the association between ASD and BD (6).

Genetic studies examining polygenic risk loci demonstrated shared effects on BD, autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder, schizophrenia and major depressive disorder (MDD). Moreover, this polygenic overlap was stronger between ASD and schizophrenia and ASD and BD rather than between ASD and MD (7).

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Patients with BD show some cognitive distortions which can also be seen in patients with ASD (8,9). There is growing evidence that individuals with BD have impairment in different cognitive domains even in euthymic phases (8). Social cognition was impaired more severely during acute episodes of BD, but it was also evident in euthymic patients with BD (9).

In a study conducted in the pediatric population, 57% of young people with bipolar affective disorder were shown to exhibit autistic-like traits/symptoms (10). The number of studies examining autism-like features in the adult psychiatric patient population is limited. In a study, adult patients with BD (n=56) were found to have autism-like symptoms independently of symptom severity (11). This study reported that some of the bipolar patients had depressive symptoms and that the incidence of autism-like features was 50% in bipolar patients (11). A recent study explored the autistic like traits/ symptoms in 797 individuals with BD in different phases of illness (12). In this study, it was reported that 47.2% of patients with BD had autism-like features and these autistic like traits/symptoms were related to global functioning.

Identification of autistic like traits/symptoms in bipolar patients may help to better understand the etiology of the disorder. Moreover, the effects of these autistic like traits/symptoms are important to understanding the nature of their effect on the course, outcome and treatment of the index condition (12).

The aim of this study was to examine the autistic characteristics of bipolar patients and to examine their relationship with the clinical features of the disorder.

## METHODS

### Participants

The study group consisted of 148 outpatients (mean age (standard deviation (SD)) = 39.05 (10.99) years, 41.9% female, 54.7% married/ living together, mean level of education (SD) = 11.07 (4.02) years) with a diagnosis of bipolar disorder according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition

(DSM-5) (13) presenting to the inpatient and outpatient clinics of two university hospitals (Gaziosmanpaşa University and Marmara University) between June 2016 and May 2018. Patients were included in the study if they were over 18 years old, were not acutely suicidal, did not exhibit any psychotic symptoms, or were not suffering from an uncontrolled medical disorder at the time of their presentation. Any patients with a diagnosis of mental retardation, or dementia were excluded from the study. Patients who scored lower than 10 on the Montgomery Asberg Depression Rating Scale (MADRS) (14) and lower than 7 on the Young Mania Rating Scale (YMRS) (15) were considered in remission, and 104 (70.3%) of the participants were classified accordingly. The clinicians grouped the participants according to the Autism-Spectrum Quotient's (AQ) (16). According to the (AQ) screening cut-off score of 26, 39 (26.4%) of the participants were classified as demonstrating higher levels of autistic traits. Out of the 104 remitted bipolar patients, 25 (24%) demonstrated higher levels of autistic traits. According to the cut-off score of 26 (16), and 109 (73.6%) of the participants were classified as demonstrating lower levels of autistic traits, whereas 39 (26.4%) of the participants were classified as demonstrating higher levels of autistic traits. Out of the 104 remitted bipolar patients, 79 (76%) demonstrated lower levels of autistic traits. Details of the demographic and clinical characteristics of the participants were presented in Table 1.

### Psychometric Scales

**Sociodemographic and Clinical Data Form:** Developed by the authors, this form was designed to assess the patients' sociodemographic variables (such as age, gender, level of education and occupational status), and clinical features (such as age at the time of onset of the disorder, the total duration of the disorder, history of substance abuse)

**Montgomery-Asberg Depression Rating Scale (MADRS):** It is a widely used clinical scale for rating depressive symptoms and detecting the change of

**Table 1: Demographic and clinical characteristics of the participants, and group comparisons according to these characteristics**

