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# RISK FACTORS FOR BORDERLINE PERSONALITY IN TREATMENT SEEKING PATIENTS WITH A SUBSTANCE USE DISORDER: AN INTERNATIONAL MULTICENTER STUDY

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**Abstract (151 words/allowed: 150 words)**

Borderline Personality Disorder (BPD) and Substance Use Disorders (SUD) often co-occur sharing some risk factors. In this international multicentre study, differences between risk factors will be examined for BPD in SUD patients with and without comorbid BPD. In total, 1,205 patients were comprehensively examined by standardized interviews and questionnaires on psychiatric diagnoses and risk factors finding that 1,033 (85.7%) had SUDs without BPD and 172 (14.3%) had both BPD and SUDs. Patients with SUD+BPD were significantly younger, more often females and more often diagnosed with Attention Deficit / Hyperactivity Disorder (ADHD). The groups did not differ in most risk factors typical for SUD such as maternal use of drugs during pregnancy or parents having any SUD. However, SUD+BPD patients had a higher risk of having experienced emotional and physical abuse, neglect or family violence in childhood compared to SUD patients suggesting that child abuse and family violence are BPD-specific risk factors.

## Introduction

Substance Use Disorders (SUDs) such as alcohol and/or drug use disorders are major public health problems that have serious biological, physiological, and social consequences (Maniglio, 2011). Moreover, individuals with SUDs have elevated rates of a host of psychiatric disorders, including various personality disorders (PDs) (Hasin et al., 2011).

Psychiatric disorders among patients with SUDs are well recognized and of great clinical and public health interest. These so-called 'dual disorder' patients have more inpatient treatment, and a higher prevalence of suicide, social problems and medical conditions compared with those who have SUDs only or only another psychiatric disorder (Kranzler & Rounsaville, 2004).

There is a strong link between PDs and SUDs, Borderline Personality Disorder (BPD) in particular. BPD is a common mental disorder with severe functional impairment characterized by interpersonal dysfunction, disturbed self-image, emotional instability, and impulsivity. In psychiatric treatment seeking patients, 10% of outpatients and 15-25% of inpatients have BPD (Leichsenring, Leibing, Kruse, New, & Leweke, 2011).

Numerous studies have investigated the comorbidity of BPD and SUDs. Patients with BPD or antisocial PD have the greatest co-occurrence with SUD in both the general population and in clinical settings (Sher & Trull, 2002; Trull, Jahng, Tomko, Wood, & Sher, 2010; Trull, Sher, Minks-Brown, Durbin, & Burr, 2000). In a large community sample of nearly 35,000 participants, 2.7% had BPD. Almost 80% of those were diagnosed with a lifetime SUD (Tomko, Trull, Wood, & Sher, 2013). Cross-sectional clinical studies found that 23-84% of BPD patients met criteria for SUDs (Zanarini, Frankenburg, et al., 2011). Conversely, patients with treated SUDs have high rates of PD, among those 5-22% with BPD (Verheul, 2001). In a clinical sample, Morgenstern and colleagues found a BPD prevalence of 22.4% for patients with alcohol use disorder (Morgenstern, Langenbucher, Labouvie, &

Miller, 1997). Based on the findings of the last-mentioned two studies, up to one fifth of SUD treatment-seeking patients may suffer from a BPD in addition to a SUD.

Risk factors are correlates that at least precede and change the occurrence of a disorder but are not its concomitant or consequence. Risk factors are not necessarily causal but a variable or fixed marker of a disorder (Kraemer et al., 1997). For example, risk factors for SUD include alcohol use by the mother during pregnancy or a family history of SUD (Dube et al., 2003; Hemphill et al., 2011; Kilpatrick et al., 2000).

Risk factors for BPD are often explained within a biopsychosocial model; genetic factors as well as adverse childhood events influence biological and psychosocial factors (Leichsenring et al., 2011). SUD and BPD also share certain risk factors. For example, family studies have shown that family factors increase the risk for both BPD and SUD (Distel et al., 2012). Child sexual, physical and emotional abuse, violence within family, or neglect are risk factors for BPD patients (Bradley, Jenei, & Westen, 2005; Chanen & Kaess, 2012; Hernandez, Arntz, Gaviria, Labad, & Gutierrez-Zotes, 2012) as well as for SUDs (Dube et al., 2003; Hawkins, Catalano, & Miller, 1992; Kilpatrick et al., 2000; Maniglio, 2011).

