

# Trauma exposure and post-traumatic stress disorder in bipolar disorder

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## Abstract

**Introduction** There is a lack of data about post-traumatic stress disorder (PTSD) in European bipolar patients compared to the US-population. This study was conducted to ascertain the rates and types of traumatic events and PTSD in bipolar-I disorder.

**Methods** Euthymic bipolar patients were screened for lifetime diagnosis of PTSD using the Post-Traumatic Stress Diagnostic Scale and the Clinician Administered Post-traumatic Stress Disorder Scale.

**Results** A total of 74 patients (m = 30, f = 44) with diagnosis of bipolar-I disorder were assessed. 37 patients (50%) reported no trauma, 22 patients (29.7%) experienced traumatic events without diagnosis of PTSD and 15 patients (20.3%) had comorbid PTSD. Bipolar PTSD patients were at higher risk to be exposed to physical violence, parental disregard, alcohol dependence of parents, sexual assault by a family member or acquaintance. The number of siblings was higher and they had higher scores on the Hamilton Depression Rating Scale and the Global Assessment of Functioning Scale.

**Conclusions** Bipolar patients are more likely to experience traumatic events and PTSD is a relevant comorbid disorder. PTSD is associated with an increased illness severity of bipolar disorder.

**Keywords** Affective disorders · Comorbidity · Post-traumatic stress disorder · Bipolar disorder

## Introduction

There is increasing evidence suggesting that traumatic experiences may have a negative impact on the course of mental illness. Based on the current literature, traumatic experiences such as child abuse have been considered to play a substantial role in psychosis and schizophrenia [28]. Traumatic experiences are frequent in patients with severe mental illness. Garino et al. [9] reported on severe childhood trauma in approximately half of a sample of patients with bipolar disorder. Furthermore, studies of bipolar disorder patients reported on a relationship between child abuse and neglect and an earlier onset of the illness, severity of mania, number of manic episodes, clinical course and higher rates of suicide attempts [28]. A proportion of persons concerned develop post-traumatic stress disorder (PTSD) following adverse experiences. According to a review of the literature, the estimated mean prevalence of PTSD in bipolar patients amounts to 16% [25]. Considering risk factors for PTSD, they found the presence of multiple axis I disorders, length of trauma exposure, neuroticism, and lower levels of extraversion, social support and socio-economic status increase vulnerability in bipolar patients. Moreover, a manic state may be a risk factor for the development of PTSD after indirect trauma exposure [27]. Finally, the course of bipolar disorder has been

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demonstrated to be negatively affected by comorbid anxiety disorders with PTSD [24].

Frequency of trauma and prevalence of PTSD vary across different countries. Assessing the US-population, Kessler et al. [16] reported a lifetime prevalence of 8% in the general population. German surveys showed prevalence rates ranging from 2 to 4% PTSD in younger participants [19, 26]. According to current knowledge, no data exist on prevalence rates of traumatic experiences or PTSD in bipolar patients in Germany or Europe. The aim of our study was to evaluate the hypothesis of a higher rate of PTSD in bipolar disorder patients and to provide the first clinical data on the impact of trauma on the course of bipolar illness in a German, respectively, European population.

## Methods

### Sample

Patients in this study had to be aged at least 18 years and were inpatients or outpatients of the Department of Psychiatry and Psychotherapy, Ruhr University Bochum or of the LWL-Klinik Dortmund, Department of Psychiatry, Psychotherapy and Psychosomatic Medicine, Germany. Between September 2006 and August 2007, 74 patients of both genders who fulfilled the inclusion criteria were recruited into the study. Written informed consent was obtained before study participation. The study was checked by the local ethics committee of the Ruhr University Bochum, Germany.

