

Physical Activity as An Intervention to NSSI (Non-Suicidal Self-Injury) in Adolescents: A Review of Research

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Abstract - Non suicidal self-injury (NSSI) is a deliberate destruction of the surface of one's own body without suicidal intent e.g., cutting, hitting, biting to oneself to induce pain. NSSID (Non suicidal self-injury disorder) is a new included disorder in DSM-5 and it's most prevalent among adolescents than in adults. NSSI is primarily used as a maladaptive coping strategy and was performed both to regulate internal emotional states (automatic reinforcement) and to influence others in the environment (social reinforcement). NSSI is also referred as self-harm. According to a WHO report Suicide and "accidental death from self-harm" were the third cause of adolescent mortality in 2015. The suicide rate among adolescents is on rise in India and particularly in the twin states of Telangana and Andhra and we are unsure how many of these are result of accidental death from self-harm though they are looked out as suicides. This is a theoretical study and is focused on stressing the need for physical activity as an intervention to reduce and prevent NSSI with a factor of automatic reinforcement, emphasizing the underlying mechanisms that's working in both, which is the release of endorphins and this postulate is supported by few studies. The lack of healthy coping mechanisms at the times of stress is an underlying factor contributing to this NSSI behavior and 'physical activity' can be used as an alternate healthy coping strategy. It is found that as per reports, the active living is on decline and sedentary lifestyle is rising in adolescents which is providing no space/channel for letting out their pent-up emotions and making them choose these poor strategies like NSSI to relieve themselves from emotional pain. The mental health benefits of physical activity are less prioritized than it deserves is evident from the reports.

Index Terms - NSSI, Physical activity, Endorphins, Adolescents, Emotional outlet.

INTRODUCTION

Non suicidal self-injury (NSSI) refers to deliberate destruction of the surface of one's own body without suicidal intent. These behaviors include cutting, burning, scraping skin, hitting, and biting oneself and are primarily inflicted to cause pain. Individuals engage in these behaviors with no intent to end their life, but instead with the expectation that the injury will cause minor or moderate physical pain and, in some cases, to get attention of others in social environment. Non suicidal self-injury disorder (NSSID) is a newly included disorder in DSM-5. It is also referred as 'self-harm' and is most prevalent in adolescents than in adults as per research. The current study is aimed at bringing into light an intervention, which might work for reducing NSSI particularly in adolescents.

The DSM-5 proposed criteria for NSSI disorder outline three possible functions for NSSI (criterion B). These are obtaining relief from a negative feeling state, inducing a positive feeling state, or resolving an interpersonal difficulty.

According to four function model (FFM) of non-suicidal self-harm by Nock and Prinstein (2004, 2005), the factors behind NSSI are (a)automatic positive reinforcement, (b)automatic negative reinforcement, (c)social positive reinforcement, and (d)social negative reinforcement.

The NSSI was performed both to regulate internal emotional states (automatic reinforcement) and to influence others in the environment (social reinforcement).

Automatic positive reinforcement - cutting/hurting oneself to induce positive feelings

Automatic negative reinforcement - cutting to alleviate negative feelings

Social positive reinforcement - cutting to get attention of others in the social environment

Social negative reinforcement - cutting to avoid works
The intervention we are stressing in the study works for the automatic reinforcement factor of NSSI. The term “automatic” refers to reinforcement that is carried out by oneself, and suggests that what may maintain the behavior, are the physical sensations and emotions that arise when one engages in non-suicidal self-harm (i.e., emotion regulation). Prototypical non suicidal self-harm is thought to be maintained by automatic negative reinforcement (e.g., cutting to alleviate negative feelings).

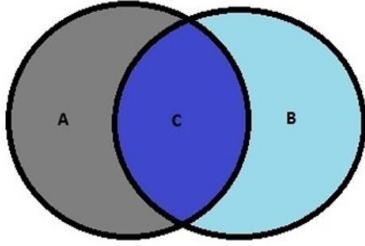
NSSI is most prevalent in adolescents than in adults is a researched backed fact and hence the study is mainly focused on this age group. A study by Sivashankari et al., 2014 concluded that the maximum number of adolescents who self-harmed, had moderate severity of self-harm behaviors and the common type of self-harm behaviour indulged among adolescents was cutting and least indulged behavior was swallowing dangerous substances. Naphisabet Kharsati et al., 2015 found that the most common method of NSSI was self-hitting (15.2%) followed by cutting or carving skin (13.2%). A majority of self-injurers endorsed multiple methods of NSSI, and there were no significant gender differences in NSSI rates. A 2016 German study concluded that in comparison to findings from community samples of adolescents, adults seem to have lower lifetime prevalence rates of NSSI, thus making it necessary to emphasize prevention and treatment efforts in younger age groups (Paul L. Plener et al., 2016). A study by poornima bhola et al., 2017 on adolescents and youth with a sample of 1571 male and females from 19 private and government aided high schools, pre-university colleges and undergraduate colleges in an urban city in South India found that the rates of self-reported non-suicidal self-injurious behavior (NSSI) at 33.8% and self-injurious acts with associated suicidal intent at 6.8%.

