

Childhood Trauma as an Environmental Determinant of Risk of Violence in Bipolar Disorder

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ABSTRACT

Introduction: The complex interaction of violent behavior, childhood trauma and bipolar disorder (BD) is unclear. Therefore, we aimed to investigate the risk factors of violence in BD and studied the relationship between different types of childhood trauma and violence.

Methods: We assessed 105 remitted patients diagnosed with BD I (n=91) or BD II (n=14). All patients were evaluated with the Young Mania Rating Scale (YMRS), Hamilton Depression Rating Scale (HDRS), Childhood Trauma Questionnaire (CTQ), Buss-Perry Aggression Questionnaire (BPAQ) and Violence Tendency Scale (VTS). Uni- and Multivariable Linear Regression Analyses were conducted to predict violent behavior.

Results: All patients scored high points on CTQ and violence scales. In the univariate regression analysis, CTQ total and subscale scores

(except physical neglect), age and presence of lifetime suicide attempts were correlated with both VTS and BPAQ. Emotional and sexual abuse subtypes had a significant correlation with violence. In the multivariate analysis, only CTQ total score and age were significantly correlated with violence. There was a negative relationship between age and violence.

Conclusion: All types of childhood traumas seem to be correlated with violent behavior in patients with BD. Childhood trauma and younger age are significant determinants of violence in BD. The VTS, which emerged in Turkey, may assist clinicians to detect potentially aggressive behavior before it becomes obvious.

Keywords: Bipolar disorder, childhood trauma, violent behavior

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INTRODUCTION

The relation between mental disorders and violent behavior has been documented by many studies previously (1–5). Bipolar Disorder (BD) is a common, disabling disorder (6) and is associated with an increased risk of violence (7,8). Violent behavior observed in BD is related to various kinds of risk factors such as alcohol and substance misuse (1,5,9–11), childhood neglect and abuse (sexual, physical), and stressful life events (2,11). Although the exact mechanism of the relationship has not been understood precisely, early life stress has been suggested to cause vulnerability to mood disorders. (12). There are repeatedly emphasized outcomes of childhood trauma in BD such as early onset of BD, early hospitalization, increased suicidality, impulsivity, aggression, and comorbidities (13,14). However, the relationship between childhood trauma and violent behavior has not been specifically investigated in patients with BD.

As a result, the complex interaction among violent behavior, childhood trauma and bipolar disorder needs further clarification. Therefore, in this study, we aimed to investigate how childhood trauma and its subcomponents affect violent behavior in BD. Investigating the relationship between violent behavior and childhood trauma will contribute to finding methods that will help patients with BD.

Highlights

- Childhood trauma and lifelong violent behaviors are common in bipolar disorder (BD).
- Violent behaviors are especially related to emotional/sexual abuse in childhood.
- Violent behaviors decrease with age in BD.
- Violence Tendency Scale may allow us to determine possible violent behaviors in the early stages of BD.

METHODS

Participants

Patients diagnosed with BD I and BD II according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria by clinician interview (15) who had been in remission for at least two months (according to Young Mania Rating Scale (YMRS) and Hamilton Depression Rating Scale (HAM-D) scores) were recruited from Dr. Abdurrahman Yurtaslan

Ankara Oncology Training and Research Hospital special Bipolar Disorder outpatient clinic. Exclusion criteria were: i) age <18 and >65, ii) refusing to participate in the study or withdrawing consent at any time, iii) traumatic head injury with loss of consciousness more than three minutes, iv) any history of major medical or neurological disorders, and v) the presence of other comorbid psychiatric disorders including lifetime drug and alcohol abuse and personality disorders. On April 7, 2015, the Dr. Abdurrahman Yurtaslan Ankara Oncology Training and Research Hospital's institutional review board approved the protocol with the number of 2015-05/163 and 105 subjects provided written informed consent for this study.

