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Research / Araştırma

Relationship of Functionality with Impulsivity and Coping Strategies in Bipolar Disorder

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ABSTRACT

Relationship of functionality with impulsivity and coping strategies in bipolar disorder

Objective: In patients with bipolar disorder, functional losses may be observed even during remission of the disease, and psychopathological traits such as impulsivity, subthreshold clinical symptoms, or stigmatization may influence functionality. Coping strategies are defined as a person's attitudes towards daily life events and their adaptedness. This study aimed to investigate the effects of coping strategies and impulsivity on functionality in bipolar disorder and whether the effect of impulsivity is mediated by dysfunctional coping strategies.

Method: This study was conducted with patients suffering from bipolar disorder (n=74) in remission and healthy controls (n=74) matched with the patient group in terms of age, gender and education. Patients were assessed using the Bipolar Disorder Functioning Questionnaire (BDFQ), Coping Strategies Inventory (COPE), Barratt Impulsiveness Scale-11 (BIS-11), Hamilton Depression Rating Scale (HAM-D), Young Mania Rating Scale (YRMS) and Hamilton Anxiety Rating Scale (HAM-A).

Results: The functionality score of the bipolar disorder group was significantly lower than in the healthy control group (p=0.027). Moreover, attention (p=0.020) and motor (p=0.006) impulsivity scores were higher and the maladaptive coping strategies score (p=0.032) was lower in the bipolar disorder group. The correlation between the total score of the BIS and the maladaptive coping strategies subscale of the COPE in the bipolar disorder group was statistically significant (r=0.38, p<0.01). Hierarchical multiple regression analysis showed that adaptive coping strategies (B=0.23, p=0.020), attention (B=-0.31, p=0.037), motor (B=0.29, p=0.027) and nonplanning (B=-0.35, p=0.003) impulsivity were the determinants of the functionality in the regression model (F=8.44, p<0.001).

Conclusion: The study has detected that functionality is affected negatively by impulsivity and positively by adaptive coping strategies in bipolar disorder, whereas the effect of coping strategies on functionality is not mediated by impulsivity. While there was a correlation between impulsivity and maladaptive coping strategies, there was no mediation between impulsivity and coping strategies, which may suggest that these dimensions are independent from each other. Prospective studies with large sample sizes should investigate the clinical determinants of functional losses in the future.

Keywords: Bipolar disorder, coping strategies, impulse control disorder

ÖZ

Bipolar bozuklukta işlevselliğin dürtüsellik ve baş etme tutumlarıyla ilişkisi

Amaç: Bipolar bozuklukta işlevsellik hastaların remisyonda olduğu dönemlerde dahi bozulabilmektedir ve dürtüsellik, eşik altı klinik belirtiler, damgalanma gibi psikopatolojik boyutların işlevselliğe etkilerinin olduğu bilinmektedir. Baş etme tutumlarıyla, bireylerin karşılaştıkları günlük olaylar karşısında tutumları ve bunların uyuma dönük olup olmadıkları ifade edilmektedir. Bu çalışmada bipolar bozuklukta baş etme tutumları ve dürtüselliğin işlevselliğe olan etkilerinin incelenmesi, dürtüselliğin uyuma dönük olan ve olmayan davranışları etkileyerek baş etme tutumları üzerinden işlevselliğe etki edip etmediğinin incelenmesi amaçlanmıştır.

Yöntem: Çalışma remisyonda bipolar bozukluğu olan 74 hasta ve yaş, cinsiyet ve eğitim durumu bakımından hasta grubuyla örtüşen 74 sağlıklı kontrol ile gerçekleştirilmiştir. Katılımcılar Bipolar Bozuklukta İşlevsellik Ölçeği (BBİÖ), Baş Etme Tutumları Ölçeği (BETÖ), Barratt Dürtüsellik Ölçeği-11 (BDÖ-11), Hamilton Depresyon Derecelendirme Ölçeği (HAM-D), Young Mani Derecelendirme Ölçeği (YMDÖ), Hamilton Anksiyete Derecelendirme Ölçeği (HAM-A) ile değerlendirilmişlerdir.

