



Trauma and psychopathology associated with early onset BPD: an empirical contribution

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ABSTRACT

Prodromal symptoms of borderline personality disorder (BPD) often arise in young age, especially in early adolescence. Several factors for early BPD onset have been identified to consent a precocious detection of high-risk population.

The present study is aimed: (1) to identify what psychopathological, traumatic, and functional factors are significantly associated to early onset in a sample of BPD patients and (2) to evaluate what factors are associated to the time interval between symptoms onset and first psychiatric visit (Δ age).

Participants were enrolled from BPD outpatients attending the Center for Personality Disorder of the University of Turin, Italy. Patients were tested with assessment instruments for specific BPD symptoms, exposure to traumatic experiences, global functioning, and perception of quality of life. All variables that were found significant at a bivariate analysis were included in two multiple regressions (stepwise backward), with the age of onset and the Δ age as dependent variables. Significance level was $P \leq 0.05$.

Seventy patients were included in the study (68 completers). Factors that were found related to age of onset were: CTQ-SF emotional abuse ($P = 0.001$); ACE-IQ bully victimization ($P = 0.005$), alcohol/drug abuser in the household ($P = 0.001$), and physical neglect ($P = 0.006$); BIS non-planning impulsivity ($P = 0.005$); and SOFAS score ($P = 0.033$). Factors that were found related to Δ age were: ACE-IQ total score ($P = 0.001$) and BIS total score ($P = 0.001$).

Earlier onset of BPD is mainly associated to traumatic events, including abuse, neglect, dysfunction in household environment, and bullying. Earlier onset is also related to a worse social functioning. Among BPD symptoms only non-planning impulsivity was found associated to early onset. A higher number of traumatic events and worse impulsive dyscontrol induce a significant reduction of the time interval between onset and first psychiatric observation.

1. Introduction

Identification of early risk factors and detection of psychiatric disorders soon after their onset is a serious challenge for clinicians and researchers. Unfortunately, in clinical practice, the time interval between onset of psychopathological manifestations and first psychiatric visit is rather long. So, mental disorders are often diagnosed several years after the initial symptoms. In the last decade a growing number of investigations and systematic reviews have been focused on environmental, temperamental, psychopathological, and neurobiological factors that can be associated to early onset of personality disorders, in particular borderline personality disorder (BPD) (Chanen and Kaess,

2012; Sharp and Fonagy, 2015; Stepp et al., 2016; Bozzatello et al., 2019). BPD is a polymorphous pathology, characterized by poor cohesion of self and identity, high level of impulsive dyscontrol and affective instability, and compromised interpersonal relationships. Factors predisposing to BPD are already present in childhood and prodromal symptoms often arise in young age, especially in early adolescence (Miller et al., 2008; Kaess et al., 2014; Stepp and Lazarus, 2018). BPD diagnosis may be applied to adolescents when “the individual’s particular maladaptive personality traits appear to be pervasive, persistent, and unlikely to be limited to a particular developmental stage” (APA, 2013). If this condition endures over one year, it cannot be minimized as a transient phenomenon linked to the adolescent bustle, but a diagnosis

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of BPD must be carefully considered (APA, 2013; Paris, 2014). Prevalence rates of this disorder in youths are rather high, with estimates of 1.4% at 16 years and 3.2% at 22 years, and they rise in psychiatric population until 11% in outpatients and 50% in inpatients (Coid et al., 2006; Johnson et al., 2008). Several studies indicated that early BPD onset has a negative impact on outcome and long-term prognosis. In particular, younger age of onset is associated to longer and more frequent hospitalizations, concomitant antisocial behaviors and substance use disorder. BPD onset in late childhood or adolescence produces a significant impairment in relational and occupational functioning and quality of life until 20 years after diagnosis. (Newton-Howes et al., 2015; Winsper et al., 2020; Bozzatello et al., 2019; Zanarini et al., 2018).