Clinical Assessment and Measurement Instruments

Psychopathology was rated using the YMRS for mania symptom severity (16) and the 17-item HAMD for depression symptom severity (17). The reliability and validity study of the Turkish version of the YMRS was performed by Karadağ et al. in 2001 (18) and the reliability and validity study of the Turkish version of the HAMD was performed by Akdemir et al. in 1996 (19). All patients scored under the cut-off on the HAMD and YMRS.

General sociodemographic information and clinical data were collected for each subject with a semi-structured questionnaire.

Childhood Trauma Questionnaire: Childhood trauma was assessed with the short form of Childhood Trauma Questionnaire (CTQ), which has five clinical subscales: physical abuse (PA), emotional abuse (EA), sexual abuse (SA), physical neglect (PN) and emotional neglect (EN), consisting of 28 items in total. It was derived from the original form of CTQ (20) by Bernstein in 2003 (21). Şar et al. performed the validity and reliability study of the Turkish version of the CTQ (22). It has been reported that the cut-off scores could be defined as seven points for PN and EA, 12 points for EN, and 35 point for the total CTQ score to determine the presence of childhood trauma (22).

Buss-Perry Aggression Questionnaire and Violence Tendency Scale: Violent behavior was assessed by using both the Buss-Perry Aggression Questionnaire (BPAQ)-Turkish Version (23) and the Violence Tendency Scale (VTS) (24). The BPAQ is a 29-item scale developed by Buss and Perry in 1992 with four clinical subscales measuring physical aggression (PA), verbal aggression (VA), anger (A), and hostility (H) (25). The items are rated on five-point Likert scale ranging from 1 (extremely uncharacteristic of me) to 5 (extremely characteristic of me) with a total score from 29 to 145. High BPAQ scores indicate an increased level of aggression. The VTS is a 20-item scale developed for assessing the tendency of violence among high school students in Turkey (Cronbach alpha=0.87). The VTS score differs from 20 and 60 and a high score means that the individual has a high tendency for violence (24). While the BPAQ measures violent behavior and aggression levels, the VTS mainly tries to determine the tendency for violent acts in individuals. Therefore, we used both VTS and BPAQ in this study.

Statistical Analyses

The IBM Statistical Package for the Social Sciences (SPSS) program (Inc; Chicago, IL, USA) v. 11.5 was used to construct the databases and perform the statistical analysis. Quantitative variables were reported as means and standard deviations and qualitative variables were reported as percentages. Uni- and multivariable linear regression analyses were used to determine factors that act on BPAQ and VTS. P-values $p < 0.05$, $p < 0.01$ and $p < 0.001$ were considered statistically significant.

RESULTS

Socio-demographic and Clinical Characteristics

This study included 105 patients who had been diagnosed with BD I (n=91) or BD II (n=14) in remission. Table 1 summarizes the socio-demographic and clinical characteristics of the sample.

Table 1. Socio-demographic and clinical characteristics of the whole sample

	Mean	SD
Age (years)	41.20	±12.87
Education (years)	11.76	±3.68
Age at onset of BD (years)	26.27	±9.64
Duration of illness (years)	14.68	±10.26
Number of hospitalizations	1.56	±2.19
Number of past episodes	5.65	±6.89
	n	%
Sex		
Female	65	61.9
Male	40	38.1
Occupation		
Yes (regular work)	39	37.1
No (student, unemployed or retired)	66	62.9
Marital status		
Single	38	36.2
Married	55	52.4
Separated/divorced	12	11.4
Living environment		
With family members	90	85.7
Alone	9	8.6
Other	6	5.7
Type of first episode		
Mania/hypomania	66	62.9
Depression	39	37.1
Type of BD		
BD I	91	86.7
BD II	14	13.3
Presence of lifetime suicide attempts	23	22.3

BD: Bipolar Disorder; SD: Standard Deviation

Distribution Pattern of Childhood Trauma and Violent Behavior Subtypes in the Sample

Table 2 shows the childhood trauma and violent behavior scores of the sample. According to Şar's assessment (7 points for PN and EA, 12 points for EN, and 35 point for total CTQ score); 61.9% of our sample (n=65) had a history of any type of childhood trauma. The ratio of those above the subscale cut-offs according to the trauma type was as follows: 39% of the sample (n=41) reported EA, 29.5% (n=31) PA, 42.9% (n=45) EN, 46.7% (n=49) PN and 29.5% (n=31) SA (22).

