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THE EFFECT OF EMOTIONAL DYSREGULATION AND IMPULSIVITY ON SUICIDALITY IN PATIENTS WITH BIPOLAR DISORDER

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SUMMARY

Background: *We aimed to evaluate the effect of emotional dysregulation and impulsivity on suicidality in patients with bipolar disorder by comparing patients with bipolar disorder with healthy individuals.*

Subjects and methods: *The study included 85 patients (59 women, 26 men) with bipolar disorder and education and age-matched 65 (44 women, 21 men) healthy volunteers. The patient group was separated into 3 different groups if they have a suicide attempt history, or have suicidal ideation without attempt, or have neither suicide attempt nor ideation. Sociodemographic Form, The Difficulties in Emotion Regulation Scale (DERS), Barratt Impulsivity Scale (BIS-11), Scale for Suicidal Ideation, Suicide Behaviors Questionnaire scales were applied to the participants.*

Results: *Patients with bipolar disorder (n=85) had significantly higher scores for emotion dysregulation and impulsivity than the healthy controls ($p<0.001$, $p<0.001$). The scores of DERS, BIS-11, Suicidal ideation, and Suicide behavior scores were significantly correlated. DERS Total and BIS Total scores of bipolar patients with suicide attempts were significantly higher than bipolar patients with suicidal ideation and bipolar patients with neither attempt nor ideation. According to the hierarchical regression analysis, strategies, clarity, and non-planning impulsiveness were found as the predictors of suicidal ideation in bipolar patients.*

Conclusions: *Suicidal behavior has a significant relationship between emotional dysregulation and impulsivity in patients with BD. Clinicians must carefully evaluate emotional dysregulation and impulsivity among this population to develop treatment strategies in suicide prevention.*

Key words: *emotional dysregulation – impulsivity - bipolar disorder - suicide*

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INTRODUCTION

Bipolar disorder (BD) is a common, vigorous, and disabling psychiatric disorder. The prevalence of BD is about 1-5%. However, among psychiatric disorders, BD has the highest risk of suicide (Goldstein et al. 2012). BD patients have approximately 10-30 times higher suicide risk than the population (Undurraga et al. 2011). 20-60% of BD patients assay suicide at least once during their lifespan and 20% of them have completed suicide (Undurraga et al. 2011). Since the relationship between suicide and BD is an important issue, identifying the risk factors for suicidality is a critical part of suicide prevention for BD.

Suicidality is multidimensional and consists of four main features: suicidal ideation, suicide plan, suicidal attempt, and suicidal behavior. Suicidal ideation is thoughts to end life, suicide plan is method of the suicidal ideation. Suicidal attempt is self-injury behaviors with a non-lethal outcome. Finally, suicidal behavior is the combination of suicidal ideation, plan, and attempt. Suicidal behaviors are mainly divided into two groups; impulsive suicides are mostly episodic, difficult to predict, and lead quickly to suicide attempts. In contrast, planned suicides are progressive, consists of organized thought, have a longer duration (Malhi et al. 2018).

Impulsivity (Moeller et al. 2001) is generally linked with manic episodes of BD, but may also be present in euthymic periods. Acting without inhibition and choosing immediate pleasure are two main components of impulsivity. Measuring the impulsivity traits, the Barratt Impulsivity Scale (BIS-11) is commonly used (Patton et al. 1995). It is composed of three subgroups: attention, non-planning, and motor impulsivity. Impulsivity subtypes may depend on the mood episode. While motor impulsivity is frequently related to mania, non-planning impulsivity is commonly associated with depression. During manic episodes, impulsivity is related to hypersexuality, poor judgment, and risky behaviors. In depressive episodes, difficulties in impulse control increase the risk for suicidality (Eskander et al. 2020). According to Mann et al. impulsivity increases the individuals' likelihood of acting on their suicidal thoughts. Bryan and Rudd reported that impulsivity is a more important indicator of suicide attempts than the existence of a suicide plan (Klonsky & May 2015).This situation is explained by the role of impulsivity in facilitating suicide acts among those with suicidal ideation. However, previous findings have confirmed suicide attempters had higher levels of impulsivity independent of psychopathology and this association was linked to neurobiological factors as well (Gokcay & Balcioglu 2020, Drachman et al. 2022).

Gratz and Roemer brought forth a formulation of emotion dysregulation involving 6 dimensions, according to this; emotion dysregulation (ED) is defined as deficiency of the following emotion regulation features: (i) emotion acceptance (nonacceptance), (ii) awareness of emotions (awareness), (iii) the ability to use situationally appropriate responses to meet personal aims and situational requirements (strategies), (iv) the capacity to dominate impulsive acts while going through damaging feelings (impulse), (v) acts by desired goals (goals), (vi) clarity about what emotions are experienced (clarity) (De Berardis et al. 2020). Anger bursts, suicide threats, and aggression are common examples of emotional dysregulation. According to previous researches, emotion dysregulation was associated with suicidality. Suicidal behaviors have been thought of as coping mechanisms with negative emotions. Patients who have difficulties in accepting their emotions may attempt suicide when they feel a lack of any other coping strategies (Sağlam et al. 2020). Emotion dysregulation type may also vary depending on suicidal behavior type. According to Zlotnick et al., adolescents who had suicide attempts reported more difficulties with impulse control than adolescents with suicidal ideation (Zlotnick et al. 2003). Weinberg and Klonsky reported that emotional dysregulation dimensions except awareness were linked with suicidal ideation. Furthermore, nonacceptance and strategies had the most powerful relation with suicidality (Weinberg & Klonsky 2009). Similarly, BD patients have also problems in regulating emotions compared to healthy controls even during remission periods. According to Van Rheenen et al., patients with BD have the predisposition to use negative attentional strategies such as rumination or catastrophizing, and increased impulsivity leads to difficulties in regulation of mood (Van Rheenen et al. 2015).