	Total Group (n = 148)	Participants With Low Autistic Traits (n = 109)	Participants With High Autistic Traits (n = 39)	$\chi^2$ (df) / t (df)
Age (years)	39.05 (10.99)	38.28 (11.22)	41.23 (10.16)	-1.446 (146)
Sex, female	62 (41.9)	51 (46.8)	11 (28.2)	4.075 (1)*
Marital status, married/cohabiting	81 (54.7)	52 (47.7)	29 (74.4)	8.235 (1)**
Level of education (years)	11.07 (4.02)	11.41 (3.94)	10.10 (4.16)	1.758 (146)
Place of residence, urban	89 (60.1)	66 (60.6)	23 (59.0)	0.030 (1)
Employment status, gainfully employed	66 (44.6)	44 (40.4)	22 (56.4)	2.992 (1)
Level of income, high	48 (32.4)	39 (35.8)	9 (23.1)	5.031 (2)
Comorbid medical disorder, present	60 (40.5)	46 (42.2)	14 (35.9)	0.474 (1)
Comorbid psychiatric disorder, present	9 (6.1)	6 (5.5)	3 (7.7)	0.241 (1)
Family history of psychiatric disorder, present	55 (37.2)	43 (39.4)	12 (30.8)	0.927 (1)
History of suicide attempt, present	35 (23.6)	27 (24.8)	8 (20.5)	0.288 (1)
Substance use, present	55 (37.2)	39 (35.8)	16 (41.0)	0.338 (1)
Age at onset of disorder, < 19 years	52 (35.1)	42 (38.5)	10 (25.6)	2.730 (3)
Age at onset of treatment (years)	27.72 (9.46)	26.98 (8.79)	29.79 (10.99)	-1.602 (146)
Duration of untreated disorder (months)	61.29 (60.87)	60.96 (62.66)	62.21 (56.30)	-0.109 (146)
Number of hospitalizations	3.13 (3.42)	3.04 (3.40)	3.36 (3.53)	-0.460 (123)
MADRS score	8.07 (10.71)	7.12 (10.24)	10.74 (11.66)	-1.828 (146)
YMRS score	6.14 (12.35)	5.87 (12.73)	6.87 (11.36)	-0.433 (146)
AQ score	22.18 (5.07)	19.98 (3.89)	28.31 (1.96)	-12.764 (146)***
AQ factor 1 (communication) score	5.17 (2.55)	4.46 (2.13)	7.15 (2.60)	-6.389 (146)***
AQ factor 2 (attention to details) score	6.16 (1.81)	5.78 (1.71)	7.21 (1.67)	-4.498 (146)***
AQ factor 3 (social skills) score	5.59 (2.23)	4.97 (1.98)	7.31 (1.98)	-6.316 (146)***

Note. Results are presented as mean (standard deviation) or frequency (percentage). AQ, Autism-Spectrum Quotient; MADRS, Montgomery Asberg Depression Rating Scale; YMRS, Young Mania Rating Scale. \*  $p < 0.05$ . \*\*  $p < 0.01$ . \*\*\*  $p < 0.001$ .

depression scores sensitively (13). The MADRS is a 10-item scale and items are scored on a 6-point scale. Scores range from 0 to 60, with higher scores indicating more depression. A score of 10 or below indicates normal and a score greater than 35 indicates severe depression (17). The Turkish version of the scale was shown to be valid and reliable (18).

**Young Mania Rating Scale (YMRS):** It is a widely used and easily administered scale to assess manic symptoms (15). It consists of 11 items. Items 5, 6, 8 and 9 are rated from 0 to 8, whereas the remaining items are rated from 0 to 4. The Turkish version of the scale was shown to be valid and reliable (19).

**Autism-Spectrum Quotient (AQ):** The AQ is a self-report screening instrument for measuring the severity of autistic traits across five subscales (social skills, communication, attention to detail, attention switching and imagination). It was developed by Baron-Cohen et al.

(16). This 50-item questionnaire has the ability of screening for autistic traits in the general population. The Turkish version of the scale was shown to be valid and reliable (20). Principal component analysis supported a three-factorial structure: (poor) communication/mindreading, attention to details and social skills.

### Statistical Analysis

Descriptive statistics, i.e., mean and SD for continuous variables, and frequency and percentage for categorical variables, were used to report the demographic and clinical characteristics of the participants. Participants were compared with each other using independent samples t test or Pearson's chi-square in the groups formed according to the screening cut-off score of the AQ. Intercorrelations of the scores on the AQ and its subscales, and the demographic and clinical variables were computed using Pearson's bivariate correlations.  $p$  values  $< 0.05$  were considered statistically significant. All analyses were performed by using IBM SPSS Statistics, version 22 (21).

## Procedure

All the patients were interviewed face-to-face at the outpatient clinic of the psychiatry department by experienced clinicians according to the DSM-5, and patients with a diagnosis of bipolar disorder who were willing to participate in the study were asked to fill out the AQ.

## Ethical Approval

The study protocol was approved by the Clinical Research Ethics Committee of Tokat Gaziosmanpasa University School of Medicine (Tokat, Turkey). All participants were informed about the study purposes and procedure, and gave written informed consent before participating in the study. This study was in accordance with the Declaration of Helsinki.

