Original Research

Association of Non-Suicidal Self-Injury and Suicide Attempts in Psychiatric Inpatients with High Suicidal Risk

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Abstract: Non-suicidal self-injury (NSSI), suicide ideation, and attempted suicide are closely linked to psychiatric disorders. However, there is paucity of literature about the relationship between NSSI and suicide attempts among psychiatric patients with high suicidal risk. This study examines the relationship between NSSI and suicide attempts in psychiatric inpatients with high suicidal risk. Towards this, 120 consecutive psychiatric patients with high suicidal risk, aged 17-60, were systematically evaluated for depression severity, hopelessness, suicide ideations, suicide intent, and past attempts (both suicidal and NSSI) by using valid tools. Lifetime history of suicide attempts and NSSI was found to be 96.7% (116/120), and 36.7% (44/120), respectively. The number of lifetime suicide attempts ranged from 0 to 6 (M = 2.26, SD = 1.226), and frequency of NSSI ranged from 0 to 3 (M = 0.48, SD = 0.745). In patients with or without NSSI, there were no significant differences in depression severity, hopelessness, and suicide intent. However, the frequency of NSSI was positively correlated with the number of suicide attempts (r = 0.318, p < .05) independent of depression severity, hopelessness, and suicidal intent. To conclude, NSSI frequency appears to be an independent factor for increased suicide risk among psychiatric patients given that it has a positive association with the number of suicide attempts.

Keywords: non-suicidal self-injury, suicide attempts, psychiatric patients

Non-suicidal self-injury (NSSI) is most commonly described as the direct and deliberate destruction or alteration of body tissue without conscious suicidal intent (Favazza, 1998; Pattison & Kahan, 1983; Weierich & Nock, 2008), for instance, deliberately cutting or burning of the skin. NSSI may be considered to be prevalent along a continuum of self-harm in a place of lesser severity than suicide attempts (Brausch & Gutierrez, 2010). The most important distinction between NSSI and suicide is that NSSI is intended to injure the body without causing death (Nock & Mendes, 2008).
Several researchers (Brown, Comtois, & Linehan, 2002; Muehlenkamp & Gutierrez, 2007; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; Whitlock, Eckenrode, & Silverman, 2006) have found a link between self-injurious behaviour and, suicidal ideation and suicide attempts at a later date. Up to 16% to 70% of individuals with a history of NSSI also reported at least one previous nonlethal suicide attempt (Jacobson, Muehlenkamp, Miller, & Turner, 2008; Nock, Joiner, Gordon, Lloyd-Richardson & Prinstein, 2006; Wilcox, Arria, Caldeira, Vincent, Pinchevsky, & O’Grady, 2012).

Previous self-harm has been identified as a risk factor for current suicidal ideation (Brausch & Muehlenkamp, 2007). Suicidal ideation is more prevalent among those who engage in NSSI and have a history of suicide attempts than in those who resort to NSSI alone (Plener, Libal, Keller, Fegert, & Muehlenkamp, 2009).

At the same time, NSSI is a significant predictor of subsequent NSSI and subsequent suicide attempts (Wilkinson, Kelvin, Roberts, Dubicka, & Goodyer, 2011). Because attempted suicide and NSSI commonly co-occur (Andover, Morris, Wren, & Bruzzese, 2012), NSSI behavior has implications for future suicide attempts. Research suggests that as compared to individuals without a history of NSSI, individuals with a history of NSSI were over nine times more likely to report suicide attempts; seven times more likely to report a suicide gesture; and, nearly six times more likely to report a suicide plan (Whitlock & Knox, 2007).

The interpersonal-psychological theory of attempted and completed suicide theorizes that NSSI may habituate an individual to physical and emotional pain and to the very act of self-injury (Joiner, 2005, Joiner et al., 2005, Van Orden, Merrill, & Joiner, 2005). Joiner and colleagues (2005) suggest that the frequency of NSSI episodes might be more important for predicting suicide than the mere presence of NSSI because, the more the number of NSSI episodes an individual engages in, the more is the opportunity for habituation to physical and emotional pain, and to acquire the ability to self-injure, and thereby this behavior puts the individual to a greater risk of suicide in future. A recent study by Anestis, Knorr, Tull, Lavender, & Gratz, (2013), shows that distress tolerance moderates the relationship between NSSI frequency and suicide. High levels of distress tolerance facilitate suicidal behavior in at-risk populations and suggest that the capacity to tolerate aversive physiological and affective arousal might be vital to engagement in serious or lethal suicidal behavior.

