Borderline personality disorder in youth: The prospective impact of child abuse on non-suicidal self-injury and suicidality

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Abstract

Background: Borderline personality disorder (BPD) is characterized by greater engagement in non-suicidal self-injury (NSSI) and suicidality. The aim of the study is to test whether the occurrence of child abuse contributes to these high-risk behaviors in BPD youth.
Materials and methods: BPD female youth aged 13–21 years with ($n = 29$) and without ($n = 29$) a history of child abuse were administered clinical interviews assessing diagnostic history, child abuse, NSSI and suicidality (i.e., ideation, plans, and attempts). NSSI and suicidality were subsequently reevaluated at the 1- and 2-month follow-up assessments.
Results: Several findings emerged. First, relative to BPD youth without abuse, the abuse group reported greater past NSSI; however, no significant differences emerged in the follow-up period. Second, the occurrence of child abuse was associated with a 5-fold increase in the rate of lifetime suicide attempts relative to the no abuse group and additionally, prospectively predicted suicide ideation (but not attempts). Last, exploratory analyses indicated that the co-occurrence of physical and sexual abuse was associated with greater past NSSI and suicidality as compared to the no abuse and sexual abuse only participants.
Conclusion: As a whole, child abuse – particularly co-occurring physical and sexual abuse – increases risk for NSSI and suicidality among BPD youth, which may have important treatment implications in this high-risk population.

1. Introduction

Borderline personality disorder (BPD) is a common and debilitating psychiatric disorder. Prevalence rates range between 0.5% and 6% in adult community samples [1] and are as high as 20% among adult inpatients [2]. In youth, prevalence rates are less clear, however, recent epidemiological data show that 1–3% of community samples present with BPD [3–5], while approximately 11–27% of outpatients [6,7] and 43–49% of psychiatric inpatients [8] report BPD during adolescence and young adulthood. BPD in youth is characterized by greater non-suicidal self-injury (NSSI) and suicidal behaviors [9,10], and thus, research is warranted to identify factors that potentiate these high-risk behaviors in BPD youth.

The relationship between early childhood trauma and BPD during adulthood has been extensively studied. Early childhood maltreatment (i.e., abuse and/or neglect) is a significant risk factor for the development of BPD [11–14] cf. [15], and further, prospective longitudinal studies in adults consistently suggest a dose–response relationship between adverse childhood events and BPD. Specifically, more extensive early maltreatment (both type and severity) is associated with greater severity of BPD symptoms and increased impairment in adult psychosocial functioning [16–18]. Collectively, these data suggest that for some, childhood trauma is a core etiological risk factor in the development of BPD.

Recurrent suicidal and self-injurious behaviors also are distinguishing characteristics of BPD, contributing to the highest mortality rates and most costly demand on mental health services [19,20]. In cross-sectional and longitudinal studies with adult BPD populations, childhood abuse increases the risk of suicidal behaviors and the lifetime number of suicide attempts [21,22]. Similarly, in a 16-year prospective follow-up study, both childhood neglect and

sexual abuse predict future suicidal behavior [16]. NSSI, the intentional destruction of one's bodily tissue without the intent to die [9], is highly prevalent (up to 80%) in adult BPD populations [23], and childhood traumatic experiences independently and prospectively predict NSSI [24,25]. Unsurprisingly, comorbid BPD and PTSD also have a robust effect on the presence and frequency of NSSI in BPD adults [26].

Compared to research with adult populations, relatively few investigations have examined the prospective impact of child abuse in youth with BPD, particularly as this relates to self-injurious and suicidal behaviors. Similar to adults, early life adversity appears to play a central role in BPD development and severity in youth. For example, Westen and colleagues [27] found that female adolescents diagnosed with BPD (14–17 years old) report higher rates of abuse by multiple perpetrators and are more likely to experience multiple types of abuse (i.e., both sexual and physical) during childhood as compared to same-age peers with psychiatric difficulties other than BPD. Further, both relational and overt peer victimizations prospectively predict BPD symptoms during adolescence [28]. While it is evident that BPD youth report higher rates of NSSI and suicidal behaviors [9,10,29], it remains unclear whether the experience of early abuse differentially impacts these high-risk behaviors.

To address critical empirical gap in our understanding of BPD youth, the present study tested the prospective impact of childhood abuse (i.e., physical and sexual). In line with past research in adults [24,30,31], we hypothesized that BPD youth with a history of childhood abuse will report more frequent and severe NSSI and suicidality (ideation, planning, attempts) both at baseline and across the follow-up assessments relative to BPD youth without any abuse history. Exploratory analyses also will test the impact of co-occurring abuse – the presence of physical and sexual abuse – on NSSI and suicidality.

