

## Higher indexes of childhood trauma in borderline personality disorder compared with bipolar disorder

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### Summary

**Aim.** Comparison of the frequency of childhood traumatic events between a group of patients with bipolar disorder (BD), borderline personality disorder (BPD) and healthy persons.

**Methods.** The study included 35 patients (10 male, 25 female) with BD, hospitalized in the Department of Adult Psychiatry in Poznań, the Neuropsychiatric Hospital in Kościan and the Medical Centre in Milicz, as well as 35 patients (9 male, 26 female) with BPD under the care of the Józef Babinski Hospital in Kraków. Seventy-one healthy persons (22 male, 49 female) constituted a control group. The Polish version of the Childhood Trauma Questionnaire (CTQ) was used.

**Results.** In both clinical groups, no gender differences as to the CTQ indexes were found. Patients from both groups had more frequent childhood trauma compared with control subjects. Patients with BPD showed significantly higher CTQ indexes than those with BD.

**Conclusions.** The obtained results indicate significantly more frequent experience of traumatic events in childhood in patients with BPD compared with BD. This is discussed in the context of the pathogenesis and treatment of both conditions. It is probable that in BPD childhood trauma plays the biggest role among all psychiatric disturbances.

**Key words:** childhood trauma, bipolar disorder, borderline personality disorder

### Introduction

Childhood traumatic experiences may play an important role in the development and course of many mental disorders. It has been shown that both individuals with bipolar disorder (BD) and those suffering from borderline personality disorder (BPD) experience negative childhood events more often than healthy individuals.

While the risk of developing BD type I concerns about 1–2 % of the population, the risk of BD type II and bipolar spectrum disorder is 3–5 %. Genetic factors play

an important role in the pathogenesis of the disease, and their contribution is estimated at 60–80 % [1]. Another pathogenetic factor is life events, primarily those occurring in the early stages of life, such as the experience of any kind of violence and the loss of or separation from parents. A study by Aas et al. [2] shows that all types of trauma (physical, sexual and emotional abuse, as well as emotional and physical neglect) are strongly associated with the subsequent occurrence of BD, although the specific role of each type of trauma is still under discussion. In a study conducted in Poznań, it has been found that, compared to the control group of healthy individuals, BD patients showed higher indexes of physical, emotional and sexual abuse, as well as physical and emotional neglect, and more often experienced other negative events in childhood, such as alcoholism, mental illness and suicide in the family, parental abandonment, divorce, death of one of their parents and long-term separation from a parent [3]. Studies of the relationship between early childhood trauma and the course of BD show that these events have a significant impact on the development and course of the disease and are associated with such factors as the age of onset, the age of diagnosis, the presence of psychotic symptoms, suicide attempts, rapid cycling, drug resistance, the coexistence of other mental disorders (anxiety disorders) and the presence of somatic diseases (hypertension, obesity) [4]. We have also found that the unfavourable course of the disease was most influenced by emotional abuse and neglect [5].

Borderline personality disorder (BPD) is characterised by a strong instability that affects most aspects of personality functioning, including relations with the environment, self-image, emotions and behaviour. The image of oneself, one's goals and preferences (including sexual preferences) are distorted or unclear. As a rule, there is a constant feeling of inner emptiness. There is a tendency to enter into intense and unstable relationships with others, which may be accompanied by excessive threats of suicide or self-harm (which also occur for no apparent reason) [6]. BPD affects 1.1 %–2.5 % of the general adult population, is more common in women, and is associated with serious social consequences and a significant reduction in the functioning and quality of life [7]. The risk of suicide was previously assessed as 8-10% [8]; however, recent indexes are lower [9].

In the pathogenesis of BPD, the influence of genetic predisposition is estimated at 40% [10]. From the very beginning of the identification of this disorder, it has been shown that experiencing physical and sexual abuse in childhood, witnessing domestic violence and early separation are very important in its development [11]. A study conducted by van Dijke et al. [12] showed that 71.4% of BPD patients reported experiencing traumatic events in childhood, and 69% of women and 31% of men with symptoms of this disorder reported experiencing sexual abuse in childhood. Traumatic experiences also exacerbate psychopathological symptoms in the course of BPD. Our study has shown that the level of negative experiences in childhood is a predictor of self-destructive behaviour and suicidal tendencies in individuals with BPD [13].