### Assessment

Clinical interviews and ratings were performed by a consultant in psychiatry or by a trained and experienced interviewer. All of the patients had a DSM-IV diagnosis of bipolar I disorder confirmed by using the mini-international neuropsychiatric interview [1, 32]. Patients were euthymic or exhibited at maximum mild to moderate depressive symptoms. The 21-item Hamilton Depression Rating Scale (HAM-D) was used to assess the severity of depression with a cut off score of <25 points to exclude severe depression. Assessment with Young Mania Rating Scale (YMRS) excluded patients with acute mania, setting the cut-off score of <16 points. Exclusion criteria were limited to unwillingness or inability to comply with the study procedures, assessments, or inability to give informed consent.

Personal data (name, gender, age, nationality, ancestry) and socio-demographic data (school education, profession, marital status, family background, broken home experience)

were obtained. All the subjects included were free of significant medical disorders (neurological disease, metabolic disease, and other chronic diseases) as ascertained in an interview including the medical history, and a complete physical examination.

In addition, we collected data about previous manic episodes, the number of depressive episodes, symptoms of last episode, age of onset of psychiatric disorder, age of first diagnosis of bipolar disorder, hospitalization rate, comorbidity, self-report and chart records of alcohol and substance abuse and suicide attempts. Moreover, pharmacological treatment, history of ECT or psychotherapy were recorded.

Further assessments were the Clinical Global Impressions Scale for Bipolar Disorders (CGI-BP) [34], the Global Assessment of Functioning Scale (GAF) and the WHO Disablement Scale (WHO-DDS). The WHO-DDS is comparable to the GAF and investigates functional disabilities referring to the ICD-10 [20].

Prevalence of lifetime PTSD was detected by the Post-Traumatic Stress Diagnostic Scale (PDS), a widely used screening instrument in clinical and research settings [8]. The PDS is a 17-item self report scale reflecting DSM-IV diagnostic criteria with good internal reliability and convergence to other measures of PTSD. It provides both diagnosis of PTSD and measures of overall and subscale symptom severity. Psychometric evaluation of the German version of the PDS demonstrated a high internal consistency ( $\alpha = 0.94$ ), excellent sensitivity of 1.00, and a moderate specificity of 0.64 [12].

In order to reflect that the diagnosis of PTSD derived with this instrument should be considered provisional pending structured clinical assessment, we interviewed patients with probable PTSD again, using the Clinician Administered Post-traumatic Stress Disorder Scale (CAPS) [3].

The CAPS is a 30-item structured interview that corresponds to the DSM-IV criteria for PTSD. The CAPS gives both continuous score for symptom frequency and intensity as well as the ability to make diagnostic determinations of PTSD status. We used a German translation of the CAPS that is validated and comparable to the original American version [30]. The CAPS can be used to make a current (past month) or lifetime diagnosis of PTSD. Because of its conceptual design as a structured interview in comparison to the self-report scale PDS, the CAPS is more precise in diagnosing PTSD [13]. Moreover, the PDS tends to overestimate the number of PTSD diagnoses.

### Statistical analysis

Statistical analyses were performed using the Statistical Package for Social Sciences version 15.0 (SPSS<sup>®</sup>, Chicago, IL, 60606). Analysis was calculated for three groups. The

first group included all patients with bipolar disorder without any trauma events in reference to the PDS (BD−). Patients with self reported trauma without PTSD (BD+) formed the second group and the third group consisted of patients with trauma events and diagnosis of PTSD referring to the PDS (BD + P). Patients included were tested for PTSD according to the PDS, and the diagnoses were assured using the CAPS. All categories were tested for normal distribution, and variance consistency was confirmed by means of Levene's test. Categorical variables in all analyzed groups were compared using the Kruskal–Wallis Test. Continuous variables in the three groups were compared using a one-way analysis of variance (ANOVA) with a two-tailed post hoc mean comparison test (Newmann Keuls and Scheffée Test). We report results that approached significance with the critical value set at  $P < 0.05$ .

## Results

A total of 74 bipolar patients were reviewed for the study, 30 were men (41%) and 44 were women (59%). The mean age was 48.3 ( $\pm 13.8$ ) years with an age range of between 20 and 82 years.

One patient rejected consent without further reasons. Four patients with a lifetime diagnosis PTSD due to PDS refused the CAPS interview. They were characterized as dropouts and data obtained was not taken into statistical analysis.