Several predisposing factors for early BPD onset have been identified to consent a precocious detection of high-risk individuals. We examined literature findings on risk factors for BPD (Bozzatello et al., 2019) and found that high-risk subjects are characterized by a positive history of traumatic experiences, in terms of precocious emotional and/or physical abuse and neglect by caregivers (Johnson et al., 2000, 2001; Carlson et al., 2009; Belsky et al., 2012; Bornovalova et al., 2013), bully victimization by peers (Crowell et al., 2009; Kaess et al., 2014; Haltigan et al., 2015; Antila et al., 2017), persistent abnormalities in familial behaviors and parent-child relationships (Lyons-Ruth et al., 2015; Vanwoerden et al., 2017), and severe maternal psychopathology (Baron et al., 2013; Stepp et al., 2015; Mahan et al., 2018). When traumatic experiences occur in subjects who have specific temperamental traits (relational aggression, low emotional control, and negative affectivity) or particular neurobiological characteristics (fronto-limbic abnormalities) the risk to develop early BPD increases. In a similar way, early psychopathology such as depression, attention deficit hyperactivity disorder (ADHD), eating disorders, substance use disorder, and oppositional-defiant disorder interact with adverse experiences in childhood and adolescence and with temperamental and personality features in increasing the risk of BPD in young age (Vaillancourt et al., 2014; Ha et al., 2014; Hallquist et al., 2015; Sharp et al., 2015; Conway et al., 2015; Stepp et al., 2019; Milijkovitch et al., 2018; Mahan et al., 2018; Bornovalova et al., 2018). Moreover, several of these psychiatric antecedents in childhood and adolescence present considerable symptoms overlap with BPD and complicate the process of reconstruction of it early phenomena.

Proceeding from the available data, further investigations have to explore which factors are predominant and more closely associated with precocious BPD.

The present study is aimed to address the first issue, namely to identify what psychopathological, traumatic, and functional factors are significantly and independently associated to earlier onset in a sample of BPD patients. We addressed also another relevant question and evaluated what are the factors associated to the time interval between symptoms onset and first psychiatric visit.

2. Material and methods

2.1. Participants

Participants were enrolled from outpatients attending the Center for Personality Disorder of the Department of Neuroscience, University of Turin, Italy. Consecutive outpatients who received a DSM-5 diagnosis of BPD were included.

Exclusion criteria were: (1) a lifetime diagnosis of delirium, dementia, amnesic disorder, or other cognitive disorders; schizophrenia or other psychotic disorders; bipolar disorder; ADHD; post-traumatic stress disorder; other personality disorders; (2) a concomitant diagnosis of major depression; and (3) the occurrence of substance use disorder in the twelve months before evaluation.

Diagnoses were made by an expert clinician (P.B.) and were confirmed using the Structured Clinical Interview for DSM-5 Clinical

Version (SCID-5-CV) and Personality Disorders Version (SCID-5-PD) (APA, 2013).

All patients included in the study received treatment as usual in accordance with the guidelines for the treatment of BPD (APA, 2001; NICE, 2009, 2015; NHMRC, 2012; Stoffers et al., 2015). Treatment as usual was decided by the psychiatrist who was responsible for the clinical management of the patient and was different from the study investigators. In our Center it is commonly a combination of novel antipsychotics (mainly aripiprazole and olanzapine) or mood stabilizers (mainly valproate or lamotrigine) and specific psychotherapies (mainly interpersonal psychotherapy for BPD). No changes of therapeutic strategies could be decided by study investigators.

Patients were tested with the following instruments: the Social and Occupational Functioning Assessment Scale (SOFAS) (Goldman et al., 1992); the Satisfaction Profile (SAT-P) (Majani and Callegari, 1998); the Borderline Personality Disorder Severity Index (BPDSI) (Arntz et al., 2003; di Giacomo et al., 2018); the Barratt Impulsivity Scale - Version 11 (BIS-11) (Patton et al., 1995); the Dissociative Experiences Scale (DES) (Bernstein et al., 1986); the Childhood Trauma Questionnaire - Short Form (CTQ-SF) (Bernstein et al., 2003); the Adverse Childhood Experience International Questionnaire (ACE-IQ) (OMS, 2016).

Age of BPD onset and age of first psychiatric visit were obtained with an accurate anamnesis with patients, family members, and caregivers, and were confirmed, when available, by clinical records. Age of onset was considered as the moment in patient's history when we can be reasonably sure that a sufficient number of BPD core symptoms were present and at least a moderate impairment of functioning derived from symptoms.