The symptoms of BD and BPD may overlap [14]. Some studies show that almost 40% of BD patients who are in the euthymic phase meet the criteria for being diagnosed with a personality disorder, most often BPD [15]. On the other hand, one of the main features of BPD is excessive mood reactivity and affective instability, which may resemble the course of BD, particularly of the ultra-rapid cycling type [16]. Some believe that up to 80% of BPD patients display some features of BD, approximately 10–20% of BD patients are diagnosed with comorbid BPD, and approximately 20% of BPD patients are diagnosed with BD, with BPD appearing to coexist more frequently with BD type II than type I [17, 18].

A genetic study performed with the genome-wide association study (GWAS) method showed a genetic ‘overlap’ between BPD and BD, as well as with schizophrenia and recurrent depression [19]. In a positron emission tomography (PET) study comparing patients with BPD and BD type II, decreased glucose metabolism in the regions of the insula was found in patients with both diseases, which may suggest common pathophysiological mechanisms [19]. The presence of negative childhood events in both BD and BPD patients was associated with decreased cortisol levels [21].

Compared to patients with one disorder, individuals experiencing both BD and BPD have a much more severe course of the disease, many comorbid symptoms, experienced more traumatic events in childhood, report more suicidal tendencies and are hospitalised more often. In their family history, disorders of depression, antisocial personality and psychoactive substance use were more frequent [22]. In young individuals with BD, it was observed that the additional occurrence of BPD-related symptoms was associated with a more severe course of the disease and more frequent self-destructive behaviours [23]. Riemann et al. [24] have shown that affective instability, impulsiveness and suicidal or self-harm tendencies lead to a higher frequency of episodes in BD patients.

A genetic predisposition and epigenetic factors affect the influence of negative events in childhood on the appearance and course of BD and BPD in adulthood. In BD, a possible interaction between environmental (stress) factors and polymorphism of the serotonin transporter gene, brain-derived neurotrophic factor (BDNF), the toll-like receptor (TLR2) and the FKBP5 gene has been indicated [25]. This interaction has also been found in BPD in relation to the genes of the serotonergic, dopaminergic and noradrenergic systems [26]. Other genes such as the BDNF gene and the vasopressin receptor gene have also been studied [27]. The GWAS [19] has shown that the DPYD and PKP4 genes may be important in BPD. Stanley and Siever [28] argue that the core problem in BPD is interpersonal sensitivity, which in turn contributes to impulsive behaviour and emotional dysregulation, which is associated with the dysregulation of neuropeptides, including abnormal levels of opioids, oxytocin and vasopressin.

Epigenetic mechanisms such as DNA methylation may also be important for the neurobiological effects of trauma, which may have an impact in BD individuals on the functioning of the brain throughout life [25]. Abnormalities in DNA methylation have also been demonstrated in BPD [29, 30]. Interestingly, some researchers indicate that psychotherapy may affect the methylation status in such patients [30].

According to Dudek [32], the features differentiating BD and BPD are the periodic course of the former, episodes of depressed and elevated mood, a family history of BD, general functioning and cognitive schemas. On the other hand, emotional instability, impulsiveness, mood swings, the risk of substance abuse, self-harming behaviour and suicidal tendencies are common to individuals with BD and BPD. While BPD patients are characterised by significantly higher impulsivity compared to BD patients, increased impulsivity in BD patients is associated with a history of childhood trauma [20]. There is a similarity between the affective lability characteristic of BPD and the symptoms of rapid cycling BD [33] and sometimes such an onset of BD may be incorrectly diagnosed as BPD. However, it should be remembered that the symptoms of BPD persist for a long time, while the symptoms of BD occur periodically. BPD individuals do not experience a highly elevated mood, grandiose delusions, or a significantly reduced need for sleep. A positive family history of BD may also be helpful in distinguishing between the two disorders [34].