Predictors of Violent Behavior in BD

As shown in Table 3a; age, presence of lifetime suicide attempts, CTQ total score and EA, PA, EN, and SA subscale scores predicted VTS total score in the univariate linear regression analysis.

Since the total CTQ score represents the CTQ subscale scores, only CTQ total score was included with age and lifetime suicide attempts in the multivariate linear regression analysis for VTS total score. As a result of the multivariate linear regression analysis, age and CTQ total score were significantly associated with the VTS total score in the model, and these two variables together explain the 17.2% of the variance in the VTS total score ($R^2=0.172$) (Table 3b). Table 3b also shows that as the patient's age increases by one unit, the VTS total score decreases by 0.122 units; and

Table 2. The childhood trauma and violent behavior scores of the sample

	Mean	SD
CTQ total score	40.60	±12.76
EA	7.88	±3.61
PA	6.07	±2.42
EN	12.36	±5.37
PN	8.20	±3.45
SA	6.16	±2.78
BPAQ total score	55.31	±18.60
PAg	12.38	±5.78
VA	11.33	±3.93
A	16.71	±5.88
H	14.74	±5.62
VTS total score	26.66	±6.33

A: Anger; BPAQ: Buss-Perry Aggression Questionnaire; CTQ: Childhood Trauma Questionnaire; EA: Emotional abuse; EN: Emotional neglect; H: Hostility; PA: Physical abuse; PAg: Physical Aggression; PN: Physical neglect; SA: Sexual abuse; SD: Standard Deviation; VA: Verbal Aggression; VTS: Violence Tendency Scale.

Table 3a. Univariate linear regression for VTS total score

	β	SE	P value	95% CI for β		R ²
				Lower Bound	Upper Bound	
Age	-0.114	0.048	0.018*	-0.209	-0.020	0.054
Sex	-2.337	1.277	0.070	-4.869	0.196	0.032
Education	0.371	0.472	0.434	-0.566	1.307	0.006
Marital status	-0.156	0.749	0.836	-1.643	1.331	0.001
Age at onset of BD	-0.119	0.065	0.069	-0.247	0.010	0.033
Type of BD	1.618	1.832	0.379	-2.017	5.254	0.008
Number of past episodes	-0.041	0.086	0.636	-0.211	0.129	0.002
Presence of lifetime suicide attempts	3.252	1.473	0.030*	0.330	6.173	0.046
EA	0.823	0.158	<0.001***	0.510	1.135	0.211
PA	0.509	0.255	0.049*	0.003	1.015	0.038
EN	0.238	0.114	0.039*	0.012	0.463	0.041
PN	0.015	0.181	0.936	-0.345	0.374	0.001
SA	1.005	0.201	<0.001***	0.606	1.405	0.196
CTQ total score	0.170	0.046	<0.001***	0.078	0.261	0.117

BD: Bipolar Disorder; CI: Confidence Interval; CTQ: Childhood Trauma Questionnaire; EA: Emotional abuse; EN: Emotional neglect; PA: Physical abuse; PN: Physical neglect; SA: Sexual Abuse; SE: Standard Error; VTS: Violence Tendency Scale.
Statistical significance: *p<0.05; **p<0.01; ***p<0.001.