The aim of this large international multicenter study is to examine risk factors of BPD in SUD patients such as family history of SUD and child abuse and family violence, respectively, between patients with SUD and patients with SUD+BPD comorbidity. We controlled for age, gender and attention deficit / hyperactivity disorder (ADHD) to estimate the contribution of each risk factor. ADHD is generally associated with an elevated risk of having a psychiatric disorder, including a BPD diagnosis (Bernardi et al., 2012). In a former data analysis of this large SUD treatment seeking patient sample, a higher risk for BPD was found for patients with an ADHD than for patients without an ADHD diagnosis (van Emmerik-van Oortmerssen et al., 2013).

To our knowledge, this is the first study regarding risk factors in SUD and comorbid SUD+BPD patients with SUD without BPD as the index group. The authors advance the hypothesis that patients with SUD+BPD comorbidity have an elevated risk for common risk factors but not for SUD specific risk factors compared to SUD only patients.

## **Methods**

### **Design and Procedure**

The study was conducted by the International Collaboration on ADHD and Substance Abuse (ICASA, 2013) and was part of the International ADHD in Substance use disorder Prevalence Study (IASP). The IASP is an international, multicenter, cross-sectional study consisting of a screening stage for ADHD and a diagnostic stage with a full assessment of various psychiatric disorders, including BPD and SUD. Ten countries (Australia, Belgium, France, Hungary, Norway, Spain, Sweden, Switzerland, the Netherlands, and the USA) with 47 SUD treatment centers participated in the screening stage. France, Hungary, Norway, Spain, Sweden, Switzerland, and the Netherlands, also participated in the full assessment, which took place within a few weeks after the screening stage. Treatments varied from outpatient to inpatient treatment settings and according to whether they were treatments for alcohol use disorders, drug use disorders or mixed SUDs. For a detailed description of the background, the study population and the screening results see van de Glind and colleagues (van de Glind et al., 2013). The regional ethics committees of all participating countries and centers approved the IASP study. Written informed consent was obtained from all patients prior to study inclusion. Patients did not receive financial compensation, except for Australia, where patients received 20 Australian Dollar compensation for associated costs.

### **Patients**

Of the 3,558 SUD treatment-seeking patients, 1,205 agreed to participate and completed the full assessment to diagnose psychiatric disorders (drop-out rate is discussed in another publication: van

de Glind et al., 2013). Of these 1,205 patients who were comprehensively assessed, 695 (57.7%) had SUD only, 338 (28.0%) had SUD and psychiatric comorbidities other than BPD (e.g. mood disorder, bipolar disorder, antisocial PD, or ADHD). In addition 172 (14.3%) had comorbid BPD, including 50 (4.0%) with BPD comorbidity only. Therefore the present study included two sub-samples; 1,205 patients including 1,033 SUD patients with or without comorbidity other than BPD and 172 SUD+BPD with or without other current psychiatric disorders.

### **Measures**

For this study, we used the questionnaires and semi-structured interviews in the full assessment stage of the IASP, all administered by trained clinicians. The borderline module of the Structured Clinical Interview for DSM-IV personality disorders (SCID II) (Spitzer, Williams, Gibbon, & First, 1992; Williams et al., 1992) was conducted to assess BPD and the Mini International Neuropsychiatric Interview (M.I.N.I) Plus version 5.0.0 (Sheehan et al., 1998) to assess prior and current episodes of SUD, mood disorders (e.g. major depressive disorder, bipolar disorder) and antisocial personality disorder according to the DSM-IV criteria. Risk factors were evaluated with the Conners' Adult ADHD Diagnostic Interview for DSM-IV (CAADID) Part I (Epstein, Johnson, & Conners, 2001), a questionnaire that was completed by the patient to assess information on developmental course and risk factors. The important risk factors for BPD and SUD assessed in this study are: mother used alcohol and/or other drugs during pregnancy, diagnosis of alcohol and/or other drug use disorders of mother and/or father, child abuse (e.g. sexual abuse, physical abuse, emotional abuse), physical and emotional neglect, and experience of violence within the family. The number of adverse childhood experiences (i.e. sexual abuse, physical abuse, emotional abuse, physical and emotional neglect, and violence) was calculated by summing up these five risk factors.