The investigation was carried out in accordance with the latest version of the Declaration of Helsinki. Study design was approved by the Ethical Committee of our University Hospital in Turin, Italy. Informed consent of the participants was obtained after the nature of the procedures had been fully explained.

2.2. Measures

The SOFAS is a clinician-rated scale to measure a patient's impairment in social and occupational areas. It is independent of the psychiatric diagnosis and the severity of the patient's symptoms. The score is ranged between 0 and 100. Higher scores indicate a better functioning.

The SAT-P is a self-administered questionnaire consisting of 32 scales which provides a satisfaction profile in daily life and can be considered as an indicator of subjective quality of life. The SAT-P considers five different factors: "psychological functioning"; "physical functioning"; "work"; "sleep, food, and free time"; and "social functioning". The investigator asks the patient to evaluate his satisfaction in the last month for each of the 32 life areas on a 10 cm analogical scale ranging from "extremely dissatisfied" to "extremely satisfied".

The BPDSI is a semi-structured clinical interview assessing frequency and severity of BPD related symptoms. It consists of 70 items, arranged in nine subscales representing the nine DSM-IV BPD criteria. For each item, the frequency is rated on an 11-point scale, running from 0 (never) to 10 (daily), including 'abandonment', 'inter-personal relationships', 'impulsivity', 'para-suicidal behavior', 'affective instability', 'emptiness', 'outbursts of anger', 'dissociation and paranoid ideation'. Identity-disturbance items form an exception and are rated on 5-point Likert scales, running from 0 (absent) to 4 (dominant, clear, and well-defined not knowing who he/she is). Scores for the nine DSM-IV criteria are derived by averaging the item scores. The total score is the sum of the nine criteria scores (range 0–90). The BPDSI showed adequate reliability and construct validity also in the Italian version (di Giacomo et al., 2018).

The BIS-11 is a 30-items self-report questionnaire measuring the trait of impulsivity on a 4-point Likert scale. Higher scores for each item indicate higher levels of impulsivity. Twelve items are reverse-scored, in order to avoid response sets. Is it possible to identify three factors:

cognitive impulsivity, motor impulsivity, and non-planning impulsivity. Global score is obtained by the sum of these factors. The BIS-11 showed adequate reliability and construct validity in both USA (Patton et al., 1995) and Italian (Fossati et al., 2001) samples.

The DES is an inventory including questions that refer to a variety of types of dissociation, including both problematic dissociative experiences and normal dissociative experiences (e.g., day-dreaming). Questionnaire asks about experiences that patients may have in his daily life. The interview consists of 30 items scored on a 10-point frequency scale (0 = never; 10 = daily). The DES is an evaluation instrument with a good level of inner coherence and validity. The CTQ-SF is a retrospective instrument to evaluate abuse and neglect experiences. It is a standardized measure to detect a positive history of trauma exposure. As CTQ-SF is sensitive also to mild interpersonal trauma, it is retained particularly adequate for the screening of high-risk populations (Lipschitz et al., 1999). CTQ-SF consists of 28 items and five subscales that investigate five different types of childhood trauma: emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. There is one additional scale to explore the tendency to minimization or denial. Each item is scored on a 5-point frequency scale (1 = never true; 5 = very often true). Scoring for each scale is ranged between 5 and 25. Scoring for the scale minimization/denial is ranged between 0 and 3. Higher scores indicate more severe exposition to traumatic events.

The ACE-IQ is a 43-items screening questionnaire designed to be integrated within broader health surveys to allow analysis of associations between adverse childhood experiences and subsequent health outcomes and health risk behaviors. Childhood experience have been sorted into 13 categories: emotional abuse; physical abuse; sexual abuse; violence against household members; living with household members who were substance abusers; living with household members who were mentally ill or suicidal; living with household members who were imprisoned; one or no parents, parental separation or divorce; emotional neglect; physical neglect; bullying; community violence; collective violence. This tool is designed for administration to people aged 18 years and older. The ACE-IQ asks the patient to answer the questions on the basis of their life experiences during the first 18 years. Response options for each question may be dichotomous (i.e. Yes/No; Items F1–F5), based on a 5-point Likert scale ranging from “Never” to “Always” (Items P1–P2), or based on a 4-point Likert scale ranging from “Never” to “Many times” (remaining items). The original scale developers have proposed two scoring algorithms. First, the binary scoring method uses the lowest threshold for identifying ACEs, where any experience of adversity denotes exposure. The second scoring method, the frequency method, accounts for the level of exposure, which differs by the ACE type. We used the first scoring method. Initial scoring for each ACE category determines if the participant is “exposed” or “not exposed” to that ACE type. Then, the total number of ACE categories that the participant was “exposed” to are summed to create an ACE score ranging from 0 to 13.

