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The Relationship Between Rates and Severity of Non-Suicidal Self-Injury and Suicide Attempts in Youth with Borderline Personality Disorder

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Original data from this manuscript may be accessed upon request from the corresponding author (andrew.chanen@orygen.org.au).

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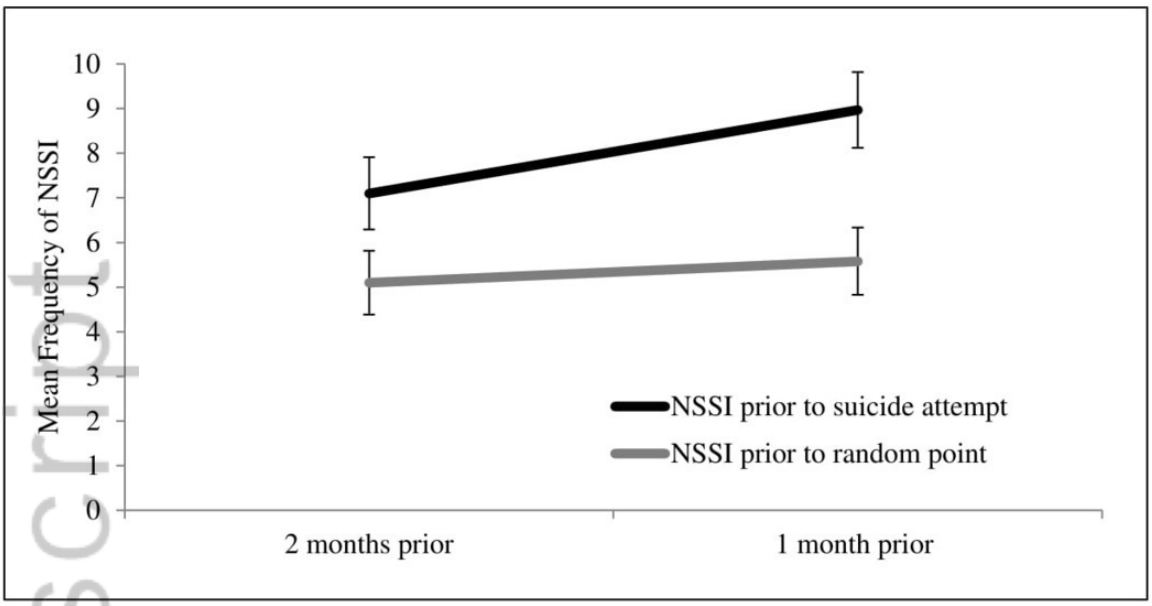
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Short Title: Non-Suicidal Self-Injury and Suicide attempts in Youth with BPD

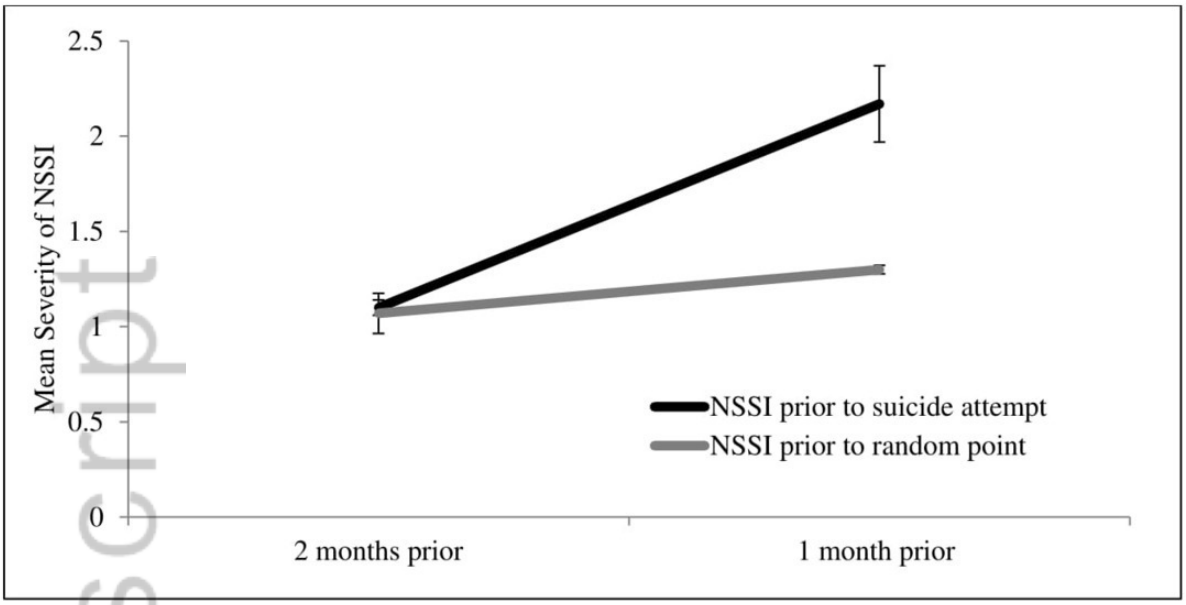
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Abstract