Bulgular: Bipolar bozukluk grubunun işlevsellik puanları kontrol grubuna göre anlamlı derecede düşüktü (p=0.027). Ayrıca bipolar bozukluk grubunda dikkat (p=0.020) ve motor (p=0.006) dürtüselliğin artmış olduğu ve de maladaptif baş etme tutumlarının daha fazla görüldüğü (p=0.032) tespit edilmiştir. BDÖ toplam puanıyla maladaptif baş etme tutumları arasında anlamlı derecede korelasyon saptanmıştır (r=0.38, p<0.01). Hiyerarşik çoklu regresyon analizinde, adaptif baş etme tutumları (B=0.23, p=0.020), dikkat (B=-0.31, p=0.037), motor (B=0.29, p=0.027) ve planlanmamış (B=-0.35, p=0.003) dürtüselliğin işlevselliğin belirleyicileri oldukları saptanmıştır (F=8.44, p<0.001).

Sonuç: Bu çalışmada bipolar bozuklukta işlevselliğin dürtüsellikten olumsuz biçimde, adaptif baş etme tutumlarından olumlu biçimde etkilendiğini, baş etme tutumlarının işlevselliğe etkisinde dürtüselliğin aracı rolünün olmadığı tespit edilmiştir. Dürtüsellikle maladaptif baş etme tutumları arasında bağıntı olmasına rağmen aracılık etkisinin görülmemesi, aracılık edici bir ilişki olmadığına işaret etmektedir. Büyük örneklemli izlem çalışmalarıyla işlevselliğin belirleyicilerinin değerlendirilmesi hastalıkta görülen işlev kayıplarının kontrol edilebilmesi açısından önem taşımaktadır.

Anahtar kelimeler: Bipolar bozukluk, baş etme tutumları, dürtü kontrol bozukluğu

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INTRODUCTION

Bipolar disorder is a disease characterized by depression, mania, and periods of remission, which may affect functionality (1). In the course of the disease, in addition to neurobiological factors, psychosocial components are also important (2). Personal factors such as personality, coping with stress, and social adaptation skills as well as environmental factors like exposure to stress, family structure, social environment, and prejudices towards the disease can affect its course (3). Stress and insufficient stress coping strategies underlying these factors can even lead to neurobiological consequences (4). It is evident that in bipolar disorder, stressful life events may hasten the onset of the disease (5) or affect traits of its course such as more frequent episodes of depression, psychotic symptoms, or anxiety (6). Even during remission, patients' functionality in the areas of work/school, family or interpersonal relations may deteriorate following a stressful life event (7).

When stress is mainly perceived as a threat, the situation is subsequently analyzed, evoking coping processes (8). Humans develop coping mechanisms in order to adapt to mentally and physically disturbing internal and external stimuli encountered throughout their lives and to reduce as far as possible the effects of stress factors (9). Coping is assessed under two headings: problem-centered, focusing on the main source of the problem and actively seeking a solution, or emotion-focused, trying to cope with the emotions caused by the problem and getting away from the stressor (10). Another possible distinction is that between adaptive and maladaptive coping mechanisms, the latter being considered more closely related to psychopathology (11,12). Patients suffering from bipolar disorder are known to have problems coping with problems in interpersonal relations and stress (13). Maladaptive coping mechanisms found in bipolar disorder include rumination, catastrophism, self-blame, substance use, risk-taking, behavioral disengagement, problem-direct coping, venting of emotions, or mental disengagement (14-16). The use of maladaptive coping strategies can lead to problems in areas like the patient's family life (15). Furthermore, excessive denial and lack of acceptance can lead to non-compliance in the treatment of bipolar disorder I patients (17).

Among other behavioral changes affecting functionality in bipolar disorder are impulsivity, excitement-seeking, neglect of self-care, and anxiety (16,18,19), which complicate social and professional adaptation (16,20,21). It is important to cope with these problems in order to regain functionality (16). Impulsivity is an element of a number of neurological and psychiatric diseases, consisting in a maladaptive nonplanning behavior quickly displayed towards internal or external stimuli in order to derive joy or pleasure without considering negative outcomes (19). Impulsivity is a state related to risk-taking behavior, lack of planning, rapid mental fatigue, and sudden unprepared action without focusing on the task at hand (22). In bipolar disorder, an increase is seen in both of the two elements of impulsivity, state and trait impulsivity (23). Particular trait impulsivity, which is of a permanent nature, is known to be related with suicide risk, substance use, and non-compliance with medication (24,25). Trait impulsivity, which is found in all three phases of bipolar disorder, can lead to a chronification of the disease (24), substance use, and functional disorders (20).