2.3. Statistics

Statistical analysis was performed in two phases: (1) the age of onset and the difference between the age of first psychiatric visit and the age of onset (Δ age) were assessed in two bivariate analyses with Pearson’s correlation for continuous variables and Student’s t-test for categorical variables. All variables that were found significant were included in two models of multiple regression (stepwise backward), with the age of onset and the Δ age as dependent variables. Significance level was $P \leq 0.05$. The software IBM SPSS Statistics version 26, (IBM Corp, 1989, 2019) was used for analyses.

3. Results

Seventy patients (24 men and 46 women) were included in the study. In our sample mean age \pm SD was 29.66 ± 8.12 ; mean age of BPD onset

was 19.63 ± 5.41 ; mean age of first psychiatric visit was 26.29 ± 9.97 ; mean time prior to diagnosis was 6.63 ± 6 . Two patients did not complete the evaluation. Results were obtained from 68 patients.

Continuous variables included in Pearson’s correlation were: age of first psychiatric visit; BPDSI total score and items score (abandonment; interpersonal relationships; identity; impulsivity; para-suicidal behaviors; affective instability; emptiness; outbursts of anger; dissociation/paranoid ideation); DES total score; BIS total score and subscales score (attentive impulsivity; motor impulsivity; non-planning impulsivity); SOFAS total score; SAT-P subscales score (psychological functioning; physical functioning; work; sleep/food/free time; social functioning); CTQ-SF subscales score (emotional abuse; sexual abuse; physical abuse; emotional neglect; physical neglect; minimization/denial).

Categorical variables included in Student’s t-test were: gender, ACE-IQ single categories (physical abuse; emotional abuse; physical neglect; emotional neglect; contact sexual abuse; alcohol and/or drug abuser in the household; incarcerated household member; someone chronically depressed/mentally ill/instituzionalized or suicidal; violence in the household; parental separation/divorce; bullying; community violence; collective violence).

Variables resulted significant at the Pearson’s correlation for the age of onset were: BPDSI total score ($P = 0.006$) and items impulsivity ($P = 0.006$), affective instability ($P = 0.014$), emptiness ($P = 0.009$); BIS total score ($P = 0.005$) and subscales attentive impulsivity ($P = 0.041$), motor impulsivity ($P = 0.001$), non-planning impulsivity ($P = 0.005$); SOFAS total score ($P = 0.005$); SAT-P subscales work ($P = 0.005$), sleep/food/free time ($P = 0.005$), social functioning ($P = 0.001$); CTQ-SF subscales emotional abuse ($P = 0.006$), emotional neglect ($P = 0.021$), physical neglect ($P = 0.032$); ACE-IQ total score ($P = 0.005$).

Results are displayed in Table 1.

Variables resulted significant at the Student’s t-test for the age of onset were: ACE-IQ emotional abuse ($P = 0.027$); emotional neglect ($P = 0.05$); physical neglect ($P = 0.014$); bullying ($P = 0.005$); community violence ($P = 0.05$); violence in the household ($P = 0.043$).

Results are displayed in Table 2.

Variables resulted significant at the Pearson’s correlation for the Δ age were: BPDSI total score ($P = 0.021$) and single items impulsivity ($P = 0.047$), affective instability ($P = 0.001$), emptiness ($P = 0.018$), dissociation/paranoid ideation ($P = 0.025$); BIS total score ($P = 0.027$) and subscale non-planning impulsivity ($P = 0.006$); SOFAS total score ($P = 0.001$); SAT-P subscales work ($P = 0.001$), sleep/food/free time ($P = 0.002$), social functioning ($P = 0.005$); CTQ-SF subscale physical neglect ($P = 0.031$); ACE-IQ total score ($P = 0.005$).