Aim: Non-suicidal self-injury (NSSI) is a recognised indicator of suicide risk. Yet, the ubiquity of this behaviour in borderline personality disorder (BPD) limits its utility as a predictor of risk. Consequently, this study aimed to elucidate the relationship between other features of NSSI, including frequency and severity, and suicide attempts.

Method: Participants were 107 youth (15-25 year-olds) with BPD who were assessed for BPD severity, depressive symptoms, 12-month frequency of NSSI and suicide attempts, as well as the levels treatment sought following each self-harm event.

Results: Three-quarters (75.7%) of youth with BPD reported NSSI and two-thirds (66.4%) reported a suicide attempt over the previous 12-months. The frequency of NSSI over the prior 12-months did not show a linear or quadratic relationship with the number of suicide attempts when adjusting for severity of depression, impulsivity and interpersonal problems. NSSI severity was not associated with more frequent suicide attempts. Only impulsivity and depression were uniquely predictive of suicide attempt frequency. A relative increase in the frequency and severity of NSSI occurred in the months prior to a suicide attempt.

Conclusion: The frequencies of NSSI and suicide attempts among youth presenting for their first treatment of BPD appear to be perilously high; considerably higher than rates reported by adults with BPD. These findings suggest that clinicians should give more weight to average levels of impulsivity and depression, rather than the absolute frequency and severity of NSSI, when assessing for risk of suicide attempts. Notwithstanding this, a relative increase in the frequency and severity of NSSI appears to be predictive of a suicide attempt.

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Key words: Non-Suicidal Self-injury, Suicide Attempt, Youth, Borderline Personality Disorder, Psychiatry.

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INTRODUCTION

Eight percent of adults with Borderline Personality Disorder (BPD) complete suicide,[1] making accurate clinical risk assessment an essential but challenging task. Previous non-suicidal self-injury (NSSI) has been identified as a robust risk predictor for completed suicide.[2–4] However, as 50 to 90% of adults with BPD report a history of NSSI,[5–12] prior or current engagement in NSSI *per se* is an imprecise predictor of suicide attempts. Risk assessment in BPD might be improved by investigating the relationship between more detailed characteristics of NSSI, such as frequency, severity, and subsequent suicide attempts. This task is especially challenging in youth with BPD due the normative peak in both NSSI[13] and borderline personality pathology[14,15] in early adolescence.