In light of the findings regarding the role of emotional dysregulation and impulsivity in suicidality, the goal of this study was to see if emotional dysregulation dimensions and impulsive traits differ among patients with BD who had different suicidal behaviors (suicidal ideation, suicide attempt, neither ideation nor attempt). Moreover, we aimed to investigate if these dimensions and traits could predict suicidal behavior in bipolar disorder.

SUBJECTS AND METHODS

Participants

The participants of this study were consisting of outpatients with bipolar disorder who applied to Erenkoy Training and Research Hospital for Mental Health and Neurological Diseases psychiatry outpatient clinic between November 2020 – January 2021. Eighty-five outpatient (59 women, 26 men) who met Diagnostic and Statistical Manual of Mental Disorders -DSM-5 criteria for bipolar disorder type-1 (BD), who have been in remission period for at least two months were admitted to study. The participants were evaluated by two psychiatry specialists. Screening for the suicidal behavior, a semi-structured form was used. The form had two questions. Participants were asked to respond to the question, "have you ever attempted suicide in your life?". If the participant answered yes, he/she was attended to the patient group with suicide attempt. Screening for suicidal ideation, participants answered the question "have you ever thought to attempt a suicide or made a plan for it?". If participants responded yes, he/she was considered in the patient group with suicidal ideation. Patients who had no suicide attempt history or suicidal ideation were considered the third group. Sixty-five healthy controls (44 women, 21 men), with no record of psychiatric illness, and no history of suicide attempt or suicide idea before were selected from hospital staff. The exclusion criteria of the healthy control group and the patient group were lack of education, cognitive weakening, mental retardation, and comorbid psychiatric illness (ie substance use disorder, personality disorder, anxiety disorder). Thus, thirty-eight (38) patients were excluded from the study. Barratt Impulsivity Scale (BIS-11), The Difficulties in Emotion Regulation Scale (DERS), The Beck Scale for Suicidal Ideation, and Suicide Behaviors Questionnaire scales were applied to the participants. Ethics committee approval for the study was granted by the Erenkoy Research and Training Hospital for Mental Health and Neurological diseases Ethical Committee with approval number 1 dated January 06, 2020, and written informed consent was obtained from the patients.

Instruments

Sociodemographic Data Form

This form consists of demographic features including age, gender, marital status, education, occupation, history of suicide attempt, and suicidal ideation.

Barratt Impulsivity Scale -11 (BIS-11)

The BIS-11 is a self-report scale, consists of 30-item questions for examining impulsivity as a trait (Patton et al. 1995). Cronbach's alpha of the total scale was 0.83. It evaluates three types of impulsivity: non-planning impulsivity, motor impulsivity, and attentional impulsivity. High scores mean a higher level of impulsivity. Items are rated between 1 (never) to 4 (very often, always). The Turkish version had been validated by Gulec et al. (2008). Cronbach's alpha of the total scale was 0.80, and the subscales ranged between 0.23 and 0.76 in that study. In this present study, Cronbach's alpha coefficient for BIS-11 was found to be 0.76.

The Difficulties in Emotion Regulation Scale (DERS)

DERS is a self-report scales and used to assess difficulties in emotional dysregulation (Gratz & Roemer 2004). Sample items from the six subscales include strategies, goals, nonacceptance, impulse, awareness, clarity. Items are rated from 1 (never) to 5 (always). higher scores mean higher difficulties in emotional regulation. Cronbach alpha was 0.93, and for subscales ranged between 0.80 to 0.89. Its Turkish form has been

validated by Rugancı & Gençöz (2010). In that study, Cronbach's alpha was 0.94, and the subscales ranged between 0.75 to 0.90. In this study, Cronbach's Alfa coefficient for the scale was found to be 0.92, for the subscales from 0.76 to 0.90.

The Beck Scale for Suicidal Ideation

The Beck Scale for Suicidal Ideation is a self-report scale that evaluates passive and active suicidal ideation, consists of 21-item (Beck et al. 1979). Cronbach's alpha was 0.97. The Turkish version of Suicidal Ideation has been validated by Dilbaz et al., and Cronbach's alpha was found as 0.88 (Dilbaz et al. 1995).

Suicide Behaviors Questionnaire

The scale was developed by Linehan and Nielsen in 1981, consists of four items (Linehan & Nielsen 1981). First item: 'suicide plan and attempt' is about the suicide history of the past. The second item is about 'suicide ideation' and there are 5 options. It is scoring between 0 and 4 in the Likert method. The third item is about 'suicide threat' and consists of two options. 'No' is scored as 0 and 'yes' is scored as 1 point. The fourth item is about the repeatability of suicide and consists of five options and the Likert method is scored between 0 and 4. Cronbach's alpha was found as 0.80. The Turkish version of this scale was validated by Bayam et al., and Cronbach's alpha was found 0.73 (Bayam et al. 1995).