Table 1

Results of Pearson’s correlation between age of onset and continuous variables.

Variables	Mean \pm SD	Pearson’s coefficient	P
BPDSI total score	40.32 \pm 8.60	-0.459	0.006
BPDSI impulsivity	5.94 \pm 1.68	-0.458	0.006
BPDSI affective instability	7.11 \pm 1.18	-0.411	0.014
BPDSI emptiness	6.26 \pm 1.56	-0.437	0.009
BIS total score	65.17 \pm 12.84	-0.629	0.001
BIS non-planning impulsivity	24.71 \pm 6.09	-0.6	0.001
BIS motor impulsivity	20.74 \pm 6.23	-0.526	0.001
BIS attentive impulsivity	19.57 \pm 5.44	-0.347	0.041
CTQ emotional abuse	13.54 \pm 4.42	-0.458	0.006
CTQ emotional neglect	15.74 \pm 4.21	-0.390	0.021
CTQ physical neglect	6.14 \pm 1.75	-0.363	0.032
ACE-IQ total score	4.74 \pm 2.77	-0.630	0.001
SOFAS	52.69 \pm 10.47	0.631	0.001
SAT-P work	43 \pm 17.63	0.584	0.001
SAT-P sleep/food/free time	40.23 \pm 11.84	0.609	0.001
SAT-P social functioning	25.31 \pm 12.12	0.531	0.001

Abbreviations SD: Standard Deviation; BPDSI: Borderline Personality Disorder Severity Index; BIS-11: Barrett Impulsiveness Scale, version 11; CTQ: Childhood Trauma Questionnaire; ACE-IQ: Adverse Childhood Experience International Questionnaire; SOFAS: Social Occupational Functioning Assessment Scale; SAT-P: Satisfaction Profile.

Table 2

Results of Student's t-test performed in comparison of age of onset between groups with and without categorical variables.

Variables	Mean ± SD Group 1 (with factor)	Mean ± SD Group 2 (without factor)	t	P
ACE-IQ emotional abuse	17.92 ± 3.31	24.56 ± 7.33	2.622	0.027
ACE-IQ emotional neglect	18.08 ± 3.57	23 ± 7.22	2.140	0.05
ACE-IQ physical neglect	16.71 ± 2.29	20.36 ± 5.75	2.623	0.014
ACE-IQ bully victimization	17.20 ± 2.65	22.87 ± 6.49	3.188	0.005
ACE-IQ community violence	17.55 ± 3.01	20.58 ± 6.04	1.985	0.05
ACE-IQ violence in the house	17.54 ± 3.20	20.86 ± 6.11	2.108	0.043

Abbreviations SD: Standard Deviation; ACE-IQ: Adverse Childhood Experience International Questionnaire.

Results are displayed in [Table 3](#).

Variables resulted significant at the Student's t-test for the Δ age were: ACE-IQ bullying ($P = 0.004$), community violence ($P = 0.035$). Results are displayed in [Table 4](#).

In the model of multiple regression with age of onset as dependent variable, factors that were found significantly and independently related were: CTQ-SF emotional abuse ($P = 0.001$); ACE-IQ bully victimization ($P = 0.005$), alcohol/drug abuser in the household ($P = 0.001$), and physical neglect ($P = 0.006$); BIS non-planning impulsivity ($P = 0.005$); and SOFAS score ($P = 0.033$). All coefficients were negative, except for SOFAS score. So, higher scores of the above mentioned items of CTQ-SF, ACE-IQ, and BIS were related to earlier age at onset, while a higher level of functioning at SOFAS was related to a later onset.

In the model of multiple regression with Δ age as dependent variable, factors that were found significantly and independently related were: ACE-IQ total score ($P = 0.001$) and BIS total score ($P = 0.001$). Both coefficients were negative.

Results are displayed in [Tables 5 and 6](#).

Table 3

Results of Pearson's correlation between Δ age and dependent variables.