### **Statistical analysis**

All statistical analyses were conducted using IBM SPSS Statistics 20.0 for Windows. All statistical tests were two-sided with a 5% significance level. To compare demographics and number of risk factors independent t-tests and Chi-Square tests were used. The SUD group (index group) was compared with the SUD+BPD group by using logistic regressions controlling for age, gender, and ADHD.

## Results

Among the overall sample of 1,205 patients, 647 were single, 212 were married, 225 divorced and 107 lived with a partner (from 14 patients we had no information about the social status); social status did not differ between the two groups but BPD+SUD patients are less likely employed than SUD patients. Patients with SUD+BPD were significantly younger and more likely to be female than patients with SUD. Hence, we controlled for age and gender in all other analyses (table 1). The two groups differed in the rates of comorbidities: compared to SUD patients, SUD+BPD patients were more likely to meet criteria for ADHD (29.7% vs. 11.3%,  $\chi^2 = 42.53$ ,  $p < .001$ ), depression (39.0% vs. 16.7%,  $\chi^2 = 45.59$ ,  $p < .001$ ) and bipolar disorders (25.9% vs. 3.0%,  $\chi^2 = 90.27$ ,  $p < .001$ ). In contrast, patients with SUD had used alcohol significantly longer (14.4 vs. 10.6 years,  $t = 4.05$ ,  $p < .001$ ) and drank more alcohol per day before entering treatment than patients with SUD+BPD (8.4 vs. 5.4 standard drinks [1 standard drink is 10-12 g pure alcohol],  $t = 3.24$ ,  $p < .001$ ). The primary problematic substance reported by the patients sampled was alcohol ( $n = 665$ ; 55.2%), followed by stimulants ( $n = 180$ ; 14.9%), cannabis ( $n = 128$ ; 10.6%), opiates ( $n = 126$ ; 10.5%), and other drugs ( $n = 106$ ; 8.8%). BPD+SUD patients' primary problematic substances were more likely drugs and less likely alcohol than for SUD patients.

Table 1: Patient characteristics

	Total (N = 1205)	SUD (n = 1033)	SUD+BPD (n = 172)	$\chi^2 / t$
Sex (% female)	26.6	23.1	47.1	41.42***
Age, y (mean, SD)	40.0 (11.2)	40.7 (11.2)	35.6 (9.9)	6.13***
Social status (%)				5.18
Single	54.3	53.4	60.1	
Married	17.8	18.8	11.9	
Divorces	18.9	18.8	19.6	
Living with partner	9.0	9.1	8.3	
Employment (%)	30.9	32.3	22.1	6.43*
Main substance (%)				17.84***
Alcohol	55.2	57.6	40.7	
Drugs	44.8	42.4	59.3	

Note: BPD Borderline personality disorder; SUD Substance use disorder; \*  $p < .005$ , \*\*\*  $p < 0.001$

Except for “mother used alcohol during pregnancy”, the two groups did not differ in SUD-specific risk factors. However, compared to SUD patients, SUD+BPD patients were significantly more likely to report the common risk factors of having experienced physical abuse, emotional abuse, neglect or family violence in childhood (table 2). While there was no overall difference between SUD and SUD+BPD patients with regard to the prevalence of child sexual abuse, there was a significant gender difference with more women reporting sexual abuse than men (28.1% vs. 8.0%,  $\chi^2 = 77.9$ ,  $p < .001$ ).