Table 3b. Multivariate linear regression for VTS total score

	β	SE	P value	95% CI for β		R ²
				Lower Bound	Upper Bound	
Constant	24.833	2.609	<0.001***	19.656	30.010	0.172
Age	-0.122	0.045	0.007**	-0.211	-0.034	
CTQ total score	0.168	0.045	<0.001***	0.078	0.258	

CI: Confidence Interval; CTQ: Childhood Trauma Questionnaire; SE: Standard Error; VTS: Violence Tendency Scale.
Statistical significance: *p<0.05; **p<0.01; ***p<0.001.

as the CTQ total score increases by one unit, the VTS total score increases by 0.168 units.

Table 4a shows that age, age at onset of BD, lifetime suicide attempts, CTQ total score and EA, PA, EN, and SA subscale scores predicted BPAQ total score in univariate linear regression analysis. Similar to the previous analysis, only CTQ total score was included with age and lifetime suicide attempts in the multivariate linear regression analysis

for BPAQ. Like the VTS multivariate analysis, age and CTQ total score predicted BPAQ total score in multivariate regression analysis (Table 4b). These two variables together explain the 32.3% the change in the BPAQ total score (R²=0.323). According to Table 4b; as the patient's age increases by one unit, the BPAQ total score decreases by 0.413 units, and as the CTQ total score increases by one unit, the total BPAQ total score increases by 0.714 units.

Table 4a. Univariate linear regression for BPAQ total score

	β	SE	P value	95% CI for β		R ²
				Lower Bound	Upper Bound	
Age	-0.366	0.139	0.010*	-0.641	-0.091	0.065
Sex	2.957	3.810	0.440	-4.602	10.515	0.006
Education	0.588	1.385	0.672	-2.159	3.335	0.002
Marital status	1.100	2.183	0.615	-3.231	5.432	0.003
Age at onset of BD	-0.414	0.188	0.030*	-0.788	-0.041	0.046
Type of BD	6.044	5.321	0.259	-4.514	16.601	0.013
Number of past episodes	0.125	0.262	0.635	-0.395	0.644	0.002
Presence of lifetime suicide attempts	14.277	4.210	0.001**	5.924	22.630	0.103
EA	3.233	0.395	<0.001***	2.449	4.017	0.396
PA	2.299	0.725	0.002**	0.861	3.736	0.090
EN	1.153	0.322	0.001**	0.514	1.791	0.112
PN	1.024	0.524	0.053	-0.015	2.063	0.036
SA	2.457	0.614	<0.001***	1.239	3.674	0.136
CTQ total score	0.704	0.125	<0.001***	0.455	0.953	0.236

BD: Bipolar Disorder; BPAQ: Buss-Perry Aggression Questionnaire; CI: Confidence Interval; CTQ: Childhood Trauma Questionnaire; EA: Emotional abuse; EN: Emotional neglect; PA: Physical abuse; PN: Physical neglect; SA: Sexual Abuse; SE: Standard Error.
Statistical significance: *p<0.05; **p<0.01; ***p<0.001.

Table 4b. Multivariate linear regression for BPAQ total score

	β	SE	P value	95% CI for β		R ²
				Lower Bound	Upper Bound	
Constant	43.091	7.389	<0.001***	28.418	57.763	0.323
Age	-0.413	0.124	0.001**	-0.660	-0.166	
CTQ total score	0.714	0.123	<0.001***	0.469	0.959	

BPAQ: Buss-Perry Aggression Questionnaire; CI: Confidence Interval; CTQ: Childhood Trauma Questionnaire; SE: Standard Error.
Statistical significance: *p<0.05; **p<0.01; ***p<0.001.

DISCUSSION

The relationship between bipolar disorder and tendency for violent behavior is a well-known and significant issue. Previous studies reported that childhood trauma is also a contributing factor to violent behavior in mental illness (2,11). However, there are few clarifications for bipolar disorder on the relationship between childhood trauma and violence. The main finding of our study was a positive correlation between history of childhood trauma and the violent behavior in BD, which we evaluated through two different scales. In addition, a negative correlation between age and violent behavior in patients with BD was found.