Although the history of early childhood trauma is more frequent in both disorders than in healthy persons, there is evidence that these events are significantly more common in BPD individuals. In a comparative study of women with BD or BPD conducted using the Childhood Trauma Questionnaire (CTQ), Mazer et al. [21] showed that BPD individuals showed a higher total CTQ index and experienced greater emotional abuse and neglect, as well as physical neglect, than BD individuals. BPD patients also showed greater severity of symptoms such as anxiety, impulsiveness, depression, hopelessness and suicidal thoughts.

As the first author of this study (P. J-A.) assessed early childhood trauma using the CTQ scale in both BD and BPD patients, this study attempts to compare the frequency of traumatic events in childhood between the groups of BD patients, BPD patients and healthy individuals. Only women were assessed in the cited study [21], while this study assessed and compared these indexes for both sexes.

### **Study participants**

The study was performed at the Department of Adult Psychiatry of the Karol Marcinkowski University of Medical Sciences in Poznań, the Neuropsychiatric Hospital in Kościan, the psychiatric ward of a medical centre in Milicz and the Józef Babiński Hospital in Kraków. A total of 141 individuals from the Polish population were included in the study. The tested subjects formed three groups: two clinical groups and a control group. Each group consisted of approximately 30% men and 70% women.

The clinical groups included 35 BD patients (10 men, 25 women) and 35 BPD patients (9 men, 26 women). Patients met the diagnostic criteria of ICD-10 and DSM-IV for BD and BPD, respectively.

The BD patients were in a period of clinical improvement with the intensity of depression symptoms not exceeding 10 points on the Hamilton scale and the severity of mania not exceeding 10 points on the Young scale. Psychometric evaluation of the examined patients was performed by psychiatrists. The mean age of the BD group was 42 years (SD = 10.2), and the duration of the disease was  $15.6 \pm 10.5$  years. In 34 patients (65.4%), comorbid somatic diseases were diagnosed. Diagnosed and treated arterial hypertension was demonstrated in 17 patients (32.7%), obesity in 17 patients (32.7%), thyroid dysfunction in six patients (11.5%), diabetes in seven patients (13.5%), cerebrovascular diseases in one patient (1.9%), and other somatic diseases in 15 patients (28.8%). Co-occurring mental disorders were found in 27 patients (77.1%). Alcohol dependence was diagnosed in six patients (17.1%), addiction to psychoactive substances in four patients (11.4%), addiction to tobacco products in 21 patients (60%), personality disorders in six patients (17.1%), anxiety disorders in 16 patients (45.7%), obsessive-compulsive disorder in two patients (5.7%), eating disorders in two patients (5.7%), and post-traumatic stress disorder (PTSD) in one patient (2.9%).

The mean age in the group of individuals with BPD was 29 years (SD = 5.7). Co-occurring mental disorders were found in 26 patients (74.3%). Depression was diagnosed in 45.7%, anxiety disorders in 31.4% and eating disorders in 22.8%. In turn, 5.7% were addicted to psychoactive substances, 74.3% declared the use of psychoactive substances, and 48.6% admitted that they used alcohol harmfully.

The control group consisted of 71 psychiatrically healthy individuals (49 women, 22 men) and matched the patient group in terms of sex and age. Control subjects were recruited from the colleagues (among others, health service and social care workers). The inclusion criterion was both present and previous absence of any psychiatric disturbances and treatments. The mean age of the control group was 32 years (SD = 9.0).

The study was approved by the Bioethics Committee at the Medical University of Poznań. Upon enrolment in the study, each subject was informed about its purpose and course, obtained answers to any questions and signed consent to participate in the study.

## Research methods

A survey questionnaire on demographic and clinical factors was conducted for all participants in the study, and detailed data on the course of the disease were obtained from patients in the clinical groups.