## Baseline demographic data

Almost all of the patients were Germans ( $n = 73$ ) and Caucasians. 12.1% of the patients' families had a migration background. The educational level did not differ between traumatized, PTSD and non-traumatized bipolar patients. 40.5% of the patients were married ( $n = 30$ ) and the majority of patients were unemployed ( $n = 46$ ; 62.2%). There were no further statistical differences between the three groups analyzed, except for the mean number of siblings. Bipolar disorder patients with PTSD had significantly more siblings (2.7 in mean,  $SD \pm 1.6$ ,  $P = 0.003$ ) than the BD+ and BD− group ( $1.2 \pm 0.9$ , respectively,  $1.5 \pm 1.3$ ) (Table 1).

## Trauma experience and PTSD

Our study focused on trauma experience and PTSD in bipolar patients. We compared patients with bipolar disorder who reported trauma, but did not meet the criteria for PTSD (BD+), with patients who experienced traumatic experiences and meet the criteria for PTSD (BD + P).

37 of 74 patients (50% of bipolar I patients) reported on trauma experience according to the PDS life-event-scale (12 men, 25 women), whereas 15 patients met the criteria for a lifetime PTSD on the PDS (41% of patients with trauma experience; 20.3% of total sample). One patient rejected consent without further reasons. Four patients with a lifetime diagnosis PTSD due to PDS refused the CAPS interview. The mean number of traumatic events showed

**Table 1** Baseline demographic data of bipolar disorder patients without trauma (BD−), with trauma (BD+) and with trauma and PTSD (BD + P) in reference to the PDS

Characteristics ( $N = 74$ )	BD− ( $N = 37$ )	BD+ ( $N = 22$ )	BD + P ( $N = 15$ )	Level of significance
Mean age	51.4 $\pm$ 14.0	45.0 $\pm$ 13.0	45.8 $\pm$ 12.5	NS
Children (mean, SD)	1.1 $\pm$ 1.0	1.2 $\pm$ 1.8	1.1 $\pm$ 1.4	NS
Siblings (mean, SD)	1.5 $\pm$ 1.3	1.2 $\pm$ 0.9	2.7 $\pm$ 1.6	$F = 6.239$ , $df = 73$ , $P = 0.003$
Gender (number) (men, women)	18/19	7/15	5/10	NS
Nationality (German, other)	37/0	21/1	15/0	NS
School education (elementary school, secondary school, high school diploma)	11/4/22	3/3/16	2/7/6	NS
General education (non, apprenticeship, academic)	1/26/10	1/12/9	0/12/3	NS
Employment status (non, employed)	25/12	13/9	8/7	NS
Marital status (single, married, divorced, widowed)	10/19/7/1	9/6/6/1	4/5/5/1	NS
Partnership (no, yes)	12/25	12/10	5/10	NS
Body mass index (mean, SD)	26.9	28.2	27.5	NS
Characteristics	BD− ( $N = 37$ )	BD+ ( $N = 22$ )	BD + P ( $N = 9$ )	Level of significance
Siblings (mean, SD)*	1.5 $\pm$ 1.3	1.2 $\pm$ 0.8	3.0 $\pm$ 1.6	$F = 4.714$ , $df = 73$ , $P = 0.005$

\* Statistically significant variables in study population using the CAPS

**Table 2** Type of traumatic event of bipolar disorder patients with trauma (BD+) and with trauma and PTSD (BD + P) in reference to the PDS