Volavka suggested that the terms *violence* and *aggression* are used interchangeably (7). In the first report about BPAQ, Buss and Perry described the components of aggressive behavior (25). According to this report, physical and verbal aggression aimed to hurt and harm others represent the instrumental and motor components of violent behavior. Anger, involving physiological arousal and preparation for aggression, represents the emotional and affective component. Hostility, consisting of feelings of ill will and injustice, represents the final, cognitive component. Therefore, we wanted to measure both aggression and tendency for violence, which necessitated two different scales: VTS and BPAQ.

The VTS is a scale developed to assess the tendency of violence in high school students in Turkey (24), and it can be valuable to clinicians for predicting violence without obvious violent behavior. However, there is no reliability and validity study of the scale for patients with BD. Since the scale has no cut-off point and there is no control group in our study, we cannot determine for certain the level of tendency to violence in our sample. Nevertheless, we may infer that the tendency in our sample is mild because of the low-level mean VTS total score (mean=26, the score range=20–60 points).

The mean total score of BPAQ was 55.31 and Anger had the maximum mean score among all subscales in our sample. The mean BPAQ total score and subscale scores of our sample were in line with a previous study (26). In contrast, when compared with other studies conducted on BD patients, the mean subscale scores of BPAQ of our sample were lower than those (8,27). There may be a few reasons for the low level of violence in our sample group: First, the fact that our sample is in remission. Second, our sample group was a population of patients living in Ankara, which is the capital of Turkey and is a metropolis located in the Mid-Anatolian Region. Compared to other regions (eg. the East Anatolian Region) and the country's average, there is a higher education level and lower rates of unemployment (28). Domestic violence is also more common in Eastern Region of Turkey (29). Third, our sample group consisted of patients in routine treatment and follow-up at our outpatient bipolar disorder unit, where individual psycho-education is a routine practice. Routine follow-ups in this specialized unit may have contributed to more therapeutic interventions for these patients.

In the study conducted on BD patients by Adigüzel et al., the CTQ scores are higher than what we have found. We believe that the reasons we have given above regarding the difference between BPAQ scores in their study and ours could also explain this difference (27). We observe that in both studies CTQ scores are linked with violent behavior in BD patients. This leads us to conclude that the relationship between childhood trauma and violent behavior is important in BD. Investigating this relationship in more detail seems to be important and necessary to determine which factors could be impacting this relationship or to develop methods to combat violent behavior in patients with multiple childhood trauma.

According to Şar's scoring recommendation, it is possible to suggest that 61.9% of our sample group experienced childhood trauma and PN is the

most frequent type with a percentage of 46.7% among all trauma subtypes (22). A study demonstrated that multiple traumas are more frequent in BD (63%) than in controls (20). Aas et al. reported that childhood trauma in all its subcomponents appears to be highly associated with BD (30). We found that all CTQ subscale scores were over the cut-off point and the mean scores were consistent with other studies (30,31). There may be several factors for the high rates of childhood abuse in BD. Given the complex traits linked with the genetics of BD (32), it is possible that potential aggressive behavior representing probable parental psychopathology could be responsible for childhood abuse. In addition, when prodromal features of the disorder become manifest in childhood, high levels of expressed emotion could contribute to aggressive behaviors and verbal or emotional hostility against patients with BD (33). Regarding the high rates of childhood abuse and violent behavior in patients with BD, it needs to be clarified whether childhood abuse predict violence. In the univariate regression analysis, we found that the mean CTQ total score, EA, SA, PA and EN subscale scores were correlated with both VTS and BPAQ total scores. In addition, age and presence of lifetime suicide attempts were also significantly correlated with violence measured by VTS and BPAQ in BD. There was only one different finding between VTS and BPAQ assessments: While age at onset of BD was correlated with BPAQ total score, there was no statistical correlation with VTS total score. Further, the variables presence of lifetime suicide attempts and age at onset were excluded from the model in the multivariate analysis performed for both VTS and BPAQ. Only CTQ total score and age were found to be significantly correlated with both VTS and BPAQ in the multivariate analysis. Buss-Perry aggression questionnaire is a frequently used and valuable scale for assessing the violent behavior in mental disorders. The similar findings of the VTS and BPAQ in our study may be interpreted to mean that VTS may also be a valuable scale for estimating the violence in BD, before the violent behavior becomes overt. This could enable the clinician to take precautions and take necessary steps for prevention.

