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Review Article

Non-Suicidal Self-Injury Behavior in Adolescents: A Review of Treatment Modalities

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Abstract

Non-suicidal self-injury (NSSI) involves the engagement of deliberate self-inflicted bodily injury without any suicidal intent. Almost 18 - 24% of adolescents engage in NSSI, which is considered the leading determinant of future suicidal behaviors. NSSI has multifactorial etiology, consisting of both individual and environmental factors. Studies conducted have given non-conclusive results about the efficacy of antidepressant medications in reducing NSSI. Hence, so far, there are not any approved psychotropic medications for managing NSSI. Psychotherapies such as cognitive behavioral therapy, dialectical behavioral therapy and mentalization-based treatment have reported efficacy in reducing NSSI behavior. However, these studies have several limitations, including the inability to assess NSSI independently and including it as a subcategory of self-harm. As the presence of NSSI is considered to be the antecedent of suicidal behaviors in the future, it is important to look into replicating above mentioned studies that have shown promising results with NSSI as an independently studied variable. This will help modify treatment strategies when risk factors are identified, particularly after discharge from a higher level of care.

Keywords: *Suicidal Behaviors; Future Suicidal Behaviors; Deliberate Self-Inflicted Bodily Injury; Suicidal Intent; Cognitive Behavioral Therapy; NSSI*

Introduction

Non-suicidal self-injury (NSSI) in the diagnostic and statistical manual of mental disorders (DSM-5) is engaging in deliberate self-inflicted bodily injury without having suicidal intent. Mental and medical conditions can also exhibit self-injurious behaviors; however, they differ from NSSI as they display a pattern of repetitive stereotypical behaviors and low external stimulation. On the other hand, individuals engaging in NSSI behaviors aim to diminish their negative emotions and increase positive emotions to resolve interpersonal difficulties and feel more positive after the self-injurious act [1].

While both NSSI and suicidal attempt (SA) can be categorized under self-harm, the primary differentiating factor is the intent as individuals with SA have an intention to commit suicide. Recent evidence has displayed that those self-injurious behaviors (e.g. NSSI and deliberate self-harm) have been rising among the youth. The current prevalence of NSSI in adolescents was estimated to be between 18% to 24% [2]. A meta-analysis study that included both community and clinical samples found that females were 50% more likely to engage in NSSI behaviors compared to males (OR 1.50, 95% CI 1.35 - 1.65) [3].

According to the 2018 centers for disease control and prevention (CDC), the second leading cause of death among youth between the ages of 10 - 24 is suicide [4]. Completed suicide, suicidal ideation (SI) and SA are all a part of suicidal behavior and NSSI is a leading determinant of future suicidal behavior. Individuals hospitalized for engaging in self-harm are more likely than the general population to complete suicide within a year following discharge [5]. Considering the rise in suicidal rate and self-harm behavior among youth, this review provides an understanding of NSSI regarding its etiology and presentation, risk factors and management.

Discussion

Clinical presentation

NSSI has been commonly observed, beginning at the age of 12 - 14 years [6]. However, children younger than 12 can also engage in this behavior. NSSI commonly presents as self-inflicted cutting, scratching, hitting and burning [2]. A meta-analysis examining gender differences in NSSI found that women are more likely to use methods such as cutting, scratching, hair pulling and pinching. In contrast, men were more inclined toward burning, hitting and banging [3].

Additionally, the arms and legs are common areas women use to self-injure themselves and men use their face, chest, or genitals [7]. Other forms of NSSI behavior include craving words or symbols over the skin or interfering with or preventing wound healing [8].

Etiology and risk factors

The etiology of NSSI is considered to be multifactorial, consisting of individual and environmental factors. Comorbid psychiatric conditions (depression, post-traumatic stress disorder and eating disorders) and emotional dysregulation contribute to individual factors leading to NSSI. On the contrary, parental attachment disruptions and childhood abuse are part of environmental factors [6].

Risk factors for NSSI behavior include (i) mood disorders, (ii) engaging in self-blaming, (iii) a lack of emotion regulation, (iv) poor parental attachment including neglect and maltreatment, (v) loneliness, (vi) low social support, (vii) inability to understand and express feelings and (viii) suicidal ideation or SA [2,5]. A study by Marin., *et al*. found that experimental/regular smoking of cigarettes (by two times) and hookah (by 2 - 3 times) can increase the risk for NSSI [9].