The occurrence of negative life events was assessed using the Polish version of CTQ [35, 36], according to Murzyn [37]. The CTQ is used to assess early childhood trauma related to the experience of emotional, physical and sexual abuse as well as emotional and physical neglect. The severity of the trauma is reflected by the number

of points on each subscale (from 5 to 25 points). The total trauma severity index is the sum of the points from all subscales.

### Methods for statistical analysis

The statistical analysis was performed using the Statistica 10 package. The consistency of the results with the normal distribution was assessed using the Shapiro-Wilk test. As the results concerning the age and the CTQ indexes showed a normal distribution, differences between the three groups were assessed by ANOVA, with differences between individual groups by the Newman-Keuls post-hoc test. Differences between men and women were assessed using the Student's *t*-test. The level of statistical significance was adopted at  $p < 0.05$ .

### Results

Age data and CTQ results for all three groups broken down by gender are presented in Table 1.

Table 1. Age data and CTQ indexes in the groups of men (M) and women (K) with BD or BPD and healthy individuals (CG)

Factor	BD		BPD		CG	
	M = 10	K = 25	M = 9	K = 26	M = 22	K = 49
Age (years)	39 ± 7	43 ± 11	30 ± 6	29 ± 5	31 ± 9	36 ± 8*
CTQ – total score	42.3 ± 11.6	48.2 ± 14.1	80.8 ± 15.8	78.8 ± 10.5	32.4 ± 6.8	35.6 ± 5.8*
CTQ – emotional abuse	10.9 ± 4.3	11.2 ± 5.2	19.3 ± 4.0	19.3 ± 1.9	5.4 ± 0.8	5.7 ± 1.1
CTQ – physical abuse	7.0 ± 2.8	8.0 ± 5.3	12.3 ± 5.2	11.9 ± 3.9	5.2 ± 0.5	5.3 ± 0.6
CTQ – sexual abuse	5.1 ± 0.3	6.0 ± 3.1	12.5 ± 7.5	8.2 ± 7.0	5.0	5.0
CTQ – emotional neglect	11.3 ± 5.7	13.8 ± 4.6	19.3 ± 4.1	21.2 ± 2.4	6.2 ± 1.8	6.2 ± 1.8
CTQ – physical neglect	7.4 ± 3.0	8.7 ± 3.6	12.0 ± 4.2	12.6 ± 4.4	5.6 ± 1.1	5.4 ± 0.8

\* the difference between men and women is significant,  $p < 0.05$

The table shows the means and standard deviation.

In the control group, a higher age and a higher overall CTQ index were found for the women compared to the men. However, due to the lack of significant sex differences in the clinical groups, comparison of the CTQ subscale results was performed for all the experimental groups: BD, BPD and control groups. The results are presented in Table 2.

Table 2. Comparison of individuals with BD or BPD and healthy individuals (CG) in terms of age and CTQ indexes

Tested parameter	BD N = 35	BPD N = 35	CG N = 71	Analysis of variance (p)	Post-hoc test		
					BD vs BPD (p)	BD vs CG (p)	BPD vs CG (p)
Age (years)	42 ± 10	29 ± 6	35 ± 9	< 0.001	< 0.001	< 0.001	< 0.05
CTQ – total score	46.5 ± 13.6	80.3 ± 14.5	34.6 ± 6.3	< 0.001	< 0.001	< 0.001	< 0.001
CTQ – emotional abuse	11.1 ± 4.9	19.3 ± 3.6	5.6 ± 1.0	< 0.001	< 0.001	< 0.001	< 0.001
CTQ – physical abuse	7.7 ± 4.7	12.2 ± 4.9	5.2 ± 0.5	< 0.001	< 0.001	< 0.001	< 0.001
CTQ – sexual abuse	6.0 ± 2.7	11.4 ± 7.5	5.0 ± 0.1	< 0.001	< 0.001	< 0.005	< 0.001
CTQ – emotional neglect	13.1 ± 5.0	19.7 ± 3.8	6.2 ± 1.8	< 0.001	< 0.001	< 0.001	< 0.001
CTQ – physical neglect	8.3 ± 3.4	12.2 ± 4.2	5.4 ± 0.9	< 0.001	< 0.001	< 0.001	< 0.001

The table shows the means, standard deviation, and the significance of difference determined by ANOVA and post-hoc tests.