The relationship between frequency of NSSI and suicide attempts

Studies of the relationship between the frequency of NSSI and suicide attempts in youth have yielded conflicting findings. For example, in correlational research, a weak positive relationship was identified between the frequency of NSSI and frequency of suicide attempts in a community sample of ninth grade adolescents (n = 3623; M_{age} = 14.6 years, SD = 1.3).[4] Correlational research investigating inpatient samples contrast with these results. For example, a cross-sectional study of an inpatient sample of adolescents (n = 89; M_{age} = 14.7 years, SD = 1.4) failed to exhibit a linear relationship between the 12-month frequency of NSSI and lifetime frequency of suicide attempts.[16] Similarly, a longitudinal study investigating inpatient adolescents (n = 143; M_{age} = 13.5 years, SD = 0.8) revealed that at baseline, higher 12-month frequencies of NSSI were associated with higher lifetime rates of suicidal ideation but not suicide attempts.[17] High rates of major depressive disorder were exhibited in both inpatient samples, yet the presence of personality disorders were

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only assessed in Nock *et al's*[17] study. In the latter study, 50% of inpatients exhibited a diagnosis of BPD, which indicates that findings from this study might be most generalisable to a youth BPD population.[17]

Three recent studies using logistic regression analysis in university students indicated a more complex, quadratic relationship between the frequency of NSSI and the odds of a suicide attempt (n = 263; M_{age} = 21.8 year, SD = 2.8)[18] (n = 196; *min* = 18.0 years *max* = 24.0 years)[19] (n = 12,422, M_{age} = 20.9, SD = 2.6).[20] In these studies, university students[18,21] and heterosexual college students[20] who reported less than 50 NSSI events over a lifetime exhibited higher odds of a suicide attempt than those reporting more than 50 NSSI events. The authors of both studies suggested that for individuals engaging in over 50 lifetime acts of NSSI, this behaviour had become a working, albeit maladaptive self-regulation process, which was protective against suicide. Paul *et al.*[18] questioned whether mixed findings in correlational research might be explained by a failure to investigate a quadratic relationship between the frequency of NSSI and suicide attempts. The current study aims to address this question for the first time in youth with BPD.

Prior research has found that factors other than NSSI are predictive of suicide attempts in adults with BPD. Hopelessness, depression[7,8,22,23] and severity of BPD features, including impulsivity[22] and impulsive aggression[7] are among those most commonly cited. To understand the relationship between NSSI frequency and suicide attempts it is important to adjust for these features.

The relationship between severity of NSSI and suicide attempts

Limited research has investigated the relationship between severity of NSSI and suicide attempts in non-BPD samples, with mixed results. Two group comparison studies revealed that students who were classed as engaging in higher severity acts of

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NSSI reported a history of more frequent suicide attempts (n = 663; M_{age} = 14.2 years, SD = 1.1),[24] (n =282; min = 18.0 years, max = 24.0 years).[19] In contrast, a study of inpatient adolescents found that participants classed as engaging in significantly more severe forms of NSSI did not have a history of more frequent suicide attempts (diagnoses not provided; n = 42; M_{age} = 15.7, SD = 1.5).[25] Research is yet to investigate this relationship in youth with BPD. In the aforementioned research, severity of NSSI was defined according to the potential degree of tissue damage implied by the method of self-harm employed. This is problematic, as methods labelled as 'less severe' (e.g., biting self, inserting objects under nails, sticking sharp objects into the skin, punching oneself) have the potential to cause greater physical harm than those identified as 'more severe' (e.g., burning, cutting, self-poisoning, tattooing).[19,24] To reduce this subjectivity, the current study defined severity of NSSI according to the level of medical intervention sought following the act.

Relative frequency of NSSI and severity of NSSI prior to a suicide attempt

To comprehensively investigate the relationship between NSSI and suicide attempts, it is also necessary to assess any relative changes in frequency and severity of NSSI that might occur prior to a suicide attempt. Yet, to the authors' knowledge, no prior research has investigated this question. Understanding changes in NSSI frequency and severity occurring in the months prior to a suicide attempt might assist clinicians to predict a forthcoming suicide attempt with greater accuracy and intervene.