A study by Andover & Gibb (2010), examined the relationship between NSSI and suicide attempts among 117 psychiatric patients in a general hospital in the United States. The authors found that a large proportion of the sample (45.3%) reported a history of NSSI; the lifetime frequency of NSSI ranged from 0 to over 1000 episodes; two-thirds of the patients (63.2%) reported a history of suicide attempts; and, the frequency of lifetime suicide attempts ranged from 0 to 25. Further, the study found that the presence and frequency of past NSSI was strongly associated with suicide attempts and suicide ideations rather than with hopelessness, depression severity, and symptoms of borderline personality. Also, those with a history of NSSI had made more lethal suicide attempts than those without a history of NSSI. Similarly, frequency of NSSI exhibits a stronger relationship with suicidal behavior than depression, borderline personality disorder (BPD), anxiety, and impulsivity (Klonsky, May, & Glenn, 2013). Earlier studies evaluating the relationship between NSSI and suicide have been primarily from adolescent populations and use community based samples. Very few studies have evaluated the relationship between NSSI and suicide attempts among patients with primary psychiatric illnesses. There is also lack of research on the association of NSSI and suicide attempts in patients with psychiatric illnesses with respect to established predictors of suicide, such as depression, hopelessness, and suicidal ideation. In the Indian context, these areas have yet to be investigated. This study attempts to bridge this research gap. It examines the relationship between NSSI and suicide attempts in psychiatrically ill patients presenting with high suicidal risk at the time of admission to a tertiary health care center in India. The study also investigates the relationship between NSSI and suicide attempts in the context of established predictors of suicide in psychiatric inpatients with high suicide risk.

**Method**

**Participants**

The study is based on a sample of psychiatric patients with high suicide risk who were admitted to the Emergency Psychiatry and Acute Care (EPAC) Service at the National Institute of Mental Health and Neuro Sciences (NIMHANS), Bangalore, Karnataka, India. All psychiatric patients presenting to the EPAC Service of NIMHANS from June 2011 to May 2012, with identified high suicidal risk, and who were aged between 17-60, were approached to participate in the study. Patients with dementia, mental retardation, and organic mental disorders such as head injury, tumors, CNS infections, catatonia, and those with acute psychotic symptoms, which interfere with the understanding of procedures and/or tools, were excluded from the study. Accordingly, 120 consecutive psychiatric patients with...
high suicidal risk who satisfied the inclusion criteria for the study were evaluated.

**Procedures and Measures**

All assessments were done within 48 hours of in-patient care to avoid factors which would have reduced the patients’ symptomatic severity. Approval from the Institute Ethics Committee of NIMHANS was obtained before initiating the study. Written informed consent was obtained from the patients. Assessments included a structured intake proforma to document socio-demographic and clinical information. The psychiatric diagnosis of these 120 patients was made by using the Mini-International Neuropsychiatric Interview (M.I.N.I). Patients with a M.I.N.I. score for suicidality ≥17 were classified as being at high suicidal risk. M.I.N.I is a short structured clinical interview, which was designed for epidemiological studies and multicenter clinical trials (Sheehan et al.,1998). The patients were systematically evaluated for depression severity, hopelessness, suicide ideations, suicide intent, past attempts (both suicidal and NSSI) by using the Beck Depression Inventory (BDI) (Beck, Steer, & Brown, 1996), Beck Hopelessness Scale (BHS) (Beck & Steer, 1993), Scale for Suicide Ideation (SSI) (Beck, Kovacs, & Weissman, 1979), Suicide Intent Scale (SIS) (Beck, Schuyler, &Herman, 1974), and Suicidal Behaviors Questionnaire (Linehan, 1981), respectively.

**Statistical tools**

Chi-square test was used to establish a relationship between history of NSSI and the number of suicide attempts. Mann-Whitney test and Independent Sample t-test was applied to compare the mean values of BDI, BHS, SSI, and SIS scores in patients with or without a history of NSSI. Kolmogorov-Smirnov test was used to test for normality of all variables. Variables that were found to be skewed, such as frequency of NSSI, number of suicide attempts, and BHS scores, were transformed into a logarithm scale. Bivariate correlation analysis, by using Pearson’s correlation, was used for examining the correlation between different variables such as frequency of NSSI, number of suicide attempts, BDI, BHS, SSI, and SIS scores. Step-wise regression analysis was performed to identify the independent predictors of suicide attempts.

**Results**

The mean age of the 120 patients admitted with high suicidal risk was 32.83 (SD ± 9.988), with 50% aged 18-30 years. Of the total sample, 92.5% (111/120) were admitted after having attempted suicide, 96.7% (116/120) had a life time history of attempted suicide (including the present attempt), and 36.7% (44/120) had a lifetime history of NSSI. Among the 111 (96.7%) patients, who had been admitted after having attempted suicide, 41 (37.3%) had a lifetime history of NSSI. Among the 9 (7.5%) non-attempters, 3 (33.3%) had a lifetime history of NSSI. No statistically significant difference was found between suicide attempters and non-attempters with regard to the presence of NSSI (see Table 1).