Statistical Analysis

All statistical analyses were completed using SPSS for Windows, Version 23.0. Descriptive statistics of the data are presented with n (%), and for non-normalized variables are shown as ''median (min-max), and normal distributions are shown as "mean ± SD". In descriptive statistics, the difference was examined using Independent Samples t test for age, Pearson Chi Square and Fisher Freeman Halton Exact tests for categorical variables. The variables were analyzed with Kolmogorov-Smirnov's test of normality. Since our data were not normally distributed, we used the Kruskal Wallis-H test and Mann-Whitney U test for comparisons, and Spearman correlation coefficient for correlations. Hierarchical Regression analysis was done to investigate the association between suicidal ideation in BD patients and the DERS, BIS-11, age, and gender. A p-value less than 0.05 was taken into account statistically significant. The Bonferroni method was used for multiple comparisons. The Mann-Whitney U test with Bonferroni correction was used to compare the DERS total and BIS-11 total scores between the patient groups. A p-value less than 0.05/3 was considered significant.

RESULTS

Sociodemographic characteristics of the sample

Sociodemographic variables of the patient group and the healthy controls were shown in Table 1. The patient group was divided into 3 groups according to the history of suicide. 35.29% (n=30) of the participants had a suicide attempt, 28.24% (n=24) of the participants had suicidal ideation, and 36.47% (n=31) of the participants had neither suicide attempt nor suicidal ideation. In the control group, none of the individuals had a suicide history.

Table 1. Sociodemographic Characteristics of Sample

	Healthy Controls		Bipolar Patients		p
Variable	Mean	SD	Mean	SD	
Age	34.58	8.19	35.21	8.01	0.639[a]
Variable	n	%	n	%	
Educational status					0.614[b]
Other	3	4.61	2	2.35	
Elementary School	15	23.08	18	21.18	
Middle School	11	16.92	23	27.06	
High School	27	41.54	30	35.29	
University	9	13.85	12	14.12	
Employment					0.846[c]
Unemployed	28	43.08	40	47.06	
Housewife	3	4.62	2	2.35	
Civil Servant-Workers	27	41.54	37	43.53	
Retired	4	6.15	3	3.53	
Student	3	4.61	3	3.53	
Marital status					0.900[c]
Single	19	29.23	22	25.88	
Married	44	67.69	60	70.59	
Divorced	2	3.08	3	3.53	
Gender					0.822[b]
Female	44	67.69	59	69.41	
Male	21	32.31	26	30.59	

a = independent sample t test; b = chi square test; c = Fisher Freeman Halton Exact test

Table 2a. Comparison of Emotional Dysregulation and Impulsivity Between Bipolar Patients and Healthy Controls using Mann-Whitney U test

		Mean Rank	Min.	Max.	Median	U	z	p
DERS Total	Bipolar	46.47	41.00	164.00	91.00	4367.50	-6.09	0.001
	Healthy Controls	49.47	36.00	90.00	68.00			
DERS-Strategy	Bipolar	94.52	7.00	40.00	18.00	4379.50	-6.15	0.001
	Healthy Controls	50.62	7.00	17.00	11.00			
DERS-Non-acceptance	Bipolar	93.84	8.00	28.00	15.00	4321.00	-5.93	0.001
	Healthy Controls	51.52	6.00	14.00	11.00			
DERS-Clarity	Bipolar	86.64	5.00	25.00	13.00	3709.50	-3.61	0.001
	Healthy Controls	60.93	5.00	15.00	11.00			
DERS-Impulsivity	Bipolar	88.56	5.00	30.00	15.00	3873.00	-4.23	0.001
	Healthy Controls	58.42	6.00	20.00	12.00			
DERS-Goals	Bipolar	91.05	6.00	28.00	14.00	4084.00	-5.03	0.001
	Healthy Controls	55.17	5.00	16.00	11.00			
DERS-Awareness	Bipolar	91.21	9.00	30.00	13.00	4098.00	-5.11	0.001
	Healthy Controls	54.95	6.00	18.00	11.00			
BIS-11 Total	Bipolar	92.21	41.00	98.00	60.00	4182.50	-5.39	0.001
	Healthy Controls	53.65	33.00	71.00	49.00			
BIS-11 Motor	Bipolar	89.56	11.00	35.00	20.00	3957.50	-4.55	0.001
	Healthy Controls	57.12	12.00	33.00	16.00			
BIS-11 Attentional	Bipolar	89.14	9.00	29.00	19.00	3921.50	-4.41	0.001
	Healthy Controls	57.67	8.00	24.00	15.00			
BIS-11 Non-planning	Bipolar	88.92	13.00	40.00	21.00	3903.50	-4.34	0.001
	Healthy Controls	57.95	10.00	25.00	18.00			
Suicide Behaviors Questionnaire	Bipolar	95.00	0.00	8.00	1.00	1105.00	-7.466	0.000
	Healthy Controls	50.00	0.00	0.00	0.00			
Beck Scale for Suicidal Ideation	Bipolar	95.76	0.00	20.00	1.00	1040.00	-7.658	0.000
	Healthy Controls	49.00	0.00	0.00	0.00			

DERS = Difficulties Emotional Regulation Scale; BIS-11 = Barratt Impulsivity Scale -11

Table 2b. Comparison of Emotional Dysregulation and Impulsivity Between Bipolar with neither suicide attempt nor ideation and Healthy Controls using Mann-Whitney U test