The current study

This study had twin aims. First, to investigate the relationships between the absolute frequency and severity of NSSI and the frequency of suicide attempts reported over the prior 12-months. Second, to investigate relative changes in the

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frequency and severity of NSSI occurring in the 2-months prior to a suicide attempt. Three main hypotheses were drawn from the literature: (i) as proposed by Paul *et al.*[18] a quadratic relationship would be identified between the frequency of NSSI and suicide attempts reported over the prior 12-months, adjusting for depression score and severity of BPD features; (ii) participants who, on average sought medical attention following NSSI (indicating greater severity of NSSI) would report a higher frequency of suicide attempts over the prior 12-months; and (iii) the frequency and severity of NSSI would increase in the 2-months prior to a suicide attempt, compared with a random 2-month period of NSSI.

METHOD

Participants

Participants were recruited from two government-funded youth mental health services in Melbourne, Australia as part of a larger randomised control trial of early intervention for youth with first-presentation BPD.[26] The final sample comprised 107 youth aged 15 to 25 years, who met the Structured Clinical Interview for DSM-IV Axis II disorders (SCID-II) criteria for BPD.[27] Participants included had not previously engaged in evidence-based treatment for BPD, and did not have a current DSM-IV diagnosis of a Schizophrenia Spectrum Disorder, Bipolar I or II or a severe disturbance that prevented informed consent to the study.

Measures

Diagnosis. Co-occurring mental state and personality disorders were diagnosed using the Structured Clinical Interview for DSM-IV Axis I – Patient Edition (SCID-I/P)[28] and SCID-II.[27]

Frequency and Severity of NSSI and Frequency of Suicide Attempts. NSSI and suicide attempts over the prior 12-months were identified by participants on the calendar

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time-line of the Suicide Attempt Self-Injury Interview (SASII).[29] Participants also identified the level of treatment sought following each self-harm act on an 11-point Likert scale (1 = no treatment required/sought; 2 = Went to emergency room or physician, had no medical treatment or assessment and went home; 3 = went directly to an in-patient psychiatric unit; 4 = medically treated while on in-patient psychiatric unit; …11 = mortuary), which was used as a proxy for NSSI severity. An assessment of this measure's validity revealed an agreement of 82% between self-reports of the medical treatment required following NSSI and suicide attempts and that reported in medical records. An agreement of 76% was also identified between the exact number of NSSI and suicide attempt episodes identified via self-report and the number recorded in therapist notes over the year[29].

Severity of BPD Features. All subscales of the Borderline Personality Disorder Severity Index (BPD-SI) except the parasuicide subscale were employed to adjust for severity of BPD features when investigating the relationships between NSSI and suicide attempt frequency.[30] All sub-scales exhibit good inter-rater reliability, with an intra-class correlation of 0.93 (ICC 3,1), and a median Cronbach's alpha (±) of 0.69.[30]

Depression Scores. The 10-item Montgomery–Asberg Depression Rating Scale (SIGMA) was employed to adjust for the severity of current depressive symptoms when investigating the relationship between NSSI and suicide attempt frequency.[31] The total score varies from 0 to 60 with higher scores indicating more severe symptoms of depression. This scale exhibits good inter-rater reliability with an intra-class correlation of 0.93.[31]

Procedure

Ethical approval was obtained from the Melbourne Health Human Research Ethics Committee (HREC2010.055) and the study was performed in accordance with the

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Helsinki Declaration of 1975. All participants, and for minors a parent or guardian, provided written informed consent. Participants completed the SCID-I/P, SCID-II, the SASII, BPD-SI and SIGMA.