2. Materials and methods

2.1. Procedure

The Partners Institutional Review Board approved study procedures. Participants aged 13–17 years provided written assent. Legal guardians and participants aged 18 and older gave written consent. On the first study visit, participants were administered clinical interviews assessing Axis I and II disorders, self-injurious thoughts and behaviors, and trauma. Additionally, participants completed questionnaires assessing psychiatric symptom severity. Participants' symptoms, NSSI, and suicidality were re-evaluated at the 1- and 2-month follow-up assessments.

2.2. Participants

The sample included 58 female participants aged 13 to 21 years ($M = 17.02$, $SD = 1.91$) recruited from an intensive

dialectical behavior therapy (DBT) treatment program. All participants met diagnostic criteria for BPD, confirmed with the Structured Clinical Interview for DSM-IV Axis II personality disorders, BPD module (SCID-II) [32]. The participants were predominantly Caucasian ($n = 46$, 79.3%), and the majority reported family income over $100,000 per year ($n = 49$, 84.5%). Within the sample, medication use was common: nearly all participants were being treated with at least one psychotropic medication ($n = 57$, 98.3%). Participants reported using the following categories of medication: 75.4% ($n = 43$) antidepressants (e.g., selective serotonin reuptake inhibitors), 50.9% ($n = 29$) atypical antipsychotics (e.g., risperidone), 31.6% ($n = 18$) mood stabilizers (e.g., lamictal), 14.0% ($n = 8$) benzodiazepines (e.g., klonopin), 10.5% ($n = 6$) stimulants (e.g., concerta), and 7.0% ($n = 4$) naltrexone.

Twenty-nine participants (50.0%) endorsed past physical or sexual abuse, measured by the Childhood Trauma Questionnaire (CTQ) [33], and the remainder ($n = 29$, 50.0%) reported no history of physical or sexual abuse. The abuse and no abuse groups did not significantly differ in age ($t(56) = .21$, $p = .84$, $d = .05$), race ($\chi^2(3, n = 58) = 2.37$, $p = .50$, $\varphi = .20$), family income ($\chi^2(3, n = 54) = 2.28$, $p = .52$, $\varphi = .21$), or in their use of any medication type ($\chi^2 s < 3.25$, $ps > .07$, $\varphi s < .24$).

At the 1-month follow-up assessment, 5 (8.6%) participants did not provide data, resulting in 26 participants within the abuse group and 27 youth within the no abuse group. Eighteen participants (31.0%) did not complete the 2-month assessment, leaving 20 participants within each group. Participants lost to the first follow-up differed from the retained sample on race ($\chi^2(3, n = 58) = 11.64$, $p = .009$, $\varphi = .45$), but no other significant differences on demographic characteristics emerged (all $ps > .13$, all $\varphi s < .47$). For the 2-month follow-up assessment, there were no differences in demographic characteristics between the original sample and attrited sample (all $ps > .25$, all $\varphi s < .31$).

2.3. Measures

2.3.1. Clinical interviews

Trained bachelor-level research assistants, graduate students, and postdoctoral fellows administered the clinical interviews. All interviewers received approximately 50 h of training (e.g., didactics and mock interviews) and regular clinical recalibration meetings ensured the reliability of diagnoses across interviewers. The Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID) [34] is a brief, structured interview that assesses Axis I disorders. The MINI-KID has shown good reliability and validity in community [34] and psychiatric [35] adolescent samples. The Structured Clinical Interview for DSM-IV Axis II personality disorders, BPD module (SCID-II) [32] assessed BPD symptomatology, and each participant's primary psychiatrist or psychotherapist

confirmed the BPD diagnosis. Only BPD participants who received a confirmatory diagnosis from the primary psychiatrist were included in the analyses.

The Self-Injurious Thoughts and Behaviors Interview (SITBI) [36] is a structured clinical interview that quantifies the presence, frequency, and severity of NSSI as well as suicidal thoughts and behaviors. It has adequate concurrent validity (i.e., medium-to-large correlations with other measures of suicidality) among adolescent inpatients [37]. Analyses at baseline focused on NSSI (i.e., frequency), suicidal ideation (i.e., number of days), suicide plans (i.e., number of days), and suicide attempts (i.e., frequency) over the past month and the past year. Additionally, lifetime suicide attempts, but not lifetime NSSI, suicidal ideation, or suicide plans, were assessed due to reliability issues reporting these events over a relatively large time span. Follow-up assessments were completed 1 and 2 months after baseline and probed past-month NSSI, ideation and plans. [1]

2.3.2. Childhood maltreatment

The Childhood Trauma Questionnaire Short Form (CTQ) [33] is a 25-item questionnaire that assesses the respondent's experiences of childhood trauma. The current study focused on the 5-item subscales of physical and sexual abuse. Item scores ranged from 1 (*never true*) to 5 (*very often true*). Participants' scores were then dichotomized using established criteria [38] to indicate the presence versus absence of physical ($\geq$8) and sexual ($\geq$6) abuse. Internal consistency was excellent for the physical abuse (α = .90) and sexual abuse (α = .95) subscales within the abuse group. As there was minimal variance in the no abuse group, internal consistency for these trauma measures was not calculated.