It was aimed to assess the relationship between functionality, coping strategies and impulsivity in bipolar disorder. It was expected that functionality will be affected negatively by impulsivity, positively by positive coping strategies, and negatively by negative coping strategies. However, considering that impulsive persons may display more negative and altogether fewer coping strategies, we also aim to find out if there is a relationship between these two dimensions.

METHOD

This study included patients (n=74) presenting to the psychiatric policlinic of our hospital between February 2016 and February 2017 in the remission

stage of bipolar disorder and healthy controls (n=74) matched to the patient group by age, level of education and gender. The participants were between 18 and 65 years of age; exclusion criteria were mental retardation, skull trauma, psychiatric or medical comorbidity, or analphabetism. In addition, for persons enrolled in the control group, the presence of psychiatric diagnoses among first-degree relatives was also an exclusion criterion. Written informed consent was obtained from the patients included in the study. The study was assessed and approved by the local ethics committee.

Measures

Demographic and clinical information was collected with sociodemographic data sheets prepared by the researchers. Clinical evaluation tools were as follow.

Hamilton Depression Scale (HAM-D): It is a 17-item test used to measure the severity of depression. It was developed by Max Hamilton (26) and is stil the most common scale used to measure severity of depression. Difficulty of sleeping,wake up at midnight, wake up at morning in the early, physical and sexual symptoms, weight loss and insight were rated 0-2 and other items 0-4. The lowest score is "0", the highest score is "53". The Turkish validity and reliability study was conducted by Akdemir et al. (27).

Young Mani Rating Scale (YMRS): It was developed by Young et al. (28). It is the most commonly scale used to measure mani severity in current clinical trials. YMRS is a measure of 11 items, each containing five degrees of intensity. Turkish validity and reliability study was conducted by Karadag et al. (29).

Hamilton Anxiety Scale (HAM-A): It was to determine the anxiety level and symptom distribution and to measure the change in intensity developed by Hamilton in 1959 (30). It consists of 14 items which question both mental and physical symptoms. The score of each item is 0-4, the total score varies between 0-56. Turkish validity and reliability study was conducted by Yazici and colleagues at 1998 (31).

Coping Strategies Inventory (COPE): This scale is a self-report instrument consisting of 60 questions developed by Carver et al. (32) in 1989. A validity and reliability study for this scale in Turkish was carried out by Agargun et al. (33). It includes 15 subscales with four questions each. The subscales are "positive reinterpretation and growth" [1], "mental disengagement" [2], "focus on and venting of emotions" [3], "seeking social support – instrumental" [4], "active coping" [5], "denial" [6], "turning to religion" [7], "laughing off" [8], "behavioral disengagement" [9], "restraint" [10], "seeking social support – emotional" [11], "alcohol-drug disengagement" [12], "acceptance" [13], "suppression of competing activities" [14], "planning" [15] (33). The assessment can be carried out along two subscales, adaptive coping strategies [1, 4, 5, 7, 8, 10, 11, 13, 14] and maladaptive coping strategies [2, 3, 6, 9, 12] (32,33) or in two different subdimensions, "emotion-focused coping methods" aimed at reducing stress [3, 6, 7, 8, 9, 11, 12, 13] and problem-solving oriented "problem-focused coping methods" [1, 4, 5, 10, 14, 15] (15,32,33).

Bipolar Disorder Functioning Questionnaire (BDFQ): This 52 itemed scale was developed by Aydemir et al. (34). It includes 11 subscales: emotional functionality [1], mental functionality [2], sexual functionality [3], feeling stigmatized [4], introversion [5], relations inside the household [6], relations with friends [7], participation in social events [8], daily activities and hobbies [9], taking initiative and using one's potential [10], and work [11]. The total score for the scale is obtained by adding up the scores of the subscales. The Cronbach alpha values for the subscales vary between 0.53 and 0.83, and Cronbach's alpha for the entire scale was established as 0.91. There is no cutoff point, as functionality improves with increasing scores.

