

Original Research

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

Hemendra Singh <sup>1,✉</sup>, V. Senthil Kumar Reddi <sup>2</sup>, Prabha S. Chandra <sup>2</sup>

<sup>1</sup> Department of Psychiatry, M.S. Ramaiah Medical College, Bangalore, India

<sup>2</sup> Department of Psychiatry, National Institute of Mental Health and Neuro Sciences, Bangalore, India

Submitted to SOL: March 11<sup>th</sup>, 2015; accepted: August 12<sup>th</sup>, 2016; published online: November 3<sup>rd</sup>, 2016

**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

Copyrights belong to the Author(s). Suicidology Online (SOL) is a peer-reviewed open-access journal publishing under the Creative Commons Licence 3.0.

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).

✉ Hemendra Singh, MD,  
Department of Psychiatry, M.S. Ramaiah Medical College, MSR  
Nagar, MSRIT Post, Bangalore 560054, India.  
Email address: hemendradoc2010@gmail.com

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, & Bruzese, 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  $\geq 17$  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  $\pm$  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**

Lifetime history of NSSI	Whether admitted for attempted suicide		p value
	No	Yes	
No	6 (66.7)	70 (63.1)	p = 1
Yes	3 (33.3)	41 (36.9)	

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 ( $R^2 = 0.26$ ,  $F$  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**

Variable	NSSI		Statistic
	With $M \pm SD$ ( $n = 76$ )	Without $M \pm SD$ ( $n = 44$ )	
BDI score	34.88 $\pm$ 15.148	32.68 $\pm$ 14.582	$p = 0.324$
BHS score	13.25 $\pm$ 6.206	12.66 $\pm$ 5.536	$p = 0.405$
SSI score	16.3684 $\pm$ 9.001	14.20 $\pm$ 6.79	$p = 0.255$
SIS score	32.71 $\pm$ 5.478	30.98 $\pm$ 5.846	$p = 0.118$

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**

Variable	SA <sup>@</sup>	Frequency of NSSI <sup>@</sup>	BDI	BHS <sup>@</sup>	SSI	SIS
SA <sup>@</sup>	1					
Frequency of NSSI <sup>@</sup>	<b>0.318*</b>	1				
BDI	0.175	0.200	1			
BHS <sup>@</sup>	0.123	0.163	0.352*	1		
SSI	0.198	0.121	0.442	0.427**	1	
SIS	0.371**	0.193	0.302**	0.185	0.291	1

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

\* $p < .05$  \*\* $p < .01$ .