The Childhood Trauma Interview (CTI) [39], a semi-structured interview that measures abuse and neglect from birth through age 18, was administered. Each area of adversity (separation, physical neglect, emotional abuse, physical abuse, witnessing violence, and sexual abuse) is rated in terms of its severity and frequency. Severity was rated on a scale of 1 (*minimal or mild*) to 6 (*torture or sadism*), and frequency was rated on a scale of 1 (*less than once per year*) to 6 (*every day or sometimes more than once a day*). Sexual abuse was defined as an event with a severity of 1 or higher, which at a minimum includes "non-contact experiences," such as "being looked at or spoken to in a clearly sexualized manner." Physical abuse was defined as an event with a severity of 3 or higher, which includes at least two of the following: being hit with an object, being hit on bare skin, or marks left on the skin. We computed the presence of either physical or sexual abuse based on the CTI and compared CTQ classifications (i.e., "any abuse" = presence of either physical or sexual abuse; "no abuse" = no lifetime physical or sexual abuse). The percentage of agreement between the two

measures was 81.0%; disagreements may have been due to the CTI's inclusion of more mild instances of sexual and physical abuse compared to the CTQ. Nonetheless, the CTQ and CTI showed substantial agreement [40], κ = .62, *SE* = 0.10, CI_{95} [0.42–0.82]. The CTI only was used to confirm the reliability and validity of participants' self-reported abuse experiences whereas the CTQ was used to classify participants in "abuse" and "no abuse" groups.

2.3.3. Symptom severity

The Zanarini Rating Scale for Borderline Personality Disorder (ZAN-BPD) [41] is a 9-item self-report instrument assessing BPD symptoms. Items are rated from 0 to 4, and greater total scores indicate greater BPD severity. In the current study, the ZAN-BPD reported good internal consistency in the abuse group (α = .81) and acceptable internal consistency in the no abuse group (α = .79). The Scale for Suicidal Ideation (SSI) [42] is a 21-item questionnaire that assesses current suicidal ideation. Items on the SSI range from 0 to 2, with higher scores indicating higher levels of suicidality. In the current study, there was excellent internal consistency in both groups (abuse: α = .95; no abuse: α = .94).

2.4. Data analysis

All analyses were completed using IBM SPSS Statistics version 22.0. Baseline differences between the abuse and no abuse group were compared using: (a) *t*-tests for symptoms and age and (b) chi-square analyses for other demographic variables and Axis I diagnoses. Poisson regressions tested whether membership in the abuse group versus the no abuse group was associated with NSSI, suicide ideation, plans, and attempts. For the Poisson regressions, robust standard errors were used for the parameter estimates to control for over-dispersion (i.e., variance > mean), consistent with current recommendations [43]. Poisson regressions tested whether being in the abuse group, versus the no abuse group, could uniquely predict NSSI, suicidal ideation, and suicide plans at the 1- and 2-month follow-up assessments, controlling for baseline NSSI and suicidality, respectively. Given the number of statistical tests conducted in our primary analyses, we adjusted the critical alpha to $p < .01$. For each set of results, we performed two sensitivity analyses: first, we re-ran all models controlling for the number of BPD symptoms that participants endorsed on the SCID-II, and second, we re-ran the models controlling for participants' self-reported severity of BPD symptoms, indexed by their scores on the ZAN-BPD.

As 10 participants reported both physical and sexual abuse, exploratory analyses using Poisson regression tested whether the presence of both types of abuse – compared to only sexual abuse and no abuse – was differentially associated with NSSI and suicidal behaviors at baseline and at the 1- and 2-month follow-ups. Given the exploratory nature of these analyses as well as the smaller sample size, a critical alpha of $p < .05$ was utilized.

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[1] Analyses were not conducted on suicide attempts at the two follow-up assessments; the small number of occurrences would violate the assumptions of chi-square analyses.

3. Results

3.1. Attrition

Participants lost to the first follow-up did not significantly differ from the original sample on diagnostic characteristics or symptom severity (all $ps > .27$, all $\varphi s < .15$, all $ds < .20$). Those lost to the second follow-up also did not significantly differ from the original sample in terms of these characteristics (all $ps > .10$, all $\varphi s < .22$, all $ds < .38$). Relative to the retained sample, participants lost to attrition at the 1-month assessment made more suicide plans in the past month, $\chi^2(10, n = 58) = 19.33$, $p = .036$, $\varphi = .58$, and past year, $\chi^2(20, n = 51) = 34.79$, $p = .021$, $\varphi = .83$. No other differences in NSSI or suicidal behaviors emerged when comparing participants lost to follow-up with the retained sample (1-month: all $ps > .10$, all $\varphi s < .80$; 2-month: all $ps > .06$, all $\varphi s < .74$).