Barratt Impulsiveness Scale-11 (BIS-11): This is a self-report scale developed by Barratt and Patton (35). It consists of 30 items and contains 3 subscales: attentional impulsiveness (attention and cognitive instability), motor impulsiveness (motor impulsiveness and perseverance) and nonplanning impulsiveness (lack of self-control and intolerance of cognitive complexity). The evaluation of the Barratt Impulsiveness Scale-11 results in 4 different subscores: total score, nonplanning, attention, and motor impulsiveness. A validity and reliability study for the Turkish version of the instrument was carried out by Gulec et al. (36).

Statistical Analysis

Statistical analyses were carried out using the SPSS 20.0 package (IBM, Armonk, New York, U.S.A.). For comparing frequencies and rates of categorical variables, the chi-squared test was used, and for the comparison of continuous variables the t test. Descriptive statistics are provided regarding sociodemographic data and clinical characteristics. Variable distribution was assessed using Shapiro-Wilks test and $p<0.05$ was accepted as statistically significant. To assess relations between all clinical variables, comparative statistics, Pearson's correlation analysis, and linear regression analysis were performed. Hierarchical multiple linear regression analysis was used to establish the determinants for functionality in the bipolar disorder group, testing if there was a mediating effect of impulsivity on the way adaptive coping strategies affected functionality. Hierarchical regression analysis allows examining the presence of latent factors. In hierarchical regression analysis, independent variables are analyzed in the sequence determined in advance by the researcher, and each variable is assessed regarding the variance in relation to the dependent variables. In hierarchical regression analysis, the predictor variables that have been analyzed previously serve as control variables for subsequently analyzed predictor variables (37,38). In other words, if with the addition of a variable to a later model the significant correlation of a variable from an earlier model becomes insignificant, it can be followed that the added variable had been a latent variable.

RESULTS

No statistical difference was found regarding age, sex, and educational status between the groups (Table 1). The YMRS scores were significantly higher in the bipolar disorder group ($p=0.032$).

In the bipolar disorder group, functionality scores were statistically significantly lower than in the control group ($p=0.027$) (Table 2). In the bipolar disorder

Table 1: Sociodemographic and clinical characteristics

	Bipolar Disorder (n=74)		Healthy Controls (n=74)			
	n	**%**	**n**	**%**	**χ^2/t**	**p**
Sex (female)	53	71.6	53	68.9	0.129	0.719
	Mean	**SD**	**Mean**	**SD**		
Age	38.43	13.17	39.70	10.82	-0.783	0.434
Education	11.70	3.96	11.59	4.55	-0.014	0.989
HAM-D	0.60	1.28	0.29	0.96	-1.920	0.055
YMRS	0.58	1.52	0.14	0.69	-2.149	0.032
HAM-A	1.24	2.38	1.54	2.42	-0.650	0.516
	n	**%**				
Familial disease history	35	47.3				
Stressful life event	27	37.5				
	Mean	**SD**				
Age at onset of disease	25.17	9.43				
Total number of episodes	7.74	7.59				

t Test and Chi-square Test, HAM-D: Hamilton Depression Rating Scale, YMRS: Young Mania Rating Scale, HAM-A: Hamilton Anxiety Rating Scale

group, attention (p=0.020) and motor (p=0.036) impulsivity scores were significantly higher than in the control group, as were the scores for maladaptive coping (p=0.032).

Correlation analysis was carried out to establish if there was a relation between the total BDFQ score and BIS and COPE (Table 3). Significant correlations with the total BDFQ score were found for problem-focused

Table 2: Intergroup comparison for functionality, impulsivity and coping mechanisms