Table 2: Logistic regressions with risk factors as the independent variable and SUD / SUD+BPD as the dependent variable controlled for age, gender and ADHD

	SUD n=1033	SUD+BPD n=172	<i>b</i> ( <i>SE</i> )	<i>Wald</i>	OR (95% CI)
<b>Patients characteristics:</b>					
Sex (% female)	23.1	47.1	-1.18 (.18)	44.34***	0.31 (0.22-0.43)
Age	40.7 (11.2)	35.6 (9.9)	-0.04 (.01)	21.32***	0.96 (0.95-0.98)
ADHD	11.3	29.7	1.15 (.21)	31.44***	3.16 (2.12-4.73)
<b>Risk factors:</b>					
Mother drank alcohol during pregnancy	9.8	18.9	0.79 (.25)	10.35*	2.20 (1.36-3.56)
Mother used drugs during pregnancy	0.8	0.6	-0.33 (.99)	0.10	0.72 (0.08-6.17)
Parental alcohol use disorder	26.3	28.5	-0.18 (.35)	0.84	0.84 (0.57-1.23)
Parental drug use disorder	5.8	8.7	0.01 (.33)	0.01	1.00 (0.53-1.91)
Number of adverse events	4.6 (1.7)	3.6 (1.8)	-0.22 (.05)	19.4***	0.80 (0.72-0.88)
Child sexual abuse	13.1	19.9	-0.06 (.24)	0.05	0.95 (0.56-1.52)
Child physical abuse	25.2	46.6	0.82 (.18)	19.70***	2.27 (1.58-3.25)
Child emotional abuse	34.5	58.4	0.71 (.18)	14.84***	2.03 (1.42-2.91)
Child physical / emotional neglect	18.6	44.1	1.03 (.19)	29.41***	2.80 (1.93-4.07)
Violence within family	25.6	39.1	0.41 (.19)	4.88*	1.51 (1.05-2.18)

Note: numbers are % yes or mean (standard deviation); BPD Borderline personality disorder; SUD Substance use disorder; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

In order to control for possible group differences regarding the presence of comorbid psychiatric disorders other than BPD comparison of risk factors between the 695 SUD-only and 50 SUD+BPD-only patients yielded results very similar from those between the broader SUD and SUD+BPD groups. Again we controlled for sex, age, and ADHD. For number of adverse events (OR = 0.78,  $p = .01$ ; CI 0.67-0.94), child sexual abuse (OR = 1.12,  $p = .78$ ; CI 0.50-2.49), physical abuse (OR = 2.09,  $p = .03$ ; CI 1.09-3.99), emotional abuse (OR = 2.71,  $p = .002$ ; CI 1.44-5.09), neglect (OR = 2.27,  $p = .02$ ; CI 1.12-4.61), and violence within family (OR = 1.58,  $p = .18$ ; CI 0.81-3.06). Moreover, the SUD specific risk

factors do not differ significantly between the two groups; maternal use of alcohol during pregnancy (OR = 1.96,  $p = .15$ ; CI 0.79-4.87), parental alcohol use disorder (OR = 1.03,  $p = .92$ ; CI 0.53-2.02), and parental drug use disorder (OR = 1.14  $p = .82$ ; CI 0.39-3.33). None of the mothers of the SUD+BPD patients consumed drugs during pregnancy, therefore a statistical calculation is not possible.

## **Discussion**

This is the first international multicenter study evaluating SUD and BPD risk factors among a large sample of treatment seeking SUD patients with and without comorbid BPD using the same standardized interviews by trained clinicians. In the primary analysis we included patients with other current comorbidities. The potential influence of co-occurring disorders (e.g. mood disorder, bipolar disorder, antisocial PD) was explicitly excluded for the secondary analysis by restricting the sample to patients with SUD-only and BPD+SUD only. The results were almost the same, suggesting that they are generalizable for typical clinical samples of SUD treatment seeking patients with or without BPD.

The first main finding was that patients with SUD+BPD had higher frequencies of physical and emotional neglect and abuse in childhood and were more likely to have a childhood history of family violence. Moreover, these adverse events were independently associated with significantly greater odds of having comorbid BPD, suggesting that increased childhood adversity is a specific risk factor for SUD+BPD patients. For example, the risk of having experienced physical and emotional neglect was 2.8 times higher among SUD+BPD patients (45%) than for SUD patients (19%). As expected the two groups did not differ in family history of SUD except that the mothers of the SUD+BPD patients were more likely to drink alcohol during pregnancy than the mothers of the SUD patients, suggesting that an impact of alcohol on the unborn child might be associated with BPD. However, this effect disappeared when the SUD-only group was compared with the BPD+SUD only group. Thus, the impact of maternal alcohol use during pregnancy seemed to be more likely associated with the presence of other psychiatric comorbidities.