		Mean Rank	Min.	Max.	Median	U	z	p
DERS Total	Bipolar	49.47	41.00	107.00	68.00	944.50	-0.494	0.621
	Healthy Controls	46.47	36.00	90.00	63.00			
DERS-Strategy	Bipolar	51.50	7.00	17.00	11.00	914.50	-0.734	0.463
	Healthy Controls	47.07	7.00	24.00	10.00			
DERS-Non-acceptance	Bipolar	48.88	8.00	18.00	11.00	983.00	-0.194	0.846
	Healthy Controls	47.71	6.00	14.00	10.00			
DERS-Clarity	Bipolar	53.11	5.00	20.00	11.00	643.00	-2.662	0.053
	Healthy Controls	39.74	5.00	15.00	9.00			
DERS-Impulsivity	Bipolar	52.44	6.00	24.00	12.00	751.50	-1.921	0.057
	Healthy Controls	40.24	5.00	20.00	10.00			
DERS-Goals	Bipolar	48.63	5.00	20.00	11.00	1003.50	-0.032	0.975
	Healthy Controls	48.44	6.00	16.00	11.00			
DERS-Awareness	Bipolar	53.08	10.00	18.00	12.00	865.50	-1.138	0.255
	Healthy Controls	46.32	6.00	17.00	11.00			
BIS-11 Total	Bipolar	55.94	41.00	91.00	55.00	777.00	-1.807	0.071
	Healthy Controls	44.95	33.00	71.00	49.00			
BIS-11 Motor	Bipolar	53.48	12.00	35.00	17.00	853.00	-1.217	0.224
	Healthy Controls	46.12	11.00	33.00	16.00			
BIS-11 Attentional	Bipolar	50.48	8.00	24.00	16.00	946.00	-484	0.628
	Healthy Controls	47.55	9.00	24.00	15.00			
BIS-11 Non-planning	Bipolar	52.92	16.00	35.00	18.00	945.50	-528	0.590
	Healthy Controls	49.95	10.00	25.00	20.00			

DERS = Difficulties Emotional Regulation Scale; BIS-11 = Barratt Impulsivity Scale -11

No statistically significant differences were found between the patient and the healthy control groups regarding gender (p=0.822), age (p=0.639), marital status (p=0.900), educational status (p=0.614), and employment (p=0.846).

Comparison of Impulsivity, Difficulties in Emotional Regulation Between Patient and Healthy Control Groups

A Mann-Whitney U test was done to examine DERS total, DERS Strategies, DERS Non-accept, DERS Impulsivity, DERS Goals, DERS Clarity, DERS Awareness, BIS-11 Total, BIS-11 Motor, BIS-11 Attentional, and BIS-11 Non-planning scores difference between healthy controls and bipolar patients.

In terms of DERS total, the result of the Mann-Whitney U test was significant (U=4367.5, z=-6.09, p<0.001). The distribution of DERS total for bipolar patients was significantly different from the Healthy control distribution. The median for bipolar (*Median* = 91.00) was significantly larger than the median for healthy controls *(Median* = 68.00) Table 2a presents the result of the two-tailed Mann-Whitney U test.

In terms of BIS-11 Total, the result of the Mann-Whitney U test was significant (U=4182.5, z=-5.39, *p<0.001).* The distribution of BIS-11 Total for bipolar patients was significantly different from the distribution for the healthy controls. The median for bipolar (*Median* = 60.00) was significantly larger than the median for healthy controls (*Median* = 49.00*).*

A Mann-Whitney U test was done to examine DERS total, DERS Strategies, DERS Non-accept, DERS Impulsivity, DERS Goals, DERS Clarity, DERS Awareness, BIS-11 Total, BIS-11 Motor, BIS-11 Attentional, and BIS-11 non-planning scores difference between healthy controls and bipolar patients with no suicide history. There were no statistically significant differences between two groups in terms of all scales. The results of the two-tailed Mann-Whitney U test were shown in Table 2b.

Correlations Coefficients among DERS Total, BIS-11 Total, Suicide Behaviors Questionnaire, and Beck Scale for Suicidal Ideation

Inter-correlations between BIS-11, DERS, Suicide Behaviors Questionnaire, and Beck Scale for Suicidal Ideation were presented in Table 3. DERS Total was found to be significantly and positively correlated with BIS-11 Total (r_s = 0.744, p<0.001), Suicide Behaviors Questionnaire *(*r_s =0 .770, p<0.001), and Beck Scale for Suicidal Ideation (r_s = 0.770, p<0.001). BIS-11 Total was found to be significantly and positively correlated with Suicide Behaviors Questionnaire (r_s = 0.567, p<0.001) and Beck Scale for Suicidal Ideation *(*r_s = 0.552, p<0.001). Suicide Behaviors Questionnaire was found to be significantly and positively correlated with Beck Scale for Suicidal Ideation (r_s =0.942, p<0.001).