**Table 1 Suicide Attempts and NSSI among the Participants**

<table>
<thead>
<tr>
<th>Lifetime history of NSSI</th>
<th>No</th>
<th>Yes</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whether admitted for suicide attempters for</td>
<td>6 (66.7)</td>
<td>70 (63.1)</td>
<td>p = 1</td>
</tr>
<tr>
<td></td>
<td>3 (33.3)</td>
<td>41 (36.9)</td>
<td></td>
</tr>
</tbody>
</table>

Of the 44 patients who had a lifetime history of NSSI, the most frequently used method for NSSI was cutting the wrist with sharp objects, 10 (22.7) cases. The other methods used were, in order of importance, manual strangulation, 9 (20.5%) swallowing poison/caustic or hitting one’s head/ biting oneself, 8 (18.2%) in each case; taking an overdose of pills, 7 (15.9%); burning one-self, 4 (9.1%); jumping from a height or drowning in shallow water, 1 (2.3%) in each case.

Among those who were admitted after having attempted suicide (111), the number of lifetime suicide attempts ranged from 1 to 6 (M = 2.26, SD = 1.226). Among those who had engaged in NSSI behavior (44), the frequency of NSSI ranged from 1 to 3 (M = 0.48 SD = 0.745). Of the 44 patients with a history of NSSI, 77.3% (34) engaged in NSSI once, 13.6% (6) twice, and 9.1% (4) thrice.

Table 2 shows that among patients with or without NSSI, there were no significant differences in depression severity (p = .324), hopelessness (p = .405), suicide ideation (p = .255), and suicide intent (p = .118).

The frequency of NSSI was found to be positively correlated with the number of suicide attempts (r = 0.318, p = <.05) and was independent of depression severity, hopelessness, and suicidal intent (see Table 3). A multiple linear regression analysis was done by taking the log values of the number of suicide attempts as the dependent variable and the frequency of NSSI, BDI, BHS, SSI, and SIS scores as the
independent variables. The step-wise regression analysis indicates that the frequency of NSSI and SIS scores is the significant variable (R² = 0.26, F change = 17.97, F = 19.05) in this linear model. On the other hand, total BDI, BHS, and SSI are non-significant variables. The frequency of NSSI was a contributing factor to the suicide attempts.

Table 2 Illness Parameters of Those With or Without NSSI

<table>
<thead>
<tr>
<th>Variable</th>
<th>With (n = 76)</th>
<th>Without (n = 44)</th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI score</td>
<td>34.88 ± 15.148</td>
<td>32.68 ± 14.582</td>
<td>p = 0.324</td>
</tr>
<tr>
<td>BHS score</td>
<td>13.25 ± 6.206</td>
<td>12.66 ± 5.536</td>
<td>p = 0.405</td>
</tr>
<tr>
<td>SSI score</td>
<td>16.3684 ± 9.001</td>
<td>14.20 ± 6.79</td>
<td>p = 0.255</td>
</tr>
<tr>
<td>SIS score</td>
<td>32.71 ± 5.478</td>
<td>30.98 ± 5.846</td>
<td>p = 0.118</td>
</tr>
</tbody>
</table>

Note. BDI: Beck Depression Inventory; BHS: Beck Hopelessness Scale; SSI: Scale for Suicide Ideation; SIS: Suicide Intent Scale

Table 3 Correlation between Frequency of NSSI and the Relevant Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>SA® Frequency of NSSI®</th>
<th>BDI</th>
<th>BHS®</th>
<th>SSI</th>
<th>SIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA®</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of NSSI®</td>
<td>0.318*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BDI</td>
<td>0.175</td>
<td>0.200</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BHS®</td>
<td>0.123</td>
<td>0.163</td>
<td>0.352*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>SSI</td>
<td>0.198</td>
<td>0.121</td>
<td>0.442</td>
<td>0.427**</td>
<td>1</td>
</tr>
<tr>
<td>SIS</td>
<td>0.371**</td>
<td>0.193</td>
<td>0.302**</td>
<td>0.185</td>
<td>0.291</td>
</tr>
</tbody>
</table>

Notes. SA: number of suicide attempts; BDI: Beck Depression Inventory; BHS: Beck Hopelessness Scale; SSI: Scale for Suicide Ideation; SIS: Suicide Intent Scale

* p < .05 ** p < .01.