3.2. Preliminary analyses

Demographic information, psychiatric comorbidity, NSSI, and suicidality (i.e., ideation, plans, and attempts), stratified by group, are summarized in Table 1. Participants who reported sexual or physical abuse had significantly higher rates of PTSD than the no abuse group; however, the groups did not significantly differ on other Axis I diagnoses. Compared to the no abuse group, the abuse group reported greater BPD symptom severity.

3.3. Baseline NSSI and suicidality

Results for baseline analyses are presented in Table 1. Abuse was associated with more NSSI in the past month as well as more frequent past month and lifetime suicide attempts. Suicidal ideation also was more common in the abuse group, but this did not survive the more conservative critical alpha. In sensitivity analyses, the NSSI and suicide attempt findings remained statistically significant when we controlled for the number of BPD symptoms that participants endorsed ($ps < .013$, $ORs > 3.41$). When we controlled for ZAN-BPD scores, abuse was still significantly associated with past month and lifetime suicide attempts ($ps < .003$, $ORs > 21.62$), but not with past month NSSI ($p = .05$, $OR = 2.73$). Participants with a history of abuse also had more severe suicidal ideation (i.e., higher SSI scores) than those who had no abuse history but at a trend level.

Table 1
Baseline demographic and clinical data among BPD youth reporting abuse and no abuse.

	Abuse	No abuse				
	($n = 29$)	($n = 29$)	Statistic	p	Effect size	CI_{95}
Age	17.07 (1.87)	16.97 (1.97)	$t_{(56)} = -0.21$	.84	$d = 0.05$	
BPD symptoms	18.22 (7.85)	12.93 (7.06)	$t_{(56)} = 2.70$	.009	$d = 0.71$	0.17–1.24
Suicidal ideation severity	16.05 (11.13)	11.08 (10.28)	$t_{(56)} = 1.77$	.08	$d = 0.46$	−0.06 to 0.98
Sexual abuse severity	14.10 (6.75)	5.00 (0.00)	$t_{(28.38)} = 7.26$	<.001	$d = 1.91$	
Sexual abuse frequency	2.59 (2.64)	0.17 (0.60)	$t_{(30.90)} = 4.80$	<.001	$d = 1.26$	
Physical abuse severity	8.65 (5.38)	5.14 (0.44)	$t_{(28.00)} = 3.50$	.001	$d = 0.92$	
Physical abuse frequency	4.83 (6.02)	2.48 (3.44)	$t_{(44.53)} = 1.82$	.08	$d = 0.48$	
Psychotropic medications, n (%)	28 (96.6)	29 (100)	$\chi^2_{(1)} = 1.02$	.31	$\varphi = -0.13$	
Current comorbidities, n (%)						
MDD/dysthymia	20 (69.0)	23 (79.3)	$\chi^2_{(1)} = 0.81$	.37	$\varphi = -0.12$	
Substance disorder	13 (44.8)	12 (41.4)	$\chi^2_{(1)} = 0.07$	.79	$\varphi = 0.04$	
Posttraumatic stress disorder	13 (44.8)	1 (3.4)	$\chi^2_{(1)} = 13.56$	<.001	$\varphi = 0.48$	
Other anxiety disorders	18 (62.1)	20 (69.0)	$\chi^2_{(1)} = 0.31$	.58	$\varphi = -0.07$	
Behavioral disorder	10 (34.5)	10 (34.5)	$\chi^2_{(1)} = 0.00$	1.00	$\varphi = 0.00$	
Bipolar disorder (I, II, NOS)	8 (27.6)	5 (17.2)	$\chi^2_{(1)} = 0.89$	.35	$\varphi = 0.12$	
Bulimia nervosa	3 (10.3)	0 (0.0)	$\chi^2_{(1)} = 3.16$	.08	$\varphi = 0.23$	
Psychotic disorder	1 (3.4)	0 (0.0)	$\chi^2_{(1)} = 1.02$	.31	$\varphi = 0.13$	
NSSI and suicidality						
NSSI, past month	9.10 (11.99)	2.41 (4.99)	$\chi^2_{(1)} = 8.81$	.003	$OR = 3.77$	1.57–9.06
Suicidal ideation, past month	11.72 (11.22)	10.45 (11.34)	$\chi^2_{(1)} = 0.19$	.66	$OR = 1.12$	0.67–1.88
Suicide plans, past month	3.97 (5.19)	1.86 (5.83)	$\chi^2_{(1)} = 1.49$	.22	$OR = 2.13$	0.63–7.17
Suicide attempts, past month	1.10 (1.95)	0.03 (0.19)	$\chi^2_{(1)} = 11.23$	.001	$OR = 32.0$	4.22–242.95
NSSI, past year	159.15 (224.16)	68.59 (132.71)	$\chi^2_{(1)} = 3.63$	.06	$OR = 2.32$	0.98–5.52
Suicidal ideation, past year	148.46 (127.60)	90.07 (100.34)	$\chi^2_{(1)} = 3.74$	.05	$OR = 1.65$	0.99–2.74
Suicide plans, past year	35.64 (62.45)	19.62 (67.80)	$\chi^2_{(1)} = 0.67$	.41	$OR = 1.82$	0.44–7.57
Suicide attempts, past year	4.50 (10.01)	1.36 (3.85)	$\chi^2_{(1)} = 3.21$	.07	$OR = 3.32$	0.89–12.31
Suicide attempts, lifetime	7.93 (15.91)	1.54 (2.73)	$\chi^2_{(1)} = 10.89$	<.001	$OR = 5.16$	1.95–13.68