Type of traumatic event	BD+ (N = 22)	BD + P (N = 15)	Level of significance
Severe accident (yes/no)	8/14	4/11	NS
Natural disaster (yes/no)	1/21	1/14	NS
Witness serious injury of another (yes/no)	9/13	4/11	NS
Physical attack by family member (yes/no)	5/17	7/8	NS
Sexual assault by family member or acquaintance (yes/no)*	3/19	8/7	$\chi = 6.546$ $df = 1$ $P = 0.011$
Sexual assault by stranger (yes/no)	7/15	5/10	
Death of/or separation from very close person (yes/no)	8/14	6/9	
Other trauma (yes/no)*	7/15	0/15	$\chi = 5.727$ $df = 1$ $P = 0.017$
Trauma mode	BD+ (N = 22)	BD + P (N = 9)	Level of significance
Sexual assault by family member or acquaintance (yes/no)*	3/19	6/3	$\chi = 8.437$ , $df = 1$ , $P = 0.004$
Other trauma (yes/no)*	7/15	0/9	NS ( $P = 0.058$ )

\* Statistically significant variables in study population using the CAPS

no statistical differences between the BD + (2.18 ± 1.18) and the BD + P (2.33 ± 1.23) group. The comparison of types of traumatic event within the group of traumatized patients without PTSD to the group of patients with PTSD revealed a significantly higher risk of the experience of sexual assault by a family member or acquaintance ( $\chi = 6.546$ ,  $df = 1$ ,  $P = 0.011$ ) or other traumatic events ( $\chi = 5.727$ ,  $df = 1$ ,  $P = 0.017$ ) in the PTSD group. Four patients with lifetime diagnosis of PTSD according to PDS refused to participate further in the CAPS interview. In summary, 9 of 11 patients (81%) with lifetime PTSD diagnosis related to PDS met the criteria of lifetime PTSD evaluated in the CAPS interview. The overall prevalence of lifetime PTSD in this cohort of bipolar I patients was 20.3% using the PDS and 12% according to the CAPS rating.

There were no statistically significant differences between the BD+ and BD− group in any of the variables evaluated concerning the type of traumatic event of bipolar disorder patients. In the instance of statistically significant results collected with the PDS, we obtained significant results with the CAPS too, although we lost four patients due to drop out and identified two patients as not having PTSD using the CAPS diagnostic procedure (Table 2).

#### Baseline social characteristics

Most of the patients (93%) grew up together with their parents. The baseline social characteristics are summarized in Table 3. The relevant differences between BD− and BD+ on the one hand and BD + P on the other were, that patients with PTSD had a significantly higher probability to have at least one alcohol dependent parent in comparison to

BD− or BD+ ( $\chi = 6.993$ ,  $df = 2$ ,  $P = 0.03$ ). Moreover, bipolar patients with comorbid PTSD experienced significantly more severe physical violence by parents than those in the comparison groups ( $\chi = 11.897$ ,  $df = 2$ ,  $P = 0.003$ ). Emotional disregard by parents was significantly more frequent in BD + P in comparison to BD− or BD+ ( $\chi = 13.498$ ,  $df = 2$ ,  $P = 0.001$ ). The other characteristics analyzed showed no relevant differences. One of five patients had a first degree relative with a diagnosed bipolar disorder (Table 3).

#### Baseline clinical data

Clinical data of the three groups is summarized in Table 4. Surprisingly, the course of bipolar disorder within all analyzed groups, revealed no statistically significant differences, except for the severity of acute depression, PDS-Grading and score on the Clinical Global Functioning (GAF) scale. HAM-D score of the BD + PTSD was significantly higher (16.6 ± 10.4,  $F = 7.853$ ,  $P = 0.001$ ) than in both of the other patient groups, indicating a more severe level of depression in the BD + PTSD patients. In correspondence to these results, GAF score was significantly lower in BD + P (60 ± 11.5,  $F = 3.317$ ,  $P = 0.042$ ) compared to both other groups (BD−, 72 ± 17.5, BD+, 68 ± 13.7) as an indication of lower psychosocial functioning (Fig. 1). No relevant impact was seen for any of the variables, concerning somatic illness or substance abuse in group comparison, as was due for the number of psychopharmacological agents, history of electroconvulsive therapy, psychotherapy or compliance of patients. In addition, scores of CGI-BD and subcategories did not differ significantly within groups (Table 4).