Log transformation of skewed variables

Discussion

The findings of various studies on NSSI among adolescent psychiatric inpatients suggest that the prevalence rate for NSSI varies in the range of 30 to 40% (Darche 1990; Jacobson, Muehlenkamp, Miller, & Turner, 2008). In case of adult psychiatric patients (aged 17-73 years) it was found to be 45.3% (Andover & Gibb, 2010). As compared to this, in our study the rate of NSSI in adult psychiatric inpatients (aged 17-60 years) at 36.7% is on the lower side. This is probably due to cultural factors in India where family ties and social
support are strong in times of emotional distress and illness.

The number of lifetime suicide attempts in our study is much lower than those found by Andover and Gibb (2010). In our study, the number of lifetime suicide attempts for all the 120 patients ranged from 0 to 6 as against 0 to 25 reported by Andover and Gibb. Further, the lifetime frequency of NSSI among suicide attempters too was much lower in our study. In our study the lifetime frequency of NSSI ranged from 0 to 3 episodes as against 0 to over 1000 episodes reported by Andover and Gibb. These differences can again be explained by cultural factors such as strong family bonds and a social structure that provides emotional and physical support to a psychiatrically ill person in India. However the lower number of NSSI and past suicide attempts in psychiatrically ill patients in India could be due to under reporting, as there is a stigma attached to illness, or due to lack of awareness of psychiatric illnesses in the particular region of the country. These factors might have influenced the relationship between NSSI and suicide, and needs to be explored through further studies.

As observed by Whitlock, Eckenrode, and Silverman (2006) and Andover and Gibb (2010), we find that the most common form of NSSI was self-cutting.

Our results support Joiner et al. (2005) who suggest that the frequency of NSSI episodes might be more important for predicting suicide than the mere presence of NSSI because of habituation to physical and emotional pain as a result of NSSI behavior and the acquired ability to self-injure.

In our study, the frequency of NSSI appears to be an independent factor for increased suicide risk among psychiatric patients given the fact that it has a positive and significant association with the number of suicide attempts. As theorized by Joiner and colleagues (2005) and supporting the findings of Andover and Gibb (2010) our study observes that the frequency of NSSI was positively correlated with the number of suicide attempts ($r = 0.313, p < .01$), and was independent of depression severity, hopelessness, or suicidal intent.

Our findings have important implications while assessing suicide attempters, with a history of both NSSI behavior and suicide attempts, for suicide risk. The implications for clinical practice are important as well, in that NSSI, especially when found to be frequently prevalent, might increase the risk of suicide attempts. Hence, NSSI behavior by itself is a cause for concern in clinical practice, even when there is no evidence of other factors such as suicide ideations.

Our study observes that the majority of suicide attempters (63%) did not have a history of NSSI (see Table 1). Therefore, while assessing patients for suicide it would be clinically relevant to assess them for the other established risk factors of suicide as well, rather than relying merely on the presence of an NSSI history.

Our study has a few limitations, the first one being that it is a cross-sectional study, whereas a longitudinal study might have given a better idea about the pattern of suicide among highly suicidal patients. Another limitation of the study is that it relies on retrospective self-reports of the patients on past NSSI and suicide attempts. Given the retrospective bias of reporting, several instances might have been classified as NSSI based on the patient’s report rather than on the basis of the method used. Lastly, the findings of the study cannot be generalized because the study is based on a sample of psychiatric inpatients with suicidal risk in a tertiary care center and thus might not reflect the real clinical prevalence of NSSI in a community based sample of the Indian population.

Notwithstanding the important implications of this study for clinical practice, many important questions about NSSI and its relationship to suicide attempts need explanation through further research, such as why individuals who engage in NSSI are at a greater risk for attempted suicide. Do individuals with a greater frequency of NSSI and duration of NSSI behavior have a higher rate of lifetime suicide attempts as compared to individuals who have no history of NSSI?

There is a need for continued research in NSSI and its relation to attempted suicide by taking larger samples to further reinforce the findings of this study. Future longitudinal studies are necessary to investigate the presence and frequency of NSSI as a risk factor for suicide attempts. Research comparing the relationship of NSSI and suicide attempts in the general population with that in the severely ill psychiatric population would help in developing appropriate interventions for reducing the risk of suicide in the general population.

This study emphasizes the need for developing culture specific awareness and preventive measures to identify and intervene in case of individuals with a history of NSSI, so that risk of future suicide can be minimized.

**Conflict of Interest**

The author(s) declare that they have no competing interests.

**References**

Andover, M. S., & Gibb, B. E. (2010). Non-suicidal self-injury, attempted suicide, and suicidal...
intent among psychiatric inpatients. Psychiatry Research, 178, 101-105.