Exposure to life stressors, adverse life events and traumatic events lead to negative mental health outcomes and are risk factor for NSSI behavior. Coping strategies during distressing events and negative affective states vary between individuals as those with poor coping skills engage in substance abuse and NSSI (i.e. maladaptive coping mechanism) to reduce distress and frustration [10]. Individuals engaging in NSSI behavior can have difficulty "identifying and describing one's feelings," a condition termed alexithymia [9]. This challenge in expressing and understanding their emotions leads individuals to use NSSI as a coping mechanism during stressful periods. Alexithymia was found to be a statistically significant positive predictor for maladaptive emotion regulation ($r = 0.66$, $p < 0.001$) [13] and has been correlated with depression ($r = 0.80$, $p < 0.001$) and suicide ideation ($r = 0.72$, $p < 0.001$) [11,12].

Management

Imminent strategies to reduce NSSI behavior should include close supervision and removing means such as objects, medications and toxic substances that individuals can use to harm themselves and restricting them from settings such as tall buildings, bridges, trains and traffic signals. Additionally, creating a safety plan which the individual can refer to during a crisis has demonstrated efficacy in reducing self-harm behavior [2].

Individuals facing difficulty with parent communication should have their family members included during therapy to improve their communication skills and educate family members on effective de-escalation methods. Studies have reported that psychotherapy such as dialectical behavioral therapy for adolescents (DBT-A), cognitive behavioral therapy (CBT) and mentalization-based treatment for adolescents (MTB-A) is successful in reducing NSSI behavior [2]. In a randomized clinical trial (RCT), adolescents with depression who did not

respond to the brief psychosocial intervention were treated with selective serotonin reuptake inhibitors (SSRI) versus SSRI plus CBT. Combined SSRI and CBT intervention reduced NSSI behavior showing a statistically significant treatment effect (p = 0.023) [13]. Contradicting these findings, another RCT compared four treatment groups (SSRI vs. SSRI plus CBT vs. venlafaxine vs. venlafaxine plus CBT) for NSSI and there was statistically no significant difference in reducing NSSI behavior in depressed adolescents (p = 0.18) [14].

The majority of the studies that assessed the effectiveness of DBT in reducing self-harm behaviors found noteworthy results. Mehlum., *et al*. measured DBT compared to "enhanced usual care" (EUC) in reducing self-harm behavior among adolescents over 15-week period [15]. DBT demonstrated superiority compared to EUC in reducing self-harm episodes (-0.92, 95% CI: -1.69 to -0.15, p = 0.021) and remained superior even during a 12-month follow-up (the difference between groups: 9.4, p < 0.05) [16]. A recent RCT reported a statistical significance of DBT compared with individualized group support therapy (IGST) in improving the frequency of NSSI behaviors in adolescents with a history of SA (OR 0.32. 95% CI 0.13 - 0.77) at six months. However, these findings were not significant at 12-month follow-up (OR 0.60, 95% CI 0.24 - 1.52) [17]. Another study by Goldstein., *et al*. found that subjects receiving DBT did not engage in NSSI behaviors over the 12-month study period, whereas one subject in treatment as usual (TAU) group reported NSSI. So, the small number of NSSI behaviors excluded statistical analysis [18].

There was one study that examined MBT in adolescents. Rossouw and Fonagy conducted an RCT (n = 80) among 14 to 17-year-olds who had a confirmed episode of self-harm in the past month, comparing MTB with TAU over 12 months. These adolescents were assessed at a three-month interval. Over the year, MBT significantly improved self-harm behavior (OR = 0.74, 95% CI: 1.32 to 0.15, p < 0.01) [19].

A major limitation to these studies is that they did not assess NSSI independently and included it as a subcategory of self-harm. Additionally, some studies even combined NSSI and SA while measuring self-harm behavior [15,16]. The issue with labeling NSSI under self-harm is that self-harm behaviors can include suicidal intent. Whereas, to be classified as NSSI behavior, it must be deliberate and without the intent of suicide. Thus, future RCTs must assess NSSI as an independent category, which will better guide clinicians with management and treatment. Currently, there have not been any approved psychotropic medications for reducing NSSI behavior. However, since many individuals who engage in NSSI behavior have comorbid depression, they are often treated with antidepressants [2].