**Table 3** Baseline social characteristic of bipolar disorder patients without trauma (BP–), with trauma (BP+) and with trauma and PTSD (BP-P) in reference to the PDS

Characteristics	BD– (N = 37)	BD+ (N = 22)	BD + P (N = 15)	Level of significance
Alcohol dependence of parents (yes, no)	6/30	7/15	8/7	$\chi = 6.993, df = 2, P = 0.03$
Childhood (at parents, other family members, childrens' home, foster family)	34/0/2/1	21/1/0/0	14/0/1/0	NS
Family background (German, other)	32/5	19/3	14/1	NS
Profession of father (unemployed, unskilled worker, skilled worker, academic)	0/3/24/9	0/1/15/6	1/1/12/1	NS
Profession of mother (unemployed, unskilled worker, skilled worker, academic)	17/5/12/2	8/4/9/1	11/0/4/0	NS
History of Psychiatric disease in family (non, first degree relative, second degree relative)	17/15/5	10/10/2	2/13/0	NS
Relative with bipolar disorder (non, first degree relative, second degree relative)	28/5/3	15/5/2	10/5/0	NS
Parents divorced (yes, no)	4/32	3/19	5/10	NS
Experienced physical violence by parents (non, moderate, massive)	26/10/0	11/8/3	5/3/7	$\chi = 11.897, df = 2, P = 0.003$
Emotional disregard by parents (yes, no)	4/32	5/17	9/6	$\chi = 13.498, df = 2, P = 0.001$
Characteristics	BD– (N = 37)	BD+ (N = 22)	BD + P (N = 9)	Level of significance
Alcohol dependence of parents (yes, no)*	6/30	7/15	3/6	$\chi = 8.918, df = 2, P = 0.012$
Experienced physical violence by parents (non, moderate, massive)*	26/10/0	11/8/3	2/2/5	$\chi = 13.212, df = 2, P = 0.001$
Emotional disregard by parents (yes, no)*	4/32	5/17	2/7	$\chi = 17.365, df = 2, P = 0.000$

\* Statistically significant variables in study population using the CAPS

## Discussion

To our knowledge, this is the first published study on the prevalence rate of PTSD in a sample of European or German bipolar disorder patients. As a result of its specific characteristics, the present sample comprises a homogeneous study population and the investigation follows strict inclusion and exclusion criteria. Furthermore, this is the first published research comparing three distinct subgroups of bipolar patients, the first without self-reported trauma (BD–), the second with trauma, but without diagnosis of PTSD (BD+), and the third group with a definite diagnosis of post-traumatic stress disorder (BD + P), verified by a PDS and CAPS interview. The classification was done to discern predisposing or protecting clinical variables against the development of PTSD following trauma exposure in bipolar patients. We found no statistical differences concerning the baseline socio-demographic variables within the three groups and identified two persons with diagnosis of PTSD due to PDS who were not verified to be suffering from PTSD in the CAPS rating, which is a result of overestimation of PTSD and in line with the literature reported [13]. This was to be expected, since the CAPS interview is based on indices of frequency and intensity of symptoms, whereas the PDS procedure is based on a simple endorsement of the

presented symptoms. Furthermore, the CAPS also rely on the clinical judgement of a trained interviewer or consultant in psychiatry. According to the literature, the PDS has a better sensitivity, but worse specificity when compared to the CAPS [13].

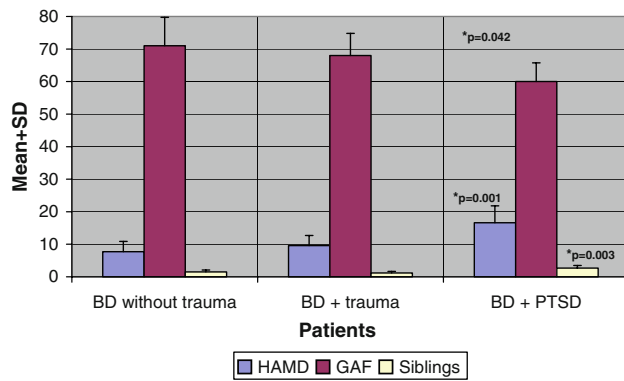
Most of the existing research on trauma encompasses study samples of broader racial heterogeneity, demonstrating for example an elevated risk of PTSD among Afro-American or Hispanic adults with bipolar disorder [10]. In the present study, we were able to rule out an ethnic inhomogeneity as a confounding variable. This investigation differs substantially from American surveys published so far.