BPD = borderline personality disorder; BPD symptoms = Zanarini Rating Scale for Borderline Personality Disorder; Depression symptoms = Beck Depression Inventory-II; Suicidal ideation severity = Scale for Suicidal Ideation; Sexual abuse severity = Childhood Trauma Questionnaire (CTQ) mean sexual abuse score; Sexual abuse frequency = Childhood Trauma Interview (CTI), total frequency of sexual abuse experiences; Physical abuse severity = CTQ mean physical abuse score; Physical abuse frequency = CTI, total frequency of sexual abuse experiences; MDD = major depressive disorder; NOS = not otherwise specified; NSSI = non-suicidal self-injury. Critical alpha for all statistical tests reported was $p < .01$.

3.4. Predicting NSSI and suicidality

Table 2 summarizes our findings at the 1-month and 2-month follow-up assessments. Abuse group was not associated with the frequency of NSSI at either follow-up. At the 1-month follow-up, being in the abuse group, versus the no abuse group, was associated with more past month suicidal ideation. This effect remained when we controlled for BPD symptom count ($p = .03$, $OR = 1.70$) and was marginally significant when we controlled for BPD symptom severity ($p = .05$, $OR = 1.69$). At the same time, neither of these findings survived the conservative alpha threshold. Abuse group was not associated with the frequency of suicide plans at the 1-month follow-up assessment; however, at the 2-month follow-up, abuse was associated with more frequent suicidal ideation. The effect of abuse on suicidal ideation at the 2-month follow-up remained statistically significant in both sensitivity analyses ($ps < .04$, $ORs > 2.31$).

3.5. Exploratory analyses

Exploratory analyses were limited by the sample size and focused on group differences between participants reporting: (a) no abuse ($n = 29$), (b) sexual abuse only ($n = 19$), and (c) co-occurring physical and sexual abuse

($n = 10$).[2] The no abuse ($M = 16.97$, $SD = 1.97$), sexual abuse only ($M = 17.47$, $SD = 1.93$), and co-occurring abuse groups ($M = 16.30$, $SD = 1.57$) did not significantly differ in age, $F(2, 55) = 1.28$, $p = .29$, $\eta^2_p = .04$. However, the three groups differed in baseline BPD symptom levels, $F(2, 55) = 7.58$, $p = .001$, $\eta^2_p = .22$, such that the co-occurring abuse group ($M = 23.05$, $SE = 2.24$) reported more severe BPD symptoms than both the no abuse group ($M = 12.93$, $SE = 1.32$; $p < .001$, $d = 1.38$) and the sexual abuse group ($M = 15.68$, $SE = 1.63$; $p = .010$, $d = 1.02$). There was no difference between the sexual abuse and no abuse groups ($p = .19$, $d = .39$). In addition, the groups differed on SSI scores, $F(2, 55) = 6.58$, $p = .003$, $\eta^2_p = .19$, such that the co-occurring abuse group ($M = 23.95$, $SE = 3.16$) endorsed higher levels of suicidal ideation than the no abuse group ($M = 11.08$, $SE = 1.85$; $p = .001$, $d = 1.18$) and the sexual abuse group ($M = 11.90$, $SE = 2.29$; $p = .003$, $d = 1.19$). There were no significant differences in suicidality between the sexual abuse and no abuse groups ($p = .78$, $d = .09$).

Table 3 summarizes differences in NSSI and suicidal thoughts and behaviors among the three groups. Being in the co-occurring abuse group was associated with: (a) more frequent past month and past year NSSI relative to the no abuse group and (b) greater past month NSSI compared to the sexual abuse group. The remaining associations between group and NSSI were non-significant. Membership in the co-occurring abuse group was associated with: (a) significantly more past month and past year suicidal ideation relative to the sexual abuse group and (b) more past year ideation compared to the no abuse group. All other associations between group and suicidal ideation were non-significant. Being in the co-occurring abuse group also was associated with: (a) more suicide attempts in the past month, past year, and lifetime, relative to the no abuse group and (b) more past month and past year suicide attempts relative to the sexual abuse only group. Additionally, membership in the sexual abuse group, versus the no abuse group, was associated with more past month suicide attempts (see Fig. 1).