## RESULTS

### Group Comparisons

Participants differed from each other only on their gender and marital status. There were more women in the group with lower autistic traits, and more participants in the higher autistic traits group were married/cohabiting. No other differences were observed on any of the demographic or clinical characteristics. As expected, participants with higher autistic traits scored higher on the total score of the AQ, and its subscales. These results were presented in Table 1.

### Correlation Analyses

AQ scores correlated only weakly positively with being married/living together and depression severity. Except for the weak positive correlation between the communication/mind reading subscale of the AQ, and depression and mania severity, no significant correlations were observed between the autistic traits, and demographic and clinical variables. These results are presented in Table 2. No significant differences were found when only the patients with remitted bipolar disorder were included in the analyses.

## DISCUSSION

The objectives of this study were to examine the autistic characteristics of bipolar patients and to examine their relationship with the clinical features of the disorder. AQ scores correlated weakly positively with being married/living together and depression severity. There was also a weak positive correlation between the communication/mind reading subscale of the AQ, and depression and mania severity.

The bipolar patients in the study consist of 148 patients both from the outpatient and inpatient clinics. Female patients constituted 41.9% of the whole group. Although the female sex ratio is lower than other studies, it is close to 1: 1 ratio seen in bipolar disorder. The lifetime prevalence of bipolar disorder appears to be equal in both genders (22,23). While most of the clinical studies in bipolar patients do not show any gender difference (24,25), male preponderance can also be seen in some studies especially involving inpatients (26,27). As it was shown that phenotypic expression of autism may vary between genders (28), it may be important to evaluate the results taking this into consideration.

The mean age of the participants in the present study is  $39.05 \pm 10.99$  and it is similar to Matsuo et al's study ( $40.4 \pm 7.8$ ) (11) and younger compared to study by Abu-Akel et al. ( $49.09 \pm 11.30$ ) (12). There is no information about the educational status of patients in the study of Abu-Akel, but it is seen that the education levels of the patients in our study are lower compared to the study group of Matsuo et al. (11). In addition to studies reporting that autistic features in childhood remain stable in adulthood (29,30), there are studies reporting significant improvements in autistic characteristics with education and age (31,32).

Other variables such as marital status, working status, comorbid medical illness and substance use in our study are similar to other studies in this field (24,27).

When the cut-offs of the MADRS and YMRS scales were taken into account, it was seen that 70.3% of the whole group was in remission. Within participants 28.4% of the participants had a MADRS score higher than 10

**Table 2: Intercorrelations for autistic traits, and demographic and clinical variables**

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. AQ score	-													
2. AQ factor 1 score	.623**	-												
3. AQ factor 2 score	.530**	.110	-											
4. AQ factor 3 score	.656**	.083	.155	-										
5. Sex	.143	.127	-.048	.120	-									
6. Age	.113	.015	.084	.039	-.016	-								
7. Marital status	.220**	.050	.146	.186*	.163*	.408**	-							
8. Level of education	-.157	-.095	-.119	-.039	.113	-.135	-.279**	-						
9. Family history of psychiatric disorder	.068	.095	-.019	.027	-.029	-.018	-.025	-.134	-					
10. Age at onset of disorder	-.054	-.010	-.064	.003	-.035	-.346**	-.212**	-.016	-.078	-				
11. Age at onset of treatment	.117	.041	.059	.103	.112	.648**	.389**	-.121	-.023	-.484**	-			
12. Duration of untreated disorder	.046	.092	-.086	.023	.125	.251**	.235**	-.179*	-.257**	.207*	.262**	-		
13. MADRS score	.183*	.241**	.062	.032	-.052	-.084	-.125	-.313**	.350**	.012	-.143	-.161	-	
14. YMRS score	.122	.224**	.030	-.041	-.057	-.209*	-.233**	-.211*	.301**	.156	-.240**	-.137	.766**	-

Note. Sex coded as 0 = Female, 1 = Male, Marital status coded as 0 = Single/Separated/Divorced/Widowed, 1 = Married/Cohabiting, Family history of psychiatric disorder coded as 0 = Present, 1 = Absent, Age at onset of disorder coded as 0 = > 19 years, 1 = < 19 years. AQ, Autism-Spectrum Quotient; MADRS, Montgomery Asberg Depression Rating Scale; YMRS, Young Mania Rating Scale. \*  $p < 0.05$ ; \*\*  $p < 0.01$ .

and 20.9% had a YMRS score higher than 7. In the study by Matsuo, having a YMRS score of 8 or over was an exclusion criteria, and they divided the group as remitted and unremitted according to depression severity as assessed by Hamilton Depression Rating Scale. The remitted bipolar patients consisted 36% of the bipolar patients ( $n=56$ ) in the study by Matsuo et al. (11). But the other study did not use any remission criteria and they emphasized the importance of assessing the effects of these autistic traits in euthymic bipolar patients (12). The present study included euthymic, depressive, hypomanic/manic patients in order to better reflect the bipolar patient population, but it is also important that the majority of the group was made up of euthymic patients.