Lifetime PTSD was prevalent in our study at a rate of 20% according to PDS and 12% using the CAPS, which is in line with research results of the American population [25]. PTSD in our sample was twice as high as the reported lifetime prevalence rates of PTSD in the general population [16]. Despite of that, none of the patients had been diagnosed beforehand as having PTSD according to the chart records, what is consistent with the results of previous research. Mueser et al. [21] conducted a study with severely mentally ill (schizophrenic, bipolar, borderline disorder) patients and reported a lifetime rate of PTSD of 2% according to chart diagnoses, but detected a rate of current PTSD of 43%.

**Table 4** Baseline clinical data of bipolar disorder patients without trauma (BD–), with trauma (BD+) and with PTSD (BD + P) in reference to the PDS

Characteristics	BD– ( <i>N</i> = 37)	BD+ ( <i>N</i> = 22)	BD + P ( <i>N</i> = 15)	Level of significance
YMRS (mean, SD)	5.0 ± 6.1	4.6 ± 4.5	3.7 ± 3.1	NS
HAMD-21 (mean, SD)	7.7 ± 6.4	9.6 ± 6.2	16.6 ± 10.4	<i>F</i> = 7.853, <i>df</i> = 73, <i>P</i> = 0.001
Age of onset first psychiatric diagnosis in years (mean, SD)	36.3 ± 13.7	31.1 ± 11.7	32.6 ± 13.3	NS
Age of onset bipolar disorder in years (mean, SD)	42.5 ± 14.9	34.6 ± 11.1	43.2 ± 12.1	NS
Clinical admissions (mean, SD)	4.8 ± 5.3	5.3 ± 4.7	5.3 ± 7.5	NS
Weeks of hospitalization (mean, SD)	32.4 ± 31.5	50.8 ± 54.9	37.2 ± 32.9	NS
Duration of last depressive/manic episode in weeks (mean, SD)	11.1 ± 9.7	13.0 ± 16.1	14.6 ± 10.5	NS
Number of manic episodes (mean, SD)	6.1 ± 6.7	8.3 ± 8.1	9.4 ± 10.9	NS
Number of depressive episodes (mean, SD)	9.4 ± 11.7	11.0 ± 8.2	14.4 ± 12.9	NS
Suicide attempts (mean, SD)	0.65 ± 0.9	0.82 ± 1.0	1.27 ± 1.9	NS
Number of actual psycho-pharmacotherapy (mean, SD)	2.4 ± 1.1	2.0 ± 0.7	2.9 ± 1.7	NS
Belief in effect of psycho-pharmacotherapy (yes, no)	27/10	18/4	12/3	NS
CGI-BP depression (mean, SD)	1.8 ± 1.3	1.5 ± 0.8	2.3 ± 1.7	NS
CGI-BP Mania (mean, SD)	1.7 ± 1.3	1.3 ± 1.0	1.7 ± 0.6	NS
CGI-BP Total (mean, SD)	2.2 ± 1.5	1.9 ± 1.1	2.1 ± 1.7	NS
GAF (mean, SD)	72 ± 17.5	68 ± 13.7	60 ± 11.5	<i>F</i> = 3.317, <i>df</i> = 73, <i>P</i> = 0.042
WHO disablement scale (mean, SD)	8.5 ± 4.9	10.3 ± 4.7	12 ± 4.9	NS
Last episode of bipolar disorder (mania, depressive, mixed)	15/18/4	7/9/6	3/11/1	NS
Initial psychiatric diagnosis (BD, Depression, other)	14/12/10	7/6/9	1/10/4	NS
Other psychiatric diagnosis (yes, no)	3/34	3/19	4/11	NS
History of drug abuse (yes, no)	4/33	2/20	3/12	NS
Other brain disease (yes, no)	0/37	1/21	1/14	NS
Metabolic diseases (yes, no)	9/28	5/17	5/10	NS
Other chronic diseases (yes, no)	10/27	8/14	4/11	NS
Smoking (none, < 20/d, ≥ 20/d)	16/13/8	9/7/6	6/5/4	NS
Alcohol Abuse (non, sporadic, daily)	15/17/5	7/15/0	6/7/2	NS
Actual drug abuse (yes, no)	1/36	0/22	0/15	NS
History of psychotherapy (yes, no)	23/13	15/7	13/2	NS
History of electroconvulsive Therapy (yes, no)	3/33	1/21	1/14	NS
Regular intake of medication (yes, no)	33/4	20/2	13/2	NS
PDS-Grading (mild, moderate, moderate to severe, severe)		5/12/3/2	0/3/8/4	$\chi^2 = 10.621$ , <i>df</i> = 2, <i>P</i> = 0.001
Number of experienced trauma (mean, SD)		2.18 ± 1.18	2.33 ± 1.23	NS
Age of trauma onset (0–6 years, 7–12 years, 13–18 years, >18 years)		4/4/2/12	4/1/5/5	NS
Duration of traumatic event (single, persisting trauma)		14/8	10/5	NS
Characteristics	BD– ( <i>N</i> = 37)	BD+ ( <i>N</i> = 22)	BD + P ( <i>N</i> = 9)	Level of significance
HAMD-21 (mean, SD)*	7.6 ± 6.4	9.5 ± 6.2	15.7 ± 9.8	<i>F</i> = 5.274, <i>df</i> = 73, <i>P</i> = 0.005
GAF (mean, SD)*	72 ± 17.5	68 ± 13.7	60 ± 11.5	<i>F</i> = 2.687, <i>df</i> = 73, <i>P</i> = 0.053
PDS-Grading (mild, moderate, moderate to severe, severe)*		5/12/3/2	0/1/5/3	$\chi^2 = 9.571$ , <i>df</i> = 1, <i>P</i> = 0.002
Number of experienced trauma (mean, SD)*		2.18 ± 1.18	2.66 ± 1.4	NS