Study	Population (N)	Study	Intervention	Scale	Results		
					Pre-intervention	Post-intervention	Difference across intervention
Brent., *et al*.	Adolescents with depression (334)	RCT	SSRI vs. SSRI + CBT vs. venlafaxine vs. venlafaxine + CBT	C-CASA	-	-	No difference, p = 0.18
Goodyer., *et al*.	Adolescents with depression (208)	RCT	SSRI vs SSRI + CBT	K-SADS-PL: depression section	SSRI: 22.3% SSRI+CBT: 28.6%	SSRI: 5.1% (at 6 wk), 11% (at 12 wk) and 9.6% (at 28 wk) SSRI+CBT: 18.4% (at 6 wk), 14.9% (at 12 wk) and 12.2% (at 28 wk)	2.681, 95% CI 1.15 to 6.26, p = 0.023
Mehlum., *et al*.	Adolescents with self-harm behavior (77)	RCT	- DBT vs EUC	LPC interview score measured in mean (SD)	DBT: 4.1 (5.8) EUC: 4.7 (5.5)	DBT: 1.2 (2) EUC: 3.3 (6.8)	-0.92, 95% CI -1.69 to -0.15, p = 0.021
Mehlum., *et al*.	Adolescents with self-harm behavior (75)	RCT	DBT vs EUC	LPC interview measured as mean frequency of self-harm behavior (95% CI)	DBT: 9 (4.8–13.2) EUC: 22.5 (11.4–33.5)	DBT: 5.5 (1.7–9.1) EUC: 4.8 (7.3–22.3)	-9.4, p < 0.05
McCauley., *et al*.	Adolescents with history of suicidal attempt (173)	RCT	DBT vs IGST	SASSI	-	-	At 6 months: OR 0.32. 95% CI 0.13 to 0.77 At 12 months: OR 0.60, 95% CI 0.24 to 1.52
Goldstein., *et al*.	Adolescents with bipolar disorders (20)	Open-label	DBT vs TAU	N episodes of self-injurious or suicidal behavior	DBT: N = 5 TAU: N = 1	DBT: N = 0 TAU: N = 1	-
Rossouw., *et al*.	Adolescents with episode of self-harm in the past month (80)	RCT	MBT-A vs TAU	RTSHI measured as Log mean (SE)	TAU: 3.08 (0.10) MBT-A: 3.12 (0.09)	TAU: 2.01 (0.21) MBT-A: 1.33 (0.22)	At 12 months: OR 0.74, 95% CI 1.32 to 0.15, p<0.01

Table 1: *Management of self-harm and nonsuicidal self-injury behavior.*

NSSI: non-suicidal self-injury; SRI: serotonin reuptake inhibitor; RCT: randomized clinical trials; SSRI: selective serotonin reuptake inhibitor; CBT: cognitive behavioral therapy; DBT: dialectal behavioral therapy; DBT-A: dialectal behavioral therapy-adolescents; EUC: enhanced usual care; TAU: treatment as usual; IGST: individual and group supportive therapy; C-CASA: Columbia classification algorithm for suicide assessment; K-SADS-PL: Kiddie schedule for affective disorders and schizophrenia present and lifetime version; SASSI: suicide attempt self-injury interview; RTSHI: risk-taking and self-harm inventory; LPC: lifetime parasuicide count

Conclusion

NSSI differs from other forms of self-harm by lacking intent. With almost a fifth of adolescents struggling with NSSI, it is noted to predict future suicidal behaviors in adolescents. So far, the studies have shown DBT-A, CBT and MBT can be effective in decreasing self-harm and other maladaptive life-threatening behaviors by reducing interpersonal conflict, improving communication and better emotional regulation. More studies are needed to show the efficacy of these therapies in reducing NSSI alone, the impact of a reduction in NSSI on future suicidal behaviors and variables that can influence these psychotherapies' efficacy in the individuals. Psychotropic medications like antidepressants have shown inconsistent results in existing studies. The scope of psychotropic medications in limiting NSSI also needs continued review.

Declaration of Interest

All authors report no conflicts of interest.

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