Our findings showed that the numbers of adverse childhood experiences are higher in SUD patients than in SUD+BPD patients. This result fits with the findings of Dube and colleagues showing that the cumulative effect of risk factors is an important risk factor for later drug use (Dube et al., 2003). Nevertheless, the number of adverse childhood experience is not a measurement for the severity and repetition of traumatic events. It is rather a measure of the quantity of the different experiences. It was unexpected that many SUD patients either with or without BPD reported not having been exposed to these risk factors. Other risk factors not assessed in this study such as underlying genetic vulnerability might contribute to SUD and comorbid disorders.

The second main finding was that there were demographics differences between SUD and SUD+BPD patients. The two groups differed in gender; there were significantly more women with SUD+BPD comorbidity than men. This is consistent with findings from other non-SUD treatment settings showing higher rates of BPD among female patients than among male patients (Widiger & Weissman, 1991). However, epidemiological studies of BPD based on data from a community sample have not found significant differences in gender. The authors suggesting that gender differences in BPD are true for patients ascertained in treatment settings, but not for those ascertained in the community (Grant et al., 2008; Tomko et al., 2013; Zanarini, Horwood, et al., 2011). In addition, SUD+BPD patients are younger than patients with SUD-only. This result is consistent with studies reporting that BPD begins in adolescence, peaks in young adulthood and that most patients recover from BPD with time (Paris, 2009; Tomko et al., 2013). Further, when controlling for comorbidity with ADHD (van Emmerik-van Oortmerssen et al., 2013) and other comorbidities, the risk factors for BPD in SUD patients remain significant, suggesting that child abuse (except sexual abuse) and family violence are important risk factors of having a BPD in SUD patients.

When interpreting the findings, the following limitations should taken into account. First, some of the risk factors assessed are confounded. Physical abuse, for example, is also associated with emotional abuse. Thus, it is difficult to disentangle the risk factors. Second, sensitive information

such as adverse childhood experiences may be underreported. However, we have no reason to expect that underreporting would differ between groups. Third, we did not consider SUD as a risk factor for BPD or vice versa. For example, early substance use and heavy drinking in adolescence may promote the development of BPD by the negative impact of alcohol on the emotional regulation system. In contrast, twin analyses revealed that, at least in 14-18 year old adolescents, the comorbidity between BPD traits and substance use is rather a consequence of common vulnerability and shared risk factors than due to one disease serving as a cause of the other (Bornoalova, Hicks, Iacono, & McGue, 2013). Further prospective and longitudinal studies are needed to inform about the causal links between BPD and SUD. Fourth, all data were self-reported and are potentially subject to recall bias. In order to minimize recall bias in future research, longitudinal studies and external assessments are recommended. Moreover, it is important to include genetic vulnerability in further studies (Bornoalova et al., 2013). Fifth, in our study significantly more patients with SUD+BPD than with SUD have additional an ADHD. Because there is some overlap between the diagnosis criteria of BPD and ADHD (e.g., impulsivity) it is possible that patients are diagnosed misleadingly with BPD although they have an ADHD only or vice versa. Finally, we did not have a BPD-only comparison group in the current study. As such, we were not able to evaluate the unique contribution of BPD specific risk factors.

## **Conclusions**

As expected, there were no differences in the majority of risk factors for SUD between SUD patients with and without comorbid BPD. However, risk factors for BPD such as child abuse and family violence were considerably more elevated in SUD patients with BPD, suggesting that child abuse and family violence were risk factors for BPD comorbidity among those suffering from SUDs. Thus, clinicians treating patients with both SUD and BPD should be aware of the elevated risk that their

patients experienced violence as a child and may need targeted treatment strategies that consider this victimization.

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