\* Variables in study population using the CAPS



**Fig. 1** Selected variables of German bipolar patients without trauma events, with exposure to traumatic events and with diagnosis of PTSD

Furthermore, the rate of lifetime exposure to at least one traumatic event was 50% in our population, which is consistent with other studies [10, 25] and is a trauma exposure rate similar to the rates in general population [16, 25]. The discrepancy between the comparable expected rate of trauma exposure and higher prevalence rate of PTSD in patients with bipolar disorder indicates a specific vulnerability of BD patients to trauma exposure. New data of medical treatment outcome in first episode depression do not depend on the prevalence of moderate to severe stressful life events prior to symptom onset [4].

In the present study, we differentiated eight types of traumatic events in reference to the PDS.

Remarkably, 50% of all types of traumatic events referred to physical violence or sexual assaults. With the structured interview, we minimized a recall bias for past histories of abuse or an underreporting of sexual abuse by male subjects. Exposure to trauma and traumatic stress appear to induce greater susceptibility to depression or PTSD [10, 31]. We detected significantly higher scores of depression in the group of BD + P in comparison to the other groups. These findings provide support for the argument that lifetime diagnosis of PTSD, but not reported trauma itself, worsens the clinical course of bipolar disorder.

Previous studies in bipolar patients found a correlation of comorbid PTSD to an increased number of manic or depressive episodes, a higher rate of suicide attempts, an increased rate of additional psychiatric or medical disorders, and a higher incidence of alcohol or substance abuse [5, 9, 17]. On the contrary, our study did not confirm these findings. Within our homogenous sample, PTSD did not seem to have a significant impact on these variables, but, remarkably, it did on the current clinical outcome and severity of bipolar disorder. Accordingly, a significantly higher level of depressive symptoms, a lower level of psychosocial functioning, and a higher grading of PDS symptoms indicated a worse clinical outcome for bipolar patients suffering from PTSD. Comparably, Simon et al.