Statistical analysis

An assessment of normality, linearity, homoscedasticity and univariate outliers was performed for all variables in the study. [32] For descriptive statistics, the median was used as the measure of central tendency for non-normally distributed variables.[33] For participants who engaged in NSSI, a series of separate negative binomial regression models were completed to identify any significant relationships between the frequency of suicide and covariates (BPD severity symptoms and depression scores). A negative binomial regression model was conducted to identify if a linear or quadratic relationship existed between the frequency of suicide attempts and NSSI, adjusting for any significant covariates. This model was chosen because it accounted for over-dispersion and the small number of zeros in the data. An assessment of the Akaike Information Criterion, Bayesian Information Criterion and standard errors revealed a better fit for this model compared with the alternative, zero-inflated negative binomial model, which often accounts better for data with an 'excess' of zeros.[34] A quadratic model was developed according to methods outlined by Ormes and Comes-Ormes, with a quadratic model initially identified and reduced to a linear model if the former was not significant.[35] Assumptions of this test were met with residuals which did not deviate from a negative binomial distribution and an absence of outliers and multicollinearity.

Due to limited variability in the medical treatment sought following NSSI (severity ratings), participants were divided into two groups according to whether, on average, they did or did not seek treatment following self-harm. An independent

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samples *t*-test was employed to compare the mean number of suicide attempts within each group.

The 2-month period of NSSI prior to the most recent suicide attempt and a random 2-month period of NSSI without suicide attempts were selected for participants who reported at least five NSSI events over the prior year. Participants with at least five NSSI events were selected to increase the probability that NSSI occurred in the random 2-month period. In the small number of cases where no NSSI occurred outside the 2-month period prior to NSSI, a random point was selected without NSSI. A series of paired sample *t*-tests were completed to compare the frequency and severity of NSSI occurring in the 2-months prior to a suicide attempt compared with the 2-months period of NSSI without suicide attempts. For these tests, Cohens *d* were reported, correcting for dependence among means.[36] The strength of these effect sizes were interpreted as 0.20 small, 0.50 medium and 0.80 large.[37] Bias-corrected and accelerated (BCa) bootstrapped intervals were completed for all ANOVAs and t-tests to show the robustness of parametric tests to slight non-normality in the data.[33] BCa confidence intervals were not completed for non-significant paired t-tests as the high correlations between variables (low mean difference) and low variance between participants rendered the output unreliable.

RESULTS

Participant characteristics

Participants were 107 youth with BPD (M_{age} = 18.1, *SD* = 2.7), 83.0% of whom were female. According to a residential postcode index of socio-economic status,[38] 45.8% were rated as having high relative socio-economic disadvantage. Mood, anxiety and eating disorders co-occurred with BPD in 83.2% and 71.3% and

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8.4% of the sample respectively. Antisocial (31.8%), followed by avoidant (23.4%) and paranoid personality disorder (20.6%) were the three most commonly co-occurring personality disorders. For further details on demographics see Andrewes *et al.*[39]

Relationship between frequency of NSSI, severity of NSSI and suicide attempts

Of the 107 participants, 89.7% (n = 96) reported on the SASII that they had engaged in either a suicide attempt or NSSI over the previous 12-months (Table 1). Fifty-two percent (n = 56) had engaged in both suicide attempts and NSSI, and cutting/stabbing/scratching was the most common method. A higher percentage of participants engaged in NSSI without suicide attempts (23%, n = 25), than suicide attempts without NSSI (14%, n = 15). For participants engaging in NSSI, severity of depression, impulsivity, and interpersonal problems (covariates) were predictive of the number of suicide attempts reported over the prior 12-months (Table 2). Both a linear and quadratic negative binomial regression model showed significantly improved fit compared with the intercept model. Yet neither a linear nor quadratic relationship was found between NSSI and suicide attempt frequency when adjusting for covariates. Impulsivity and depression uniquely predicted a higher number of suicide attempts. Specifically, a one-unit increase in impulsivity and depression predicted an increase in the number of suicide attempts by 22% and 3% respectively (Table 3). There was no significant difference between the average number of suicide attempts reported by participants who did ($M_{suicide\ attempts}$ = 2.74, SD = 2.89) and did not ($M_{suicide\ attempts}$ = 2.74, SD = 3.40) require treatment following an NSSI event (t (79) = - 0.083, p = 0.934, d = -0.02, 95% BCa CI [-1.62, 1.36]).