It has been reported that the presence of any adverse childhood event doubles the risk of violence in severe mental illness (11). A study conducted on youth without mental illness showed that physical abuse in childhood is a risk factor for youth aggression (34). In our study, all childhood trauma subtypes except PN were correlated with violence and the correlations with EA and SA were more statistically significant than the others. Previous studies reported that childhood emotional abuse and/or neglect are associated with affective lability (35) and trait aggression in BD (36). The EA may increase aggressive and violent behavior by contributing to affective lability in BD patients. While we found that SA is significantly associated with violence in BD, prior studies suggested that it is particularly correlated with suicidality (37,38). Since there is a well-known association between childhood trauma and suicidality (37–39), we made a multivariate regression analysis to eliminate this factor. The presence of lifetime suicide attempts was associated with violence in univariate analysis, however, it no longer held statistical significance when controlled in a multiple regression model. Only history of any type of childhood trauma and age were found to be the risk factors for violence in BD. Moreover, considering that childhood trauma is an etiologic risk factor for many psychiatric conditions, it could be said that early traumas are a risk for both suicidality and violence. These traumas are also important risk factors predicting the expression of these behaviors in patients with BD, at least over the course of the disorder.

Relatively younger psychiatric inpatients seem to have more of a tendency to violence (4,40,41), because of the difficulty in controlling negative feelings such as anxiety or fear at younger ages (24). Consistent with the literature, young age appears as a risk factor for violence in our sample. Violence is often perceived to be a problem of the youth. Mood disturbance, substance abuse, family, peer and academic influence, media influence, childhood abuse are some of risk factors defined for

youth aggression (34). In our findings, violence decreases with age, and it seems that the ability to deal with problems may improve with age. However, people over 65 with organic mental illness such as Alzheimer's are more likely to exhibit violent behavior than any other psychiatric patient groups. (42,43). We had already excluded patients over the age of 65 and we had no diagnoses of other organic mental illnesses in our sample.

Limitations of the present study include that both violent behavior and childhood trauma data were derived from self-report questionnaires. Retrospective assessments of childhood trauma may be influenced by uncontrolled recall bias. On the other hand, both the BPAQ and CTQ have been shown to have high reliability and validity (21,25). A prospective study is necessary to determine the predictors of violent behavior in BD. Still, regarding the findings of the multivariate regression analysis in our study, history of childhood trauma and relatively younger age can be defined as moderate predictors of violent behavior in BD. Other limitations of note are the small sample size and lack of a control group, which precluded us from defining the difference between BD I and BD II in terms of violent behavior. Another limitation of the study is that SCID-5 was not administered to confirm the patients' BD diagnoses. Furthermore, the exclusion of patients with a history of alcohol and drug abuse from the sample may prevent the results from being generalized in terms of the severity of violent behavior.

As a result, the findings of our study indicate the significance of the traumatic events in childhood on violent behavior in BD. All types of childhood traumas seem to be correlated with violent behavior in patients with BD. In addition, we found that the older the patient's age the lesser the violent behavior. Furthermore, it has also been noted that the VTS, which measures tendency to violence, may allow to the clinician to determine possible violent behavior before such behavior becomes overt. In summary, asking about history of childhood traumatic events is important to predict violent behavior in BD. Therefore, we suggest that the assessment of childhood trauma should be included in the clinical evaluation of patients with BD.

Ethics Committee Approval: Approved by Dr. Abdurrahman Yurtaslan Ankara Oncology Training and Research Hospital Ethics Committee on April 7, 2015 with the number 2015-05/163.

Informed Consent: Participants gave written informed consent to participate in the protocol.

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