[33] described decreased psychosocial functioning as a predictor of bipolar illness severity.

In recent studies, bipolar patients with lifetime diagnosis of PTSD had a higher likelihood of substance abuse disorder and had elevated rates of suicide attempts compared to bipolar patients without PTSD [6, 33]. Our data did not advocate the adoption of an elevated rate of substance abuse, since our cohort showed only 1% with present and 12% with history of substance abuse. Nevertheless, our data have to be interpreted with caution, because of the self-report assessment and the reliance on chart records, which may have resulted in an underestimation of the rate of alcohol abuse. In contrast, up to 61% of bipolar I disorder patients, in American cohorts, exhibit comorbid substance abuse [29], probably due the different assessment procedure and the use of a standard evaluation. In previous reports, poor functional outcome was associated with substance use disorder or anxiety disorder [33].

We found a significant correlation between alcohol dependence of the patients' parents and the diagnosis of lifetime PTSD in bipolar patients. In light of this finding on parental alcohol abuse, we interpreted this as a vulnerability factor to increased trauma exposure in bipolar patients. Beyond this, BD + P subjects had experienced significantly more severe physical violence and more emotional disregard by their parents. It is to be assumed, that increased traumatization is more prevalent in families with an alcohol dependent parent [5, 14, 35].

A novel finding of our research was the correlation between PTSD in bipolar patients and the number of siblings. PTSD patients had significantly more siblings. An increased number of siblings may contribute to a family atmosphere with a more stressful emotional setting, which may contribute to an increased probability for exposure to trauma [15].

The present study did not demonstrate an increased rate of trauma in bipolar PTSD patients, which differs from previous studies. However, most of the studies do not refer to that point. Mueser et al. described a rate of 3.5 different types of traumatic event on average [17, 18, 21]. Our results rather point out the relevance of the family setting and atmosphere. Nearly half of the self reported traumatic events were experienced in childhood (BD+ 45%, BD + P 66%) and were most often related to family members, as was physical attack or sexual assault (BD+ 40%, BD + P 46%).

## Conclusion

Bipolar patients frequently have trauma experience and PTSD is a relevant comorbid disorder in bipolar disorder. PTSD is significantly associated with traumatic

experiences within the patients' families and alcohol dependence of parents as a risk factor. Comorbid mental disorder is more common among patients with PTSD compared to patients without PTSD [7, 21, 22]. On one hand, trauma or PTSD, particularly at an early age, possibly contribute to the vulnerability or manifestation of comorbid psychiatric disorder. On the other hand, subjects suffering from psychiatric illness might be more vulnerable to developing PTSD after traumatic experiences. It is known from the literature, that PTSD is associated with long-term changes in neurobiology [23].

To address on the limitations of this study, our sample size was limited, nevertheless, previous studies with similar close inclusion or exclusion criteria and a comparable study design cover at least equivalent sample sizes [10]. Furthermore, we studied a clinical sample of bipolar patients rather than a randomly selected sample, which limits the more general conclusions in respect to prevalence rates of trauma or PTSD, giving note to the potential for overrepresentation of patients with comorbidity in clinical samples [2]. Contrary to that, the results are in accordance to the published data and the recruited study sample did not differ statistically significantly concerning comorbidity within the three analyzed groups. An additional limitation of this study was the retrospective assessment of trauma, which does not allow one to address issues of causality. It should be noted that a methodological approach using retrospective reports of traumatic events may be less advantageous in respect to accuracy, although longitudinal studies using PDS or CAPS as standardized measures have demonstrated overall good reliability in assessing trauma histories [11].

Finally, more attention should be drawn to comorbid PTSD in clinical care of bipolar patients. Further clinical trials are required focusing on protective psychosocial steps and psychotherapeutic strategies in the treatment of traumatic experiences and PTSD in bipolar illness.

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