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Relative change in frequency and severity of NSSI in the 2-months prior to a suicide attempt

Thirty-eight participants reported five of more NSSI acts over the previous 12-months and were included in this analysis. In the 2-month ($t(37)= -2.24$, $p = 0.031$, $d = -0.20$, 95% BCa CI [0.58, 3.57]) and 1-month ($t(37) = -2.99$, $p = 0.005$, $d = -0.36$, 95% BCa CI [1.50, 5.74]) period prior to a suicide attempt, participants exhibited a significantly higher frequency of NSSI, compared with a random 2-month period during which no suicide attempts occurred, with small effect sizes (Figure 1a). In the 1-month (t (27) = -2.28, $p = 0.031$, $d = -0.37$, 95% BCa CI [0.30, 1.72]), but not 2-month period ($t(18) = -1.00$, $p = 0.331$, $d <0.001$) prior to a suicide attempt, participants sought a higher level of treatment following NSSI, with small effect sizes (Figure 1b).

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DISCUSSION

This study identified, for the first time, the 12-month prevalence rates of NSSI and suicide attempts, along with the relationships between the frequency and severity of NSSI and suicide attempts in an acutely unwell sample of treatment-seeking youth with BPD. Four main findings emerged from this study.

First, 75.7% of participants reported NSSI over the previous 12-months. This is remarkable because it is comparable with the highest lifetime prevalence found among studies of adults with BPD.[5–11,40] These rates are also higher than the 2-year prevalence rates identified in adults with BPD over a 16-year follow-up (50.9%; Wedig et al., 2012). This suggests that NSSI might be more prevalent early in the

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course of BPD and reflect the underlying normative rise in rates of NSSI at puberty, peaking in adolescence and declining throughout adulthood.[10,13]

Second, two thirds of the sample (66.4%) reported a suicide attempt over the prior 12-months. This finding also underscores the higher levels of risk among youth with first-presentation BPD, compared with adults with BPD among whom the 12-month prevalence rate for suicide attempts is around 20%.[8,23]

Third, in contrast with our hypotheses, the frequency of NSSI events reported over the prior 12-months did not show a linear or quadratic relationship with the number of suicide attempts when adjusting for severity of depression, impulsivity and interpersonal problems. Furthermore, youth with BPD who sought higher levels treatment following an NSSI event did not engage in more suicide attempts. These findings contrast with previous literature in student populations[18,19,24] but support research from inpatient samples.[16,17,25] The higher frequency of NSSI and greater levels of pathology present among inpatients and youth with BPD might account for the conflicting findings in this study when compared with previous student samples. The finding that a high frequency of NSSI was not associated with an increase in suicide attempts suggests that, for some participants, NSSI has become a working form of emotion regulation, which might be protective against suicide. This is consistent with conclusions drawn by previous investigators.[18,19] Given these findings, the absolute frequency and average 'severity' of NSSI over the prior 12-months might be a poor indicator of risk among youth with BPD. Instead, higher levels of depression or severity of BPD symptoms, such as impulsivity and interpersonal problems, were more important for predicting suicide attempts. Impulsivity has been previously identified as a predictor of suicide attempts in adults with BPD,[7,41] yet two recent 2, 5, and 6 year follow-up studies in adults with BPD failed to identify

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impulsivity as a predictor. [23,42] Contrasting results might be explained by the different measurements and definitions of this multifaceted construct used in each study.[43] The positive relationship found between impulsivity and suicide attempt frequency in youth might be also accounted by the normative increase in risk-taking behaviour at this age.[44,45] The positive relationship between depression scores and suicide attempt frequency supports research in adult BPD populations ad suggests that higher levels of depression should also be considered an indicator of risk in younger age groups. [7,8,22,23]

Although not uniquely predictive of suicide attempts, the positive relationship between severity of interpersonal problems and frequency of suicide attempts is a novel finding in BPD populations. This relationship might be unique to youth with BPD, who experience high levels of distress associated with navigating intimate relationships and novel social experiences, such as starting high school or university.[46] Future research should compare severity of interpersonal problems and frequency of suicide attempts in both youth and adults with BPD.