Table 3. Correlation Coefficients among DERS total, Barratt total, Suicide Behaviors Questionnaire, and Beck Scale for suicidal ideation

		DERS Total	Barratt Total	Suicide Attempt	Suicidal Ideation
DERS Total	r	-	-	-	-
	p	-	-	-	-
BIS-11 Total	r	0.744	-	-	-
	p	<0.001	-	-	-
Suicide Behaviors Questionnaire	r	0.770	0.567	-	-
	p	<0.001	<0.001	-	-
Beck Scale for Suicidal ideation	r	0.770	0.552	0.942	-
	p	*<0.001*	*<0.001*	*<0.001*	-

DERS = Difficulties Emotional Regulation Scale; BIS-11 = Barratt Impulsivity Scale -11

Table 4. Kruskal-Wallis-H Test for *DERS Total and Barratt Total Difference Between* patients with Suicide Attempt, Suicidal Ideation and with neither Attempt nor ideation

	Bipolar with Suicide Attempt (Median) (min : max)	Bipolar with Suicidal Ideation (Median) (min : max	Bipolar with Neither Attempt nor ideation (Median) (min : max)	P_1	P_2	P_3
DERS Total	134.00 (84.00 : 164.00)	91.00 (66.00 : 133.00)	63.00 (41.00 : 107.00)	<0.001	<0.001	0.002
BIS-11 Total	77.00 (48.00 : 98.00)	60.00 (46.00 : 79.00)	55.00 (41.00 : 91.00)	0.203	<0.001	0.004

DERS = Difficulties Emotional Regulation Scale; BIS-11 = Barratt Impulsivity Scale -11; P_1 = Comparison for Bipolar with Neither Attempt nor ideation and Bipolar with Suicidal ideation; P_2 = Comparison for Bipolar with Neither Attempt nor ideation and Bipolar with Suicide Attempt; P_3 = Comparison for Bipolar with suicidal ideation and Bipolar with Suicidal attempt; Mann-Whitney U test with Bonferroni correction was used for P_1, P_2, P_3. *p <0.017 was considered statistically significant*

Table 5. Summary of Hierarchical Regression Analysis for Variables Predicting Suicide Ideation

Variable	*B*	*SE*	95% CI	β	*p*
Model 1					
(Intercept)	1.74	1.18	[-0.60, 4.08]	0.00	0.144
Age	-0.00	0.03	[-0.07, 0.06]	-0.01	0.896
Gender male	-0.40	0.56	[-1.51, 0.71]	-0.06	0.472
Model 2					
(Intercept)	-6.22	1.38	[-8.94, -3.50]	0.00	<0.001
Age	0.04	0.02	[-0.01, 0.08]	0.09	0.134
Gender male	-0.03	0.41	[-0.84, 0.78]	-0.00	0.940
DERS Clarity	0.25	0.08	[0.09, 0.40]	0.35	0.002
DERS Awareness	-0.07	0.07	[-0.22, 0.07]	-0.09	0.322
DERS Strategies	0.18	0.04	[0.09, 0.27]	0.43	<0.001
DERS Impulsivity	-0.03	0.06	[-0.15, 0.09]	-0.05	0.636
DERS Nonacceptance	0.05	0.07	[-0.09, 0.19]	0.09	0.450
DERS Goals	-0.02	0.08	[-0.17, 0.14]	-0.02	0.842
BIS-11 Motor	-0.02	0.05	[-0.12, 0.08]	-0.04	0.685
BIS-11 Attentional	-0.02	0.05	[-0.13, 0.09]	-0.03	0.734
BIS-11 non-Planning	0.11	0.05	[0.01, 0.20]	0.19	0.025

DERS = Difficulties Emotional Regulation Scale; BIS-11 = Barratt Impulsivity Scale -11

Comparison of DERS Total and Barratt Total between patients with Suicide Attempt, Suicidal Ideation and with neither attempt nor ideation

A Kruskal Wallis-H test was conducted to assess if there were significant differences in DERS total and Barratt Total scores between patients with suicide attempt, suicidal ideation and with neither attempt nor ideation. The results of the Kruskal Wallis-H test were significant for both DERS total ($\chi^2(2) = 55.09$, $p<0.001$) and Barratt Total ($\chi^2(2) = 26.69$, $p<0.001$). The median of DERS Total and Barratt Total were significantly different between patients with suicide attempts, suicidal ideation, and neither attempt nor ideation. The Mann-Whitney U test with Bonferroni correction test results indicated significant that DERS Total and Barratt Total median values were higher for the bipolar group with suicide attempts than the bipolar group with suicidal ideation ($p<0.002$, $p<0.004$), and the bipolar group with neither suicide attempt nor ideation ($p<0.001$, $p<0.001$). Moreover, DERS total median values were higher for patients with suicidal ideation than the patients with neither suicide attempt nor suicidal ideation ($p<0.001$). The results of the Kruskal Wallis-H Test were presented in Table 4.

The Predictors of Suicidal Ideation in Patients with Bipolar Disorder

The *F*-test for Model 1 was not significant, $F(2, 147) = 0.26$, $p=0.768$, $\Delta R^2 = 0.00$. This model indicates that adding age and gender did not explain an extra variation in suicidal ideation. Age and sex were considered as non-interest variables and entered in the first step of the multiple regression. The *F*-test for Model 2 was significant, $F(9, 138) = 16.60$, $p<0.001$, $\Delta R^2 = 0.52$. This model indicates adding DERS Clarity, DERS Awareness, DERS Strategies, DERS Impulsivity, DERS Non-accept, DERS Goals, Barratt Motor, Barratt Attentional, and Barrrat Non-planning explained an additional 51.79% of the variation in suicidal ideation. The Wald criterion demonstrated that DERS Clarity ($p=0.002$), DERS Strategies ($p=0.001$), Non-planning Impulsiveness ($p=0.025$), made a significant contribution to prediction. The results for the model comparisons are in Table 5.