Table 4 summarizes associations between baseline abuse group status (no abuse, sexual abuse only and co-occurring abuse) and NSSI and suicide ideation at the 1- and 2-month follow-up assessments.[3] Controlling for baseline suicidal ideation, sexual abuse (versus no abuse) and co-occurring abuse (versus no abuse) were associated with more frequent suicide ideation at both the 1- and 2-month follow-up assessments. In contrast, abuse group was not associated with the frequency of NSSI at either of the follow-up assessments.

Table 2
Predicting non-suicidal self-injury and suicidality at the 1- and 2- month follow-up assessments.

Predictor	b (SE)	χ^2	OR	CI$_{95}$
NSSI 1-month [$\chi^2(2, n = 53) = 123.29$, $p < .001$, AIC = 399.06]				
Baseline NSSI	0.05 (.01)	36.14***	1.06	1.04–1.08
Abuse	0.12 (.53)	0.05	1.13	0.40–3.21
SI 1-month [$\chi^2(2, n = 53) = 223.32$, $p < .001$, AIC = 446.58]				
Baseline SI	0.06 (.01)	52.68***	1.06	1.05–1.08
Abuse	0.63 (.26)	5.76*	1.89	1.12–3.16
SP 1-month [$\chi^2(2, n = 53) = 9.75$, $p = .008$, AIC = 122.67]				
Baseline SP	0.07 (.04)	3.09	1.08	0.99–1.17
Abuse	0.57 (1.03)	0.30	1.76	0.24–13.25
NSSI 2-month [$\chi^2(2, n = 40) = 27.72$, $p < .001$, AIC = 205.37]				
Baseline NSSI	0.04 (.02)	4.79*	1.04	1.00–1.08
Abuse	0.34 (.69)	0.24	1.40	0.36–5.41
SI 2-month [$\chi^2(2, n = 40) = 155.98$, $p < .001$, AIC = 375.07]				
Baseline SI	0.05 (.01)	13.03***	1.05	1.02–1.08
Abuse	0.99 (.35)	7.87**	2.69	1.35–5.36
SP 2-month [$\chi^2(2, n = 40) = 74.22$, $p < .001$, AIC = 227.66]				
Baseline SP	0.09 (.04)	4.68*	1.09	1.01–1.18
Abuse	2.94 (1.25)	5.56*	18.97	1.64–219.21

NSSI = non-suicidal self-injury; SI = suicidal ideation; SP = suicide planning. Critical alpha for all statistical tests reported was $p < .01$.

* $p < .05$.
** $p < .01$.
*** $p < .001$.

[2] We did not create a physical abuse only group because only 10 participants reported physical abuse, and all 10 also reported co-occurring sexual abuse.

[3] Results for suicide plans at the 1- and 2-month follow-ups are not included here, as these models did not converge; the validity of the models for follow-up suicide plans is therefore uncertain.

Table 3
Non-suicidal self-injury and suicidality as a function of abuse group status.

	Total effect	NA[+] vs. CA			NA[+] vs. SA			SA[+] vs. CA		
	χ^2	b (SE)	OR	CI_{95}	b (SE)	OR	CI_{95}	b (SE)	OR	CI_{95}
NSSI, past month	17.03***	1.89 (.47)***	6.63	2.63–16.69	0.82 (.51)	2.27	0.84–6.14	1.07 (.44)*	2.92	1.23–6.96
Ideation, past month	6.27*	0.53 (.27)	1.69	0.99–2.89	-0.20 (.33)	0.82	0.43–1.57	0.72 (.33)*	2.06	1.09–3.90
Plans, past month	4.49	1.17 (.64)	3.22	0.91–11.38	0.44 (.67)	1.56	0.42–5.79	0.73 (.46)	2.07	0.84–5.11
Attempts, past month	16.39***	4.11 (1.07)***	60.9	7.48–495.70	2.82 (1.03)**	16.79	2.21–127.49	1.29 (.53)*	3.63	1.28–10.30
NSSI, past year	8.65*	1.19 (.41)**	3.28	1.46–7.37	0.56 (.60)	1.75	0.54–5.73	0.63 (.53)	1.87	0.66–5.34
Ideation, past year	10.76**	0.85 (.27)**	2.35	1.38–3.99	0.23 (.31)	1.26	0.68–2.33	0.62 (.30)*	1.86	1.04–3.33
Plans, past year	0.68	0.63 (.88)	1.88	0.33–10.63	0.58 (.78)	1.79	0.39–8.17	0.05 (.77)	1.05	0.23–4.72
Attempts, past year	7.48*	1.94 (.75)**	6.96	1.62–29.99	0.46 (.71)	1.59	0.40–6.35	1.48 (.71)*	4.38	1.10–17.50
Attempts, lifetime	15.82***	2.26 (.58)***	9.62	3.11–29.78	1.12 (.63)	3.05	0.89–10.43	1.15 (.71)	3.16	0.78–12.76

NA = no abuse; CA = co-occurring physical and sexual abuse; SA = sexual abuse only; NSSI = non-suicidal self-injury.