Compared to the control group, both BD and BPD patients obtained a higher total score ( $p < 0.001$ ), as well as higher scores in all CTQ subscales, such as emotional abuse ( $p < 0.001$ ), physical abuse ( $p < 0.001$ ), sexual abuse ( $p < 0.01$ ), emotional neglect ( $p < 0.001$ ) and physical neglect ( $p < 0.001$ ).

Compared to BD patients, BPD patients obtained a higher total score ( $p < 0.001$ ) as well as higher scores in all CTQ subscales, such as emotional abuse ( $p < 0.001$ ), physical abuse ( $p < 0.001$ ), sexual abuse ( $p < 0.001$ ), emotional neglect ( $p < 0.001$ ) and physical neglect ( $p < 0.001$ ).

## Discussion

This study shows a difference between BPD and BD patients in the frequency of childhood traumatic life experiences. BPD patients had higher values of indexes measured with the CTQ: physical, emotional and sexual abuse, as well as physical and emotional neglect, compared to BD patients. This confirms the results obtained in a British study of a group of women with these disorders [21]. Significantly more frequent childhood traumatic experiences in BPD individuals compared to BD patients may indicate their significant pathogenetic role. BPD is probably one of the mental disorders in which early childhood trauma plays the greatest pathogenic role. It was postulated from the very beginning of the identification of this disorder.

The differences between BD and BPD concerning the role of early childhood trauma are reflected in the pathogenesis and treatment of these two disorders. The pathogenetic paradigm of mental disorders is currently understood as an interaction of genetic predisposition and environmental factors, primarily stressful ones. As mentioned, genetic factors play a significant role in both disorders, but this is stronger in BD (heritability of 60–80%) [1], compared to BPD (heritability of 40%) [10]. In both disorders, genetic and epigenetic factors are important for the transformation of the effects of early childhood trauma into clinical symptoms occurring in adulthood [38].

Due to the fundamental role of early childhood stress in BPD, psychotherapy plays a major role in the treatment of this disorder. Currently, the most common forms are dialectical behaviour therapy and schema therapy [39]. Pharmacotherapy in BPD plays an auxiliary role: various drugs are used, primarily to relieve symptoms such as impulsivity and depression [40]. In contrast, pharmacotherapy plays a fundamental role in the treatment of BD. The applied mood stabilisers act on the neurobiological basis of the disease and cause a favourable change in its course [41]. Psychotherapy is of auxiliary importance here and is mainly used to improve the effectiveness of the pharmacotherapy. Its most common forms are psychoeducation [42], cognitive behavioural therapy [43, 44] as well as interpersonal and social rhythm therapy [45].

Despite the above differences, in both BD and BPD patients, it is advisable to conduct a detailed interview taking negative childhood experiences into account. Such an interview should be obligatory in patients with a severe course of the disease, which is more likely in patients with childhood trauma. The information obtained about negative life events in individuals with BD and in those suffering from BPD should be used to plan appropriate pharmacological and psychotherapeutic interventions. An individual approach is based on the assumption that the clinical picture of the disorder, the history of environmental influences and genetic predisposition influence the response to treatment [38]. Psychotherapy of individuals with early childhood trauma should take into account the detailed developmental profile of the patient and the impact of childhood experiences on the development of the most important cognitive structures and schemas.

In summary, the role of stressors in the form of negative experiences in childhood for the pathogenesis of borderline personality disorder is very significant and more important than for the pathogenesis of bipolar disorder. In patients with BPD, traumatic experiences at the early stages of development can, to a great extent, modify the central nervous system functioning and influence the illness' symptoms. This necessitates a development of the therapeutic methods, especially psychotherapeutic ones, specifically targeting the disorder. Promising are methods of the so-called third wave of cognitive-behavioural therapy such as the schema therapy [46] or dialectic-behavioural therapy [47].

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