DISCUSSION

In this study, we examined the relationship between emotional dysregulation, impulsivity, and suicidality in patients with BP. The patient group is divided into 3 subgroups according to have suicide attempt history, have suicidal ideation without attempt, and have neither suicide attempt nor ideation. According to our results, bipolar patients had significantly higher scores for emotion dysregulation and impulsivity than health control groups as expected. The scores of all of the subscales of DERS and the subscales of impulsivity were significantly higher than the scores of the healthy control group. This result is similar to the literature. Emotion regulation problems are more experienced in bipolar pathophysiology models, especially since mood lability and problems in emotional regulation may results negative consequences such as suicidality (Townsend & Altshuler 2012). Becerra et al. reported differences in the six dimensions compared with the healthy controls and euthymic BD patients reported severe problems in regulating emotions (Becerra et al. 2013). Recently, Van Rheenen indicated that no matter what the present mood episode, among bipolar patients, severe symptoms are associated with severe problems in emotion regulation. Especially, difficulties in impulse control predicted mania tendency, and difficulties in strategy predicted depressive tendency in BD patients (Van Rheenen et al. 2015).

Impulsivity which is associated with a manic episode may also be found during the euthymic period. Consistent with the literature, in our study, the impulsivity scores of euthymic BD patients were significantly higher than the healthy control group. Moreover, according to our results, a positive correlation was found between emotion dysregulation, impulsivity, suicidal ideation, and suicide attempt. The association between suicidality and impulsivity has been shown in many previous researches. Swann et al. reported a relation between suicide attempts and impulsivity in bipolar patients (Swann et al. 2005). Michaelis et al. also compared bipolar patients according to their history of suicide attempts. Bipolar patients who had a history of suicide attempt had higher impulsivity levels (Michaelis et al. 2004). Maser et al. reported that impulsivity was one of the best long-term predictors of suicide behavior in patients with BD (Maser et al. 2002). Consistent with the literature, in our study, BIS-11 scores were higher in bipolar patients with suicide attempts than patients with suicidal ideation.

Difficulties in regulating emotion regulation may be an independent risk for suicide attempts and suicidal ideation (Anestis et al. 2011, De Berardis et al. 2020). Especially, in patients with post-traumatic stress disorder (PTSD), mood disorder, and borderline personality disorder, emotional instability increases the risk of suicidal ideation (Bayes et al. 2016). However, childhood trauma is one of the important factors causing emotional instability in these patients. Especially emotional abuse was found as a predictor factor for lifetime suicide attempts in bipolar patients. We may interpret these results as emotional abuse may increase the suicide risk by leading an inadequate emotional regulation (Janiri et al. 2018). Our findings support the results of previous researches that indicate emotion dysregulation is associated with suicidal thoughts (Tamás et al. 2007). However, in a very recent study that investigated the relationship between emotional dysregulation and suicide risk in a younger population (aged between 14-25) with mood disorder, emotional dysregulation had been shown as an independent risk factor for lifetime suicidal ideation in those population (Janiri et al. 2021). Furthermore, similar to our study design, Palagini et al. reported that insomnia was associated with emotional dysregulation, impulsivity, and suicidality in patients with BD (Palagini et al. 2019).

Weinberg and Klonsky reported that suicidal ideation was linked with each of the emotional dysregulation dimensions except awareness. Furthermore, strategies had the most powerful relation among the other dimensions (Weinberg and Klonsky 2009). Our results also support previous findings in terms of problems in emotion regulation that differs among suicidal ideators and suicide attempters since attempters had higher scores for DERS than the ideators (Zlotnick et al. 2003). Moreover, according to our results DERS strategies, DERS Clarity, and BIS Non-planning impulsivity made a significant contribution to suicide ideation prediction in patients with BD. According to a recent study that investigated the ability of DERS to predict ideation of suicide in individuals with different histories of suicidality, scores of strategies subscales of DERS were significantly higher in individuals with suicide attempts than in the other groups. This result is accordant with the theory that suicidal behaviors are considered as attempts to get away from negative feelings since individuals believe that they cannot arrange their feelings with other formulations (Brown 2006). Thus, we can interpret those results as strategies is the emotion dysregulation dimension which is strongly related to suicide ideation. Since patients with BD are known to have significantly less emotional clarity and they avoid or do not accept reactions to negative emotions, it can have important functional consequences. It has been assumed that poor emotional clarity places greater importance to understand emotional experiences and as a result, reduces the allocation of resources required for the arrangement of adaptive behaviors (Salovey et al. 1995). Moreover, suppressing the emotions or avoiding the emotions cause insufficient coping strategies. Finally, these negative strategies intensify emotions inconsistently and contribute to negative experiences (Gratz & Tull 2010). According to Williams, suicidal behavior is a response to a strained circumstance that stimulates feelings of frustration and is seen as inescapable. Thus, less emotional clarity and lack of appropriate strategies may lead a patient with BD to feel incapable to get over his or her negative feelings and this situation may cause suicidal ideation.