	Bipolar Disorder (n=74)		Healthy Controls (n=74)			
	Mean	**SD**	**Mean**	**SD**	**t**	**P**
BDFQ	101.99	10.94	105.65	11.10	-2.24	0.027
BIS-11						
Total score	57.81	11.48	56.33	9.76	1.62	0.109
Attention	15.22	3.50	14.50	3.04	2.35	0.020
Motor	19.63	5.05	18.05	3.93	2.79	0.006
Nonplanning	22.94	5.80	23.78	4.94	-0.59	0.555
COPE						
A- COPE	111.47	14.70	111.14	12.04	0.32	0.745
M-COPE	42.66	7.77	40.39	7.15	2.16	0.032
P-COPE	55.98	8.39	56.09	7.48	0.27	0.791
E-COPE	98.14	13.59	95.44	11.16	1.49	0.138

t Test, BDFQ: Bipolar Disorder Functioning Questionnaire, BIS-11: Barratt Impulsiveness Scale-11, COPE: Coping Strategies Inventory (total scores reported). A-COPE: Adaptive coping strategy subscale, M-COPE: Maladaptive coping strategy subscale, P-COPE: Problem-centered coping strategy subscale, E-COPE: Emotion-focused coping strategy subscale

Table 3: Correlation analysis between scale scores

	BDFQ	**P-COPE**	**E-COPE**	**A-COPE**	**M-COPE**	**BIS**	**HAM-D**	**YMRS**
P-COPE	0.25*							
E-COPE	0.14	0.51**						
A-COPE	0.30**	0.90**	0.76**					
M-COPE	-0.06	0.26*	0.84**	0.38**				
BIS-11	-0.32**	-0.10	0.18	-0.10	0.38**			
HAM-D	-0.31**	-0.06	0.01	-0.05	0.04	0.09		
YMRS	0.15	-0.04	0.16	0.04	0.16	-0.06	-0.17	
HAM-A	-0.12	0.08	-0.03	0.01	0.02	0.31**	0.43**	-0.08

BDFQ: total score for Bipolar Disorder Functioning Questionnaire, BIS-11: Barratt Impulsiveness Scale-11, COPE: Coping Strategies Inventory (total scores reported), A-COPE: Adaptive coping strategy subscale, M-COPE: Maladaptive coping strategy subscale, P-COPE: Problem-centered coping strategy subscale, E-COPE: Emotion-focused coping strategy subscale, HAM-A: Hamilton Anxiety Rating Scale, HAM-D: Hamilton Depression Rating Scale, YMRS: Young Mania Rating Scale, Pearson's Correlation Test, *p<0.05, **p<0.01

Table 4: Determinants for functionality in the bipolar disorder group

Model		**Non-Standardized Coefficients**		**Standardized Coefficients**			
		B	**SE**	**B**	**t**	**p**	**F**
1	**Adaptive coping**	0.23	0.08	0.30	2.81	0.006	7.90*
2	**Motor impulsivity**	0.73	0.29	0.35	2.55	0.013	6.00**
	Nonplanning impulsivity	-0.65	0.22	-0.34	-2.93	0.005	
3	**Adaptive coping**	0.23	0.08	0.30	2.78	0.007	7.28**
	Motor impulsivity	0.74	0.28	0.35	2.60	0.011	
	Nonplanning impulsivity	-0.66	0.22	-0.34	-3.00	0.004	
4	**Adaptive coping**	0.18	0.08	0.23	2.37	0.020	8.44**
	Attention impulsivity	-0.89	0.42	-0.31	-2.13	0.037	
	Motor impulsivity	0.62	0.27	0.29	2.26	0.027	
	Nonplanning impulsivity	-0.67	0.22	-0.35	-3.03	0.003	

Hierarchical multiple linear regression analysis. Dependent factor: BDFQ total score, independent variables in the Step 1: adaptive, maladaptive, problem-centered, emotion-focused coping strategies; independent variables in the Step 2: adaptive, maladaptive, problem-centered, emotion-focused coping strategies, total BIS-11 score, motor, nonplanning, attention impulsivity subscales; independent variable in the Step 3: adaptive, maladaptive, problem-centered, emotion-focused coping strategies, total BIS-11 score, motor, nonplanning, attention impulsivity subscales, HAM-D, HAM-A, YMRS, age, age at onset of disease, duration of disease, total number of episodes experienced, number of hospitalizations. *p<0.01, **p<0.001

($p<0.05$) and adaptive ($p<0.01$) COPE, total BIS-11 score ($p<0.01$) and HAM-D ($p<0.01$).