<sup>@</sup>: 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.
- Andover, M. S., Morris, B. W., Wren, A., & Bruzese, M. E. (2012). The co-occurrence of non-suicidal self-injury and attempted suicide among adolescents: Distinguishing risk factors and psychosocial correlates. *Child and Adolescent Psychiatry and Mental Health*, 6, 11.
- Anestis, M. D., Knorr, A. C., Tull, M. T., Lavender, J. M., & Gratz, K. L. (2013). The Importance of High Distress Tolerance in the Relationship between Nonsuicidal Self-Injury and Suicide Potential. *Suicide and Life-Threatening Behavior*, 1-13.
- Beck, A. T., Kovacs, M., & Weissman, A. (1979). Assessment of suicidal intention: The Scale for Suicide Ideation. *Journal of Consulting and Clinical Psychology*, 47, 343-352.
- Beck, A. T., Schuyler, D., & Herman, I. (1974). Development of suicidal intent scales. In A. T. Beck, H. L. P. Resnik, & D. J. Lettieri (Eds.). *The prediction of suicide*. Bowie, MD: Charles Press.
- Beck, A. T., & Steer, R. A. (1993). *Manual for the Beck Hopelessness Scale*. San Antonio, TX: Psychological Corporation.
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *BDI-II manual*. San Antonio, TX: Harcourt Brace & Company.
- Brausch, A. M., & Gutierrez, P. M. (2010). Differences in non-suicidal self-injury and suicide attempts in adolescents. *Journal of Adolescence*, 39, 233-242.
- Brausch, A.M., Muehlenkamp, J.J. (2007). Body image and suicidal ideation in adolescents. *Body Image*, 4(2), 207-212.
- Brown, M. Z., Comtois, K. A., & Linehan, M. M. (2002). Reasons for suicide attempts and nonsuicidal self-injury in women with borderline personality disorder. *Journal of Abnormal Psychology*, 111(1), 198-202.
- Darche, M. A. (1990). Psychological factors differentiating self-mutilating and non-self-mutilating adolescent inpatient females. *The Psychiatric Hospital*, 21, 31-35.
- Favazza, A. R. (1998). The coming of age of self-mutilation. *Journal of Nervous and Mental Disease*, 186, 259-268.
- Jacobson, C. M., Muehlenkamp, J. J., Miller, A. L., & Turner, J. B. (2008). Psychiatric impairment among adolescents engaging in different types of deliberate self-harm. *Journal of Clinical Child Adolescent Psychology*, 37, 363-375.
- Joiner, T. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.
- Joiner, T.E., Conwell, Y., Fitzpatrick, K.K., Witte, T.K., Schmidt, N.B., Berlim, M.T., Fleck, M.P.A., & Rudd, M.D. (2005). Four studies on how past and current suicidality relate even when "everything but the kitchen sink" is covaried. *Journal of Abnormal Psychology*, 114, 291-303.
- Klonsky, E. D., May, A. M., & Glenn, C. R. (2013). The relationship between nonsuicidal self-injury and attempted suicide: Converging evidence from four samples. *Journal of Abnormal Psychology*, 122, 231-237.
- Linehan, M.M. (1981). Suicidal Behaviors Questionnaire. Unpublished Inventory. Seattle, Washington: University of Washington.
- Muehlenkamp, J. J., & Gutierrez, P. M. (2007). Risk for suicide attempts among adolescents who engage in non-suicidal self-injury. *Archives of Suicide Research*, 11(1), 69-82.
- Nock, M. K., Joiner, T. E., Gordon, K. H., Lloyd-Richardson, E., & Prinstein, M. J. (2006). Non-suicidal self-injury among adolescents: Diagnostic correlates and relation to suicide attempts. *Psychiatry Research*, 144, 65-72.
- Nock, M. K., Mendes, W. B. (2008). Physiological arousal, distress tolerance, and social problem solving deficits among adolescent self-injurers. *Journal of Consulting Clinical Psychology*, 76(1), 28-38.
- Pattison, E. M., & Kahan, J. (1983). The deliberate self-harm syndrome. *American Journal of Psychiatry*, 140, 867-872.
- Plener, P. L., Libal, G., Keller, F., Fegert, J. M., Muehlenkamp, J. J. (2009). An international comparison of adolescent non-suicidal self-injury (NSSI) and suicide attempts: Germany and the USA. *Psychological Medicine*, 39(9), 1549-1558.
- Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., ... Dunbar, G. C. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry*. 59 (Suppl 20), 22-33; quiz 34- 57.
- Van Orden K.A., Merrill, K.A., & Joiner T.E. (2005). Interpersonal-psychological precursors to

- suicidal behavior: A theory of attempted and completed suicide. *Current Psychiatry Reviews*, 1,187-96.
- Weierich, M.R., & Nock, M. K. (2008). Posttraumatic stress symptoms mediate the relation between childhood sexual abuse and nonsuicidal self-injury. *Journal of Consulting and Clinical Psychology*, 76, 39-44.
- Whitlock, J., Eckenrode, J., & Silverman, D. (2006). Self-injurious behaviors in a college population. *Pediatrics*, 117, 1939-1948.
- Whitlock, J., & Knox, K. L. (2007). The relationship between self-injurious behavior and suicide in a young adult population. *Archives of Pediatrics and Adolescent Medicine*, 161, 634-640.
- Wilkinson, P., Kelvin, R., Roberts, C., Dubicka, B., & Goodyer, I. (2011). Clinical and psychosocial predictors of suicide attempts and nonsuicidal self-injury in the Adolescent Depression Antidepressants and Psychotherapy Trial (ADAPT). *American Journal of Psychiatry*, 168, 495-501.
- Wilcox, H. C., Arria, A. M., Caldeira, J. M., Vincent, K. B., Pinchevsky, G. M., & O'Grady, K. E. (2012). Longitudinal predictors of past-year non-suicidal self-injury and motives among college students. *Psychological Medicine*, 42, 717-726.