Prior research in adults with BPD and those with a history of psychiatric disorders have identified affective instability as predictive of suicide attempts, which contrasts with results in this study.[47,48] Conflicting findings between adults and youth might be explained by the consequences of emotional instability. As affect instability is more developmentally appropriate for youth, it is possible that they experience fewer consequences and even positive reinforcement from affect instability. Hence, while adults might experience social isolation following emotionally turbulent behaviour, adolescents might be less likely to experience alienation from peers and more likely receive support from parents or teachers.

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Fourth, as predicted, a relative increase in the frequency and severity of NSSI occurred in the months prior to a suicide attempt. This finding provides some support for the Joiner's acquired capability for suicide theory,[49,50] which posits that individuals gain the capacity for suicide following heightened frequency and severity of NSSI which leads to a habituation to the fear and pain and an amplification of the rewarding effects of this behaviour. Yet, this theory does not explain why the higher frequency and severity of NSSI over the prior 12-months was not associated with a higher number of suicide attempts. Instead, it is possible that the relative increase in the frequency and severity of NSSI occurs prior to a suicide attempt because individuals habituate to the rewarding effects of this behaviour during periods of distress and require more frequent NSSI to obtain the same emotional regulatory effects. Following a suicide attempt, NSSI might reduce due to the lasting effects of relief obtained (e.g., negative reinforcement and additional external support). The increase in NSSI prior to a suicide attempt, followed by the reduction after, might lead to overall NSSI frequencies that are comparable to individuals who do not attempt suicide. To investigate this theory, future research should employ techniques such as ecological momentary assessment to identify changes in both affect and frequency of NSSI prior and following a suicide attempt.

Strengths and limitations

A major strength of this study is its investigation of the naturally occurring frequency of NSSI and suicide attempts in an acutely unwell sample of youth with BPD with minimal confounding treatment and duration of illness effects.[51] The study sample is among the largest samples of youth with rigorously diagnosed BPD to date. However, a consequence of studying 'real-world', treatment naïve youth with BPD is that this sample is smaller than those in studies investigating the relationship between

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NSSI and suicide attempts in student populations.[18,19,21,24] Due to comparatively lower power to reliably detect small to medium effects, caution is warranted when generalising results. Another limitation of this study is that other factors that have been found to predict suicide attempts in adults with BPD, such as poor social adjustment, prior psychiatric hospitalisations, absence of outpatient treatment, childhood sexual abuse and poor psychosocial functioning, were not examined.[23,42,48,52] Given that predictors of suicide attempts might differ for adults and youth with BPD, future studies should address this shortcoming.

The level of medical attention sought following each NSSI event was used as a proxy for NSSI severity in this study. While this measure has the advantage of being less subjective than inferences made about severity on the basis of the methods used, there might have been occasions when this measure was less accurate. For example, depending on the individuals desire to seek help, some might have severely self-injured, yet failed to seek medical attention.

Findings from this study are also limited by the use of retrospective recall of NSSI and suicide attempts and severity of NSSI over the previous 12-months. The use of retrospective measures also prevented the 12-month frequency of suicidal ideation, from being measured due to issues inherent in recalling cognitions over long periods of time. While recall biases are unavoidable when using the SASII to identified NSSI and suicide attempts over the prior 12-months, future studies investigating relative changes in these variables could overcome this problem by using techniques such as ecological momentary assessment.[39]

Conclusion

Taken together, the findings from this study suggest that youth with BPD engage in even higher rates of NSSI and suicide attempts than their adult

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counterparts. Also, in this age group, initial risk assessments should primarily examine severity of impulsivity and levels of depression, rather than historical frequency or average severity of NSSI. Despite this, clinicians might anticipate forthcoming suicide attempts by identifying relative increases in both the frequency and severity of NSSI behaviour over shorter time frames.