Variables	Mean ± SD	Pearson's coefficient	P
BPDSI total score	40.32 ± 8.60	-0.389	0.021
BPDSI impulsivity	5.94 ± 1.68	-0.338	0.047
BPDSI affective instability	7.11 ± 1.18	-0.52	0.001
BPDSI emptiness	6.26 ± 1.56	-0.398	0.018
BPDSI dissociation/paranoid ideation	2.03 ± 1.1	-0.378	0.025
BIS total score	65.17 ± 12.84	-0.374	0.027
BIS non-planning impulsivity	24.71 ± 6.09	-0.452	0.006
CTQ physical neglect	6.14 ± 1.75	-0.364	0.031
ACE-IQ total score	4.74 ± 2.73	-0.466	0.005
SOFAS	52.69 ± 10.47	0.547	0.001
SAT-P work	43 ± 17.63	0.556	0.001
SAT-P sleep, food, free time	40.23 ± 11.84	0.505	0.002
SAT-P social functioning	25.31 ± 12.12	0.464	0.005

Abbreviations SD: Standard Deviation; BPDSI: Borderline Personality Disorder Severity Index; BIS-11: Barrett Impulsiveness Scale, version 11; CTQ: Childhood Trauma Questionnaire; ACE-IQ: Adverse Childhood Experience International Questionnaire; SOFAS: Social Occupational Functioning Assessment Scale; SAT-P: Satisfaction Profile.

Table 4

Results of Student's t-test performed comparing Δ age between groups with and without categorical variables.

Variables	Mean ± SD Group 1 (with factor)	Mean ± SD Group 2 (without factor)	t	P
ACE-IQ bully victimization	4.20 ± 4.44	9.87 ± 6.4	3.094	0.004
ACE-IQ community violence	4.18 ± 2.86	7.75 ± 6.74	2.197	0.035

Abbreviations SD: Standard Deviation; ACE-IQ: Adverse Childhood Experience International Questionnaire.

4. Discussion

In our study we focused on the identification of factors that are independently associated to early onset of BPD, with the aim to characterize a population with high clinical risk. We analyzed a series of potential factors with a bivariate analysis and then we included significant variables in two models of multiple regression.

Several traumatic factors were evaluated with a qualitative criterion (ACE-IQ) and measured with a quantitative criterion (CTQ-SF). In addition, symptoms of BPD, the domain of impulsivity, socio-occupational functioning and subjective quality of life were assessed with specific instruments. The dependent variables of the two multiple regression analyses were age of BPD onset and the time interval between age of onset and first psychiatric visit. This period of time is a factor of noticeable importance as it represents a measure of how long symptoms persist before being considered by a clinician.

Results of multiple regression analysis with age of onset as dependent variable indicated that in our sample the factors associated to an earlier onset of BPD are mainly represented by traumatic events, including various experiences of abuse, neglect, or dysfunction in household environment. A particular trauma that was found in our analysis and has received increasing interest in recent investigations of early BPD risk factors is bully victimization, a condition that should receive more effective prevention (Crowell et al., 2009; Kaess et al., 2014; Wolke et al., 2012; Lereya et al., 2013; Winsper et al., 2017; Haltigan et al., 2015; Antila et al., 2017).

It is noticeable that no BPD symptoms were found significantly associated to precocious onset, except for the self-rated measure of non-planning impulsivity. Another finding that deserves careful consideration is that onset of BPD is significantly related to the objective measure, but not to the subjective perception of functioning.

The finding concerning the effect of traumatic events on onset of BPD is a confirmation of data from several recent studies (Steff and Lazarus, 2018; Temes and Zanarini, 2018; Zanarini et al., 2019; Steele et al., 2019; Porter et al., 2020). Our results showed that the role of trauma depends more on its presence than on the degree of its intensity. So, it is more valuable to detect a trauma in childhood or adolescence than to investigate whether the patient feels it as less or more serious. We have also observed that the effects on BPD onset are approximately the same when patients experience an active behavior of abuse or is subjected to conditions of neglect.

It is rather surprising that, in our study, neither total severity of BPD

Table 5

Results of stepwise multiple regression with age of onset as dependent variable.

Variables	Coefficient	ES	t	P
BIS non-planning impulsivity	-0.377	0.095	-3.951	0.005
CTQ emotional abuse	-0.387	0.104	-3.714	0.001
ACE-IQ bully victimization	-4.554	0.958	-4.751	0.005
ACE-IQ physical neglect	-4.112	1.396	2.946	0.006
ACE-IQ alcohol/drug abusers in household	-4.420	1.161	-3.808	0.001
SOFAS	0.123	0.055	2.246	0.033

Table 6
Results of stepwise multiple regression with Δ age as dependent variable.