Previous studies reported higher impulsivity scores in suicide attempters. However, type of the impulsivity scores of BIS may depend on the psychiatric disorder. For example, attempters with borderline personality disorder usually scored higher motor impulsiveness scores. However, according to a recent study, total BIS-11 scores and non-planning impulsivity scores were significantly higher in patients with schizophrenia, and affective disorders with a history of a suicide attempt. According to our results, non-planning impulsivity is one of the predictors for suicidal ideation in patients with BD. Patients with schizophrenia and affective disorders had frequently used highly lethal suicidal methods and according to these results impulsivity could be behind those findings (Doihara et al. 2012).

Our study has some limitations. First, the participants of this study were recruited from one psychiatric outpatient clinic in Turkey. Second, our study is cross-sectional, and the sample size was relatively small. Third, variables about pharmacological treatment of the patients, such as compliance of medical treatment, duration time without treatment, type of pharmacological treatment may have an effect on the suicide. We could not evaluate the treatment history. Finally, we used self-rated scales and the investigation method of suicidal ideation and history of suicide attempt was subjective.

CONCLUSIONS

In conclusion, our study, although limited, suggests that patients with bipolar disorder had significantly higher emotion dysregulation problems and higher impulsivity scores than health control group. there is positive correlation between emotion dysregulation, impulsivity with suicidal ideation and suicide behavior in patients with bipolar disorder. Bipolar patients with suicide attempt had higher emotion dysregulation problems and higher impulsivity scores than bipolar patients with suicidal ideation and bipolar patients with neither attempt not ideation. Clinicians must carefully evaluate emotional dysregulation and impulsivity among this population to develop appropriate therapeutic strategies in suicide prevention.

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Contribution of individual authors:

Kulacaoglu Filiz: design of the study, literature research, sample collection, statistical design, interpretation of the data, writing the manuscript.

Izci Filiz: design of the study, literature research.

References

1. *Anestis MD, Bagge CL, Tull MT, Joiner TE: Clarifying the Role of Emotion Dysregulation in the Interpersonal-Psychological Theory of Suicidal Behavior in an Undergraduate Sample. J Psychiatr Res 2011; 45:603–11*
2. *Bayam G, Dilbaz N, Bitlis V, Holat H, Tüzer T. 1995: İntihar Davranışı ile Depresyon, Ümitsizlik, İntihar Düşüncesi İlişkisi: İntihar Davranış Ölçeği Geçerlilik, Güvenirlik Çalışması. Kriz Dergisi 1995; 3:223–25*
3. *Bayes A, Parker G, McClure G: Emotional Dysregulation in Those with Bipolar Disorder, Borderline Personality Disorder and Their Comorbid Expression. J Affect Disord 2016; 204: 103–11*
4. *Becerra R, Cruise K, Murray G, Bassett D, Harms C, Allan A, et al.: Emotion Regulation in Bipolar Disorder: Are Emotion Regulation Abilities Less Compromised in Euthymic Bipolar Disorder than Unipolar Depressive or Anxiety Disorders? 2013. doi:10.4236/ojpsych.2013.34A001*
5. *Beck AT, Kovacs M, Weissman A: Assessment of Suicidal Intention: The Scale for Suicide Ideation. J Consult Clin Psychol 1979; 47: 343*
6. *Brown MZ: Linehan's Theory of Suicidal Behavior: Theory, Research, and Dialectical Behavior Therapy 2006. doi:10.1002/jclp.20243*
7. *De Berardis D, Fornaro M, Orsolini L, Ventriglio A, Vellante F, Di Giannantonio M: Emotional Dysregulation in Adolescents: Implications for the Development of Severe Psychiatric Disorders, Substance Abuse, and Suicidal Ideation and Behaviors. Multidisciplinary Digital Publishing Institute 2020. doi:10.3390/brainsci10090591*
8. *Dilbaz N, Holat H, Bayam G, Tüzer T, Bitlis V: İntihar Düşüncesi Ölçeğinin Geçerlilik ve Güvenirliği. 31. Ulusal Psikiyatri Bilimler Kongresi Bilimsel Çalışma Kitabı 1995; 40–41*
9. *Doihara C, Kawanishi C, Ohyama N, Yamada T, Nakagawa M, et al.: Trait Impulsivity in Suicide Attempters: Preliminary Study. Psychiatry Clin Neurosci 2012; 66: 529–32*
10. *Drachman R, Colic L, Sankar A, Spencer L, Goldman DA, et al.: Rethinking 'Aggression' and Impulsivity in Bipolar Disorder: Risk, Clinical and Brain Circuitry Features." J Affect Disord 2022; 303: 331–39*
11. *Eskander N, Emamy M, Saad-Omer SM, Khan F, Jahan N: The Impact of Impulsivity and Emotional Dysregulation on Comorbid Bipolar Disorder and Borderline Personality Disorder. Cureus 2020; 12 (8). doi:10.7759/cureus.9581*
12. *Gokcay H, Balcioglu HB: Neurobiology of Impulsivity and Aggression as Substrates of Suicidal Behavior: A Narrative Focus on the Involvement of Serum Lipids. Psych and Behav. Neurosciences 2020; 10: 219-228*
13. *Goldstein TR, Ha W, Axelson DA, Goldstein BI, Liao F, Gill MK, et al.: Predictors of Prospectively Examined Suicide Attempts among Youth with Bipolar Disorder. Arch Gen Psychiatry 2012; 69: 1113–22*
14. *Gratz KL, Roemer L: Multidimensional Assessment of Emotion Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of the Difficulties in Emotion Regulation Scale. J Psychopathol Behav Assess 2004; 26: 41–54*
15. *Gratz KL, Tull MT: The Relationship between Emotion Dysregulation and Deliberate Self-Harm among Inpatients with Substance Use Disorders. Cogn Ther Res 2010; 34: 544–53*
16. *Güleç H, Tamam L, Turhan M, Karakuş G, Zengin M, Stanford SM: Psychometric Properties of the Turkish Version of the Barratt Impulsiveness Scale-11. Klin Psikofarmakol Bul 2008; 18*
17. *Janiri D, Rossi PD, Kotzalidis GD, Girardi P, Koukopoulos AE, Reginaldi D, et al.:2018. "Psychopathological Characteristics and Adverse Childhood Events Are Differentially Associated with Suicidal Ideation and Suicidal Acts in Mood Disorders." Eur Psychiatry 2018; 53:31–36*
18. *Janiri D, Moccia L, Conte E, Palumbo L, Chieffo DPR, Fredda G, et al: Emotional Dysregulation, Temperament and Lifetime Suicidal Ideation among Youths with Mood Disorders. J Pers Med 2021; 11:865*
19. *Klonsky ED, May AM: Impulsivity and Suicide Risk: Review and Clinical Implications. Psychiatr Times 2015; 32:13–13*
20. *Linehan MM, Nielsen SL: Assessment of Suicide Ideation and Parasuicide: Hopelessness and Social Desirability. J Consult Clin Psychol 1981; 49:773*
21. *Malhi GS, Outhred T, Das P, Morris G, Hamilton A, Mannie Z: Modeling Suicide in Bipolar Disorders. Bipolar Disord 2018; 20:334–48*
22. *Maser JD, Akiskal HS, Schettler P, Scheftner W, Mueller T, Endicott J, et al.: Can Temperament Identify Affectively Ill Patients Who Engage in Lethal or Near-Lethal Suicidal Behavior? A 14-Year Prospective Study. Suicide Life Threat Behav 2002; 32:10–32*
23. *Michaelis B, Goldberg JF, Davis GP, Singer TM, Garno JL, Wenze SJ 2004: Dimensions of Impulsivity and*