[+] Denotes the comparison group.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

4. Discussion

The present study examined the impact of child abuse – particularly physical and sexual abuse – on NSSI and suicidality in BPD youth. Three important findings emerged. First, child abuse showed a cross-sectional but not a prospective relationship with NSSI. Second, child abuse (compared to no abuse) is associated with a 5-fold increase in the rate of lifetime suicide attempts, and in line with our hypothesis, prospectively predicted suicide ideation and planning (trend level), but not attempts. Third, exploratory analyses found that the co-occurrence of physical and sexual abuse contributes to more severe NSSI and suicidality.

First, compared to adolescents with no childhood abuse, BPD youth with abuse histories endorsed more frequent NSSI prior to admission to an intensive DBT program. Yet, when controlling for BPD symptom severity, these effects do not persist, suggesting that BPD severity influences NSSI engagement. Contrary to hypotheses, child abuse did not prospectively predict NSSI frequency. As participants were recruited from an intensive treatment program, these null findings may reflect DBT-related effects. Specifically, before initiating DBT, patients must commit to refraining from engaging in self-injuring behaviors and are provided with 24-h skills coaching to help manage urges. In a more naturalistic setting (i.e., BPD youth without treatment),
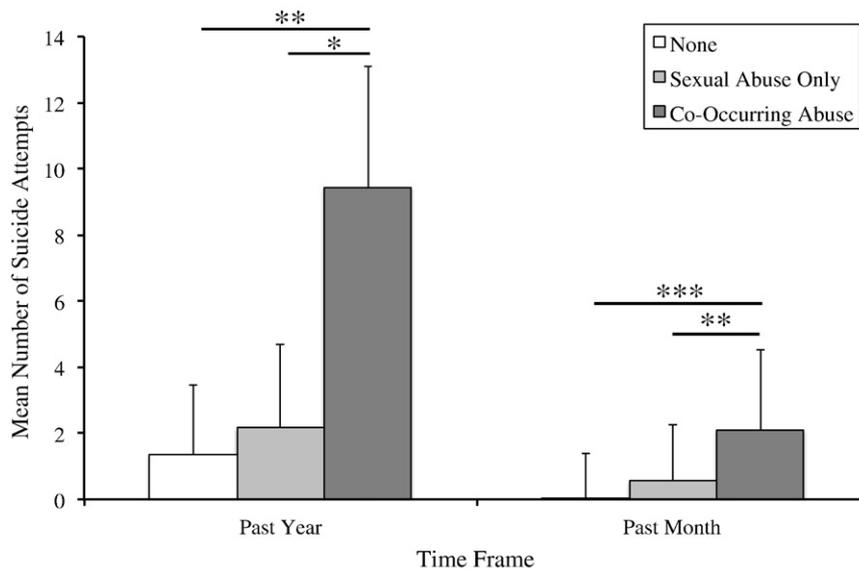

Fig. 1. Mean number of past year and past month suicide attempts reported by participants, stratified by abuse group (no abuse, sexual abuse only and co-occurring abuse). *Note.* ***$p < .001$; **$p < .01$; *$p < .05$. The effect of abuse group (no abuse, sexual abuse only and co-occurring abuse) was significant for both the past year attempts, $F(2, 53) = 4.40$, $p = .02$, $\eta^2_p = .14$, and past month attempts, $F(2, 55) = 9.43$, $p < .001$, $\eta^2_p = .26$.

Table 4
Predicting non-suicidal self-injury and suicide ideation at the 1- and 2- month follow-up assessments from baseline abuse group status.

Predictor	b (SE)	χ^2	OR	CI_{95}
NSSI 1-month [χ^2(3, n = 53) = 125.00, $p < .001$, AIC = 399.36]				
Baseline NSSI	0.06 (.02)	10.85***	1.06	1.02–1.10
Abuse				
None	Ref.			
Sexual only	0.21 (.55)	0.14	1.23	0.42–3.61
Co-occurring	−0.09 (.87)	0.01	0.91	0.17–5.01
SI 1-month [χ^2(3, n = 53) = 223.86, $p < .001$, AIC = 448.03]				
Baseline SI	0.06 (.01)	52.81***	1.06	1.05–1.08
Abuse				
None	Ref.			
Sexual only	0.59 (.29)	4.21*	1.80	1.03–3.14
Co-occurring	0.68 (.31)	4.96*	1.98	1.09–3.62
NSSI 2-month [χ^2(3, n = 40) = 40.51, $p < .001$, AIC = 194.58]				
Baseline NSSI	0.02 (.02)	0.71	1.02	0.97–1.07
Abuse				
None	Ref.			
Sexual only	−0.55 (.69)	0.63	0.58	0.15–2.23
Co-occurring	1.07 (.92)	1.36	2.91	0.40–17.52
SI 2-month [χ^2(3, n = 40) = 157.25, $p < .001$, AIC = 375.80]				
Baseline SI	0.05 (.02)	10.72**	1.06	1.02–1.09
Abuse				
None	Ref.			
Sexual only	1.08 (.34)	10.02**	2.96	1.51–5.78
Co-occurring	0.92 (.45)	4.14*	2.50	1.03–6.05