Variables	Coefficient	ES	t	P
ACE-IQ total score	-0.917	0.245	-3.749	0.001
BIS total score	-0.180	0.048	-3.733	0.001

Abbreviations SD: Standard Deviation; BIS-11: Barrett Impulsiveness Scale, version 11; CTQ: Childhood Trauma Questionnaire; ACE-IQ: Adverse Childhood Experience International Questionnaire; SOFAS: Social Occupational Functioning Assessment Scale.

symptoms nor single symptoms domain, apart from impulse dyscontrol, were found associated to age of onset. In fact, this result is in contrast with studies performed in other mental disorders, in particular in schizophrenia, indicating that the severity of symptoms of illness is related to early onset (Bellino et al., 2004; Giannitelli et al., 2019). Considering previous studies of patients with BPD available data were focused not on severity of BPD symptoms, but on the link between early onset and higher incidence of concomitant psychopathology (i.e. mood and anxiety disorders, eating disorders, and substance use disorder) (Lenzenweger, 2004; Zanarini et al., 2007; Grant et al., 2008; Gunderson et al., 2011; Videler et al., 2019). A comparison with literature data can be made for the finding of higher degree of impulsivity in earlier onset BPD. This result is actually in accordance with data from Steep and Lazarus (2018) and it requires particular attention as symptoms of impulsive dyscontrol are a clinical feature distinctive of young patients with BPD (Videler et al., 2019).

The association between early onset and impairment of social functioning that we found in our sample has been reported by several authors (Newton-Howes et al., 2015; Zanarini et al., 2018; Winsper et al., 2020) and has relevant clinical implications. This result clearly supports the importance of prevention and/or precocious interventions to minimize negative effects on functional outcome.

The second regression analysis that we conducted in our patients chose as dependent variable another factor with significant effects on BPD outcome: the delay of first psychiatric observation after the age of symptoms presentation. In our sample the delay is rather prolonged, with a mean of about 6 years and clearly indicates how difficult is for clinicians to detect early phases of the disorder.

The statistical analysis in our study found that two factors have a significant and independent effect on the duration of time between onset and first observation: a higher number of traumatic events and worse impulsive dyscontrol induce a significant reduction of this duration. A likely explanation is that victims of abuse and neglect who live in dysfunctional environment, and youths with impulsive behaviors are subjects who receive more precocious attention from social and psychiatric services. It should be noticed that this is not necessarily associated with early diagnosis and indirectly with better outcome. In these cases the first psychiatric observation often occur in emergency situations, that make difficult for the clinician to undertake the complex process for the diagnosis of BPD. The time required for the first psychiatric observation and the needed for the BPD diagnosis are actually two different concepts. Our data do not allow to reliably discriminate between them and further investigation on this topic are needed.

The present study suffers from some limitations. The first limit consists in the rather small sample size. The second limitation concerns the study design, as both age at onset and early traumatic experiences were reconstructed using a retrospective method. The third limit is caused by the choice of potential risk factors, as temperamental traits were not assessed in our patients. This choice depends on the consideration that temperament is not reliably measured in adult patients who have already a diagnosis of personality disorder. In addition, we have not considered the role of precocious mental disorders, such as attention deficit hyperactivity disorder, post-traumatic stress disorder, and substance use disorder. A further limit is that we excluded from our sample subjects with psychiatric comorbidities in order to avoid the effects of

coexisting psychiatric disorders on the identification of risk factors of BPD onset. A negative implication of this choice is that clinical characteristics of our patients can be partly different from those found in clinical practice and can limit generalizability of our findings.

The results of this study have significant implications for oncoming investigations. The detection of the main factors that are independently related to early onset of BPD is the first step of the research project, the second one being represented by the study of combination and interactions between different factors.

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Authors statement

Authors state that the work described has not been published previously, that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder.

CRedit authorship contribution statement

Paola Bozzatello: Writing - original draft. **Paola Rocca:** Writing - original draft. **Silvio Bellino:** Writing - original draft.

Declaration of competing interest

All authors declare that they have not any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work.

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