Aggression Associated with Suicide Attempts among Bipolar Patients: A Preliminary Study. Suicide and Life Threat Behav 2005; 34:172–76

24. *Moeller FG, Barratt ES, Dougherty DM, Schmitz JM, Swann AC: Psychiatric Aspects of Impulsivity. Am J Psychiatry 2001; 158:1783–93*
25. *Palagini L, Cipollone G, Masci I, Caruso D, Paolilli F, Perugi G, et al.: Insomnia Symptoms Predict Emotional Dysregulation, Impulsivity and Suicidality in Depressive Bipolar II Patients with Mixed Features. Compr Psychiatry 2019; 89:46–51*
26. *Patton JH, Stanford MS, Barratt ES: Factor Structure of the Barratt Impulsiveness Scale. J Clin Psychol 1995; 51:768–74*
27. *Rugancı RN, Gençöz T: Psychometric Properties of a Turkish Version of the Difficulties in Emotion Regulation Scale. J Clin Psychol 2010; 66:442–55*
28. *Sağlam F, Aslan E, Hurşitoğlu O: Bipolar Bozukluk Hastalarının ve Birinci Derece Yakınlarının Duygu Düzenleme Güçlükleri. Anatol J Psychiatry/Anadolu Psikiyatri Derg 2020; 21:30-36*
29. *Salovey P, Mayer JD, Goldman SL, Turvey C, Palfai TP: Emotional Attention, Clarity, and Repair: Exploring Emotional Intelligence Using the Trait Meta-Mood Scale. 1995. doi:10.1037/10182-006*
30. *Swann AC, Dougherty DM, Pazzaglia PJ, Pham M, Steinberg JL, Moeller FG: Increased Impulsivity Associated with Severity of Suicide Attempt History in Patients with Bipolar Disorder. Am J Psychiatry 2005; 162:1680–87*
31. *Tamás Z, Kovacs M, Gentzler AL, Tepper P, Gádoros J, Kiss E, et al.: The Relations of Temperament and Emotion Self-Regulation with Suicidal Behaviors in a Clinical Sample of Depressed Children in Hungary. J Abnorm Child Psychol 2007; 35:640–52*
32. *Townsend J, Altshuler LL: Emotion Processing and Regulation in Bipolar Disorder: A Review. Bipolar Disord 2012; 14:326–39*
33. *Undurraga J, Baldessarini RJ, Valenti M, Pacchiarotti I, Vieta E: Suicidal Risk Factors in Bipolar I and II Disorder Patients. J Clin Psychiatry 2011; 73:778–82*
34. *Van Rheenen TE, Murray G, Rossell SL: Emotion Regulation in Bipolar Disorder: Profile and Utility in Predicting Trait Mania and Depression Propensity. Psychiatry Res 2015; 225:425–32*
35. *Weinberg A, Klonsky ED: Measurement of Emotion Dysregulation in Adolescents." Psychol Assess 2009; 21:616*
36. *Zlotnick C, Wolfsdorf BA, Johnson B, Spirito A. Impaired Self-Regulation and Suicidal Behavior among Adolescent and Young Adult Psychiatric Inpatients. Arch Suicide Res 2003; 7:149–57*

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