According to the (AQ) screening cut-off score of 26, 39 (26.4%) of the participants were classified as demonstrating higher levels of autistic traits. Of the 104 remitted bipolar patients, 25 (24%) demonstrated higher levels of autistic traits. The rates of autistic traits are lower compared to other studies. In a study including relatively small number of patients ( $n=56$ ), autism-like features were present in the 50% of the bipolar patient population (11). In another study which included a

larger patient population ( $n=797$ ), 47.2% of the entire sample scored positive for clinically significant levels of autistic traits (12). Compared to these studies, the rate of patients showing autistic features in our study is lower. There may be role of ethnicity and culture as it was demonstrated that autistic features may be diverse among races and cultures (33). This result may also be associated with differences in patient populations, inclusion and exclusion criteria, and the clinical scales used to assess autistic features in studies. In addition, ethnicity and culture also play a role in the appearance of autistic features. Nevertheless, the presence of autistic features in 1 out of 4 patients in euthymic patients raise the question whether these features can be trait features in a subgroup of patients.

The participants in the present study were divided into two groups according to AQ scores as showing lower levels of autistic traits and higher levels of autistic traits. Thereafter, groups were compared. There were more women in the group with lower autistic traits. This finding is intuitive due to the facts that females are socially more competent and women having autistic features are more successful at camouflaging their deficiencies (34). More participants in the higher autistic

traits group were married/ living together. It is known that people with autism tend to marry less compared to the general population (35). Although our study has only studied autistic features, this finding still needs to be explained.

According to correlation analysis, AQ scores correlated weakly positively with depression severity and being married/ living together. There were no correlations between autistic features and depression severity among patients with BD in the study by Matsuo (11). Even so, the patients with unremitted depression had significantly higher autistic like features compared to remitted depressive patients and healthy controls. It was thought that autism spectrum disorders and depression have several common symptoms such as social withdrawal and obsessiveness. Also, autistic features might be decreasing when depression is remitted and resurfacing when depressive symptoms worsen. This might also be the case in the present study with BD patients. An interesting finding of the present study is being married/ living together weakly and positively correlated with AQ scores. It is expected that communication skills will normally be better in married people. It was shown that patients with BD show some negative family attitudes and distorted behaviours during and following illness episodes (36). So, these impairments in communication and social life may be increasing the level of autistic like traits in the present study.

There was a weak positive correlation between the communication/ mind reading subscale of the AQ and depression and mania severity in the whole group. Including only the remitted bipolar patients, no significant correlations were observed between the autistic traits, and demographic and clinical variables. There were no significant correlations between autistic features and depression severity in the study Matsuo et al. (11), which used YMRS >8 as an exclusion criterion. Differences in results may be associated with different patient populations and the sample size. Disruption of communication and social skills of patients with BD during illness episodes is a clinically expected and observed condition. Therefore, an increase in autistic

symptom scores when depressive or manic symptoms increase is also clinically understandable

The results of the present study must be interpreted within the limitations of the study. The main limitations of the study were as follows:

1. The number of males in our study is higher than that of females, so the bipolar patient population may not be fully reflected.
2. Patients who agree to participate may be different from others in terms of disability characteristics and functionality because the study is based on volunteerism.
3. Another limitation is the lack of a control group.
4. Cross-sectional design is another limitation. It could be more valuable to see how the autistic features of the patients change during illness episodes and during euthymic periods.
5. The difference in group numbers during group comparisons may have made it difficult to make a better comparison.

## CONCLUSION

In conclusion, we found a low rate of autistic traits in patients with BD compared to other studies. There was a weak positive correlation between the autistic features, and depression and mania severity in the whole group. But, no significant correlations were observed between the autistic traits, and demographic and clinical variables in euthymic patients.

Identification of autistic features in bipolar patients may help to better understand the etiology and clinical manifestations of the disorder. Further studies including patients with BD in different stages of illness may contribute to understanding how these autistic features affect clinical picture and prognosis of the disorder.

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