NSSI = non-suicidal self-injury; SI = suicidal ideation.
  * $p < .05$.
 ** $p < .01$.
*** $p < .001$.

prospective differences might arise, which would be consistent with prior research among BPD adults [44].

Second, the presence of abuse was associated with a 5-fold increase in the rate of past suicide attempts, and this effect predicted above and beyond BPD symptom severity. Similarly, BPD youth with a history of abuse reported higher rates of past suicidal ideation (at a trend level), and prospective findings showed similar differences in suicide ideation during the follow-up period. As a whole, child abuse is a robust predictor of increased suicidality in BPD youth, which is largely consistent with BPD adults [16,21,45]. Given the impact of abuse on suicidal behaviors within this high-risk population, recent treatment protocols have targeted the co-occurrence of BPD and PTSD; particularly as a means of combating persistent symptoms that often are unaffected using more traditional treatments [46]. Such an approach teaches patients to concurrently process trauma-related emotions and cognitions (i.e., via prolonged exposure protocols) while also learning DBT coping strategies to reduce affective lability and self-destructive behaviors. Preliminary findings in adults have demonstrated that patients were 1.5 times less likely to self-injure and 2.4 times less likely to attempt suicide in the dual-focused treatment as compared to standard DBT [47].

Last, exploratory analyses found that the co-occurrence of physical and sexual abuse contributed to greater NSSI and suicidality (i.e., ideation, plans, and attempts). Broadly speaking, this pattern is consistent with the dose–response effect reported in adult populations whereby the cumulative impact of abuse impacts the severity and persistence of self-injurious and suicidal behaviors [48–50] cf. [51]. These findings suggest that traumatic experiences from childhood, and consequent trauma-related or PTSD symptoms, may exert an influence over the lifespan and play a critical role in NSSI [52] and suicidality [16]. Recent studies suggest that self-injury plays a functional role in coping with trauma-related symptoms (which take the form of intrusive memories, trauma-related beliefs, and enduring negative emotions), and in this context, NSSI serves to alleviate the psychological distress associated with trauma-related symptoms [20,31]. One implication of these findings is that more attention needs to be paid to the specific role of trauma-related symptoms and/or co-occurring PTSD diagnoses in the design and delivery of treatments that will be maximally effective for the subgroup of BPD patients who have experienced childhood abuse and present with high levels of NSSI and suicidality. Idiographic, person-centered approaches that account for both the type and severity of abuse may, ultimately, lead to more optimal outcomes for high-risk BPD youth.

4.1. Limitations

Findings should be interpreted in light of several limitations. First, our sample size was relatively small, included only female youth, primarily Caucasian, and was recruited from an intensive DBT program, which may limit generalizability. Further, the relatively short follow-up period precluded our ability to test NSSI and suicidality over longer periods. Second, while the study probed NSSI frequency over time, changes in NSSI frequency may be directly influenced by the intensive treatment. To better understand the trajectory of NSSI, further study within a more naturalistic setting is warranted. Third, the study relied on the retrospective recall of abuse, which may be susceptible to respondent bias. Fourth, bipolar spectrum disorders were diagnosed in 13 participants, which may reflect the acuity of the sample, which was recruited from an intensive DBT program. At the same time, this severity may impact the generalizability of our findings. Last, clinical interviews were not recorded, and thus, inter-rater reliability was not obtained. However, BPD diagnoses were confirmed with the primary clinician, and recalibration meetings were held to ensure diagnostic reliability.

4.2. Clinical implications and future directions

Recent studies focusing on the treatment of adults with BPD and trauma have highlighted the importance of providing targeted, evidence-based treatment to this population. Childhood abuse experiences can impact and

maintain self-injurious and suicidal behaviors, and treatment that includes direct processing of past abuse coupled with standard cognitive-oriented therapies (e.g., DBT PE) may be most beneficial [47]. Presently, little is known about how these treatments would impact BPD youth, and thus, future research using this dual approach may prove to be more effective for reducing NSSI and suicidality within this high-risk population.

Disclosure of interest

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