Regression analysis showed that in the first step adaptive coping was a significant positive predictive variable among the coping strategies ($F=7.90$, $p<0.01$; $B=0.30$, $p=0.006$). In the last step, adaptive coping was still significant ($B=0.23$, $p=0.020$), and at the same time it was seen that impulsivity with its subdimensions of attention ($B=-0.31$, $p=0.037$), motor ($B=0.29$, $p=0.027$), and nonplanning ($B=-0.35$, $p=0.003$) was also among the significant predictive variables ($F=8.44$, $p<0.001$) (Table 4).

DISCUSSION

This study has shown that functionality in the presence of bipolar disorder is significantly reduced compared to healthy control cases, and functionality is affected negatively by attention and nonplanning impulsivity and positively by motor impulsivity and adaptive coping strategies. In addition, we have seen that in the bipolar disorder group maladaptive coping strategies are significantly more common, and motor impulsivity is also more frequently found in this group. In line with our findings, functionality disruption in bipolar disorder has been found especially in the patients' family functions (39), in interpersonal relations and in the assessment of leisure events (40,41). It has been shown that bipolar patients' marital relations deteriorate (39) and 45% of the patients are forced to give up their profession (42).

In bipolar disorder patients, impulsivity is often found even in remission stages, representing an important dimension of the loss of functionality (43,44). Bipolar disorder patients with impulsivity show a rapid and automatic behavior when focusing on their tasks, which is known for its potential to lead to problems in planning and organizing (43,44). These persons may desire instant gratification, having a low inhibition threshold and being inclined towards seeking risky and novel activities, which may induce them more frequently to apply maladaptive coping strategies (44). Thus, the negative impact of impulsivity on functionality is an expected result. It is also known that a low level of using adaptive coping strategies and a higher use of maladaptive ones may lead to an increased likelihood to develop depression (43). The fact that depression may be related with the tendency to use maladaptive coping strategies, while the used of maladaptive coping strategies creates a trend towards depression, leads to a paradoxical situation that can increase the severity of the disease. As a result, in bipolar disorder, impulsivity and depression, leading to an increased use of maladaptive coping strategies, impair functionality. Therefore, it seems appropriate in the treatment of bipolar disorder patients to focus on aims like impulse control in order to improve functionality, effective depression control, and encouragement of adaptive coping strategies.

Previous studies of coping strategies showed that frequently displayed strategies included self-blame, rumination, problem-direct coping, venting of emotions, substance use, or risk-taking (14,16). It has also been reported that bipolar disorder patients use maladaptive coping strategies more frequently and at a higher level than healthy controls (46). It was found that psychosocial interventions and psychoeducation can provide adequate ways of coping, thus improving functionality in bipolar disorder and reducing hospitalization (47). Adaptive coping strategies may allow a person to obtain more social support when encountering familial, professional, or social problems, expend more efforts towards solving the problem actively, or seek more professional support, increasing interaction with the environment and finding more effective coping methods.

Among the limitations of this study are the small sample size and the use of self-report instruments. These limitations increase the probability of a type-1 error, but the consistency of the results with the literature reduces this probability.

This study has assessed the relation of functionality with impulsivity, coping strategies, and clinical status. As a result, we have shown that adaptive coping strategies and motor impulsivity are affecting functionality positively, while attention and nonplanning impulsivity have a negative impact. Neurocognitive losses seen in remission periods (21,48-50) have the

potential in their psychopathological dimensions to affect functionality, which would be useful to examine in future studies (43). These psychopathological dimensions matter for the treatment because they can be addressed by therapeutic interventions. Beyond clinical improvement, these findings may be useful in establishing aims for the further development of functionality. Prospective studies with larger samples might be able to increase our understanding of these processes and illuminate ways of application in therapy.

Contributions category	Authors name
Development of study idea	Z.K.A., M.I.A.
Methodological design of the study	Z.K.A., M.I.A.
Data acquisition and process	Z.K.A., M.I.A.
Data analysis and interpretation	Z.K.A., M.I.A.
Literature review	Z.K.A., M.I.A.
Manuscript writing	Z.K.A., M.I.A.
Manuscript review and revision	Z.K.A., M.I.A.

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