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TABLE 1. Characteristics of non-suicidal self-injury and suicide attempts over the past 12-months.

Person Level	
% with a NSSI event *(n)*	75.7% (81)
% with a suicide attempt *(n)*	66.4% (71)
Median NSSI P/P (IQR)	7.00 (1, 52)
Median suicide attempts P/P (IQR)	2.00 (0, 4)
Median severity (IQR)	1.00 (1, 1.06)
Event level	
Total no. NSSI (range)	4683 (0 – 659)
Total no. suicide attempts (range)	283 (0 – 15)
Methods % (*n*)	
Drugs/poisons	2.09% (104)
Burning	9.83% (488)
Scratch/cut/stabbing	71.45% (3548)
Hanging/asphyxiation	2.92% (145)
Hitting[†]	11.18% (555)
Other[‡]	2.54% (126)

[†]Hitting self and object.

[‡]Includes methods that occurred on less than 1.5% of occasions: interfering with wounds, jumping, drowning, transport related injuries, biting, hair pulling, dehydration and putting self in harm's way.

NSSI, non-suicidal self-injury; P/P, per person; IQR, interquartile range.

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TABLE 2. A negative binomial regression model revealing the relationship between the frequency of suicide attempts and each covariate.

	Frequency of Suicide Attempts				
				95% Wald Confidence Interval	
Predictor (Covariates)	*B*	*SE B*	e^B	*Lower*	*Upper*
Interpersonal problems	0.13*	0.06	1.14	0.01	0.26
Abandonment	0.08	0.07	1.08	-0.06	0.21
Identity	-0.01	0.05	0.99	-0.10	0.08
Impulsivity	0.22**	0.08	1.24	0.06	0.38
Affect instabilty	0.13	0.09	1.13	0.95	1.36
Emptiness	-0.02	0.05	0.98	-0.13	0.08
Outburst of anger	0.01	0.07	1.01	-0.13	0.16
Dissociation and paranoid ideation	-0.08	0.06	0.92	-0.19	0.03
Depression (MADRAS)	0.03**	0.01	1.04	0.01	0.06

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

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TABLE 3. A negative binomial regression model revealing the quadratic and linear relationships between frequency of non-suicidal self-injury and frequency of suicide attempts, controlling for impulsivity, interpersonal problems and depression.

	Frequency of Suicide Attempts				
				95% Wald Confidence Interval	
Predictor	*B*	*SE B*	e^B	*Lower*	*Upper*
Quadratic Model					
Impulsivity	0.20*	0.09	1.22	1.03	1.46
Interpersonal problems	0.06	0.07	1.06	-0.07	0.19
Depression scores	0.03*	0.01	1.03	0.01	0.05
NSSI[†]	0.02	0.27	1.02	-0.51	0.54
NSSI[†] (Quadratic)	0.10	0.13	1.01	-0.24	0.26
Linear Reduced Model[‡]					
NSSI[†]	0.41	0.12	1.04	-0.20	0.28

[†]Refers to frequency of NSSI.

[‡] The covariates included in the reduced linear model are not shown because they exhibited the same exponentiated B and significance values as the quadratic model.

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

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Figure 1a. The mean frequency of non-suicidal self-injury (NSSI) with standard error bars. Contrasting two 30-day periods, 2-months prior and 1-month prior to either a suicide attempt or a random point for participants who did not engage in a suicide attempt.

Figure 1b. The mean severity of non-suicidal self-injury (NSSI) with standard error bars. Contrasting two 30-day periods, 2-months prior and 1-month prior to either a suicide attempt or a random point for participants who did not engage in a suicide attempt.

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