Self-harm is primarily used as a maladaptive coping method among adolescents. Harming oneself physically is a way to numb emotional pain. When the body is hurt, it releases natural chemicals such as endorphins and endocannabinoids which are soothing, pain-killing chemicals and ease their mental suffering. “You don't feel like you're hurting yourself when you're cutting. You feel like this is the only way to take care of yourself,” a young woman told journalist

Marilee Strong for her 1998 book, *A Bright Red Scream: Self-Mutilation and the Language of Pain*. Studies also suggest that self-injury might provide a form of pain relief. Psychiatrist Leo Sher et al., 2009 from their review of biological research concluded that self-injury releases opiate like chemical messengers in the brain known as endorphins. The release leads to a euphoric state that reduces pain and offers relief from emotional distress. All this come under the factor of automatic reinforcement of Non suicidal self-injury (NSSI) I.e., to induce positive feeling (to feel euphoric) to self and to alleviate negative feeling (like an emotional distress) from self.

Physical activity as an intervention and as a healthy coping strategy:

Lack of healthy coping mechanisms in times of stress is one of the underlying psychosocial factors contributing to this adoption of maladaptive coping strategies. According to psychologist James McKeen cattell, it was impossible to separate bodily energy from mental energy. The role and reason behind suggesting physical activity as an intervention for reduction and prevention of Self harm comes here. Physical activity refers to any movement of the body that uses energy. This can include daily activities such as vacuuming, gardening to activities like sports, dance, swimming etc. “Exercise” and “physical activity” is used interchangeably. Exercise is defined as a subcategory of physical activity that is planned, structured, repetitive, and purposeful in the sense that the improvement or maintenance of fitness is the objective. Conversely, physical activity includes exercise but may also be unplanned, unstructured, random and non-purposeful carried out for a multitude of reasons. When one starts exercising or involved in physical activity of vigorous intensity or of a moderate intensity for longer duration, the body perceives it as a moment of stress and gets prepared for the same. As heart pressure increases, the brain thinks you are either fighting the enemy or fleeing from it and to protect the body and brain from stress, it releases ‘endocannabinoids’ and ‘endorphins’ and these minimize the discomfort, block the feeling of pain and also associated with a feeling of euphoria which is the same as in case of this self-harm behaviors.



A: Physical activity releases neuro chemicals that de-stress and give relief and a feel of euphoria.

B: NSSI or self harm releases neurotransmitters that relieves from pain and induce a feel of euphoria.

C: Underlying mechanisms working for both are same.

The endorphins released after sufficient intensity of physical activity, interact with the receptors in your brain that 'reduce your perception of pain'. The neuron receptors endorphins bind to are the same ones that bind some pain medicines and they act as analgesics, which mean they diminish the perception of pain. The same happens with NSSI (Non suicidal self-injury) with a factor of automatic negative reinforcement where they cut their body to alleviate negative feeling/emotional pain. Endorphins after exercise also trigger a positive feeling in the body, similar to that of morphine. The same happens with NSSI with a factor of automatic positive reinforcement where they cut to induce a positive feeling. Physical activity of medium to high intensity works well for endorphin release.

The underlying mechanism that's working in both physical activity and self-harm or Non suicidal self-injury (NSSI) which is the release of neuro chemicals like endocannabinoids and endorphins and their effects is same and this relation can be utilized and stressed in adopting a good coping mechanism in form of physical activities to have emotional outlet instead of unhealthy, destructive coping mechanisms like self-harm that are being most prevalent in today's generation and also as an intervention to prevent such behaviors by encouraging more of physical activity in form of sports or dance or any basic workout of sufficient intensity in adolescents through which they can unburden their emotions and de-stress in a positive channel.

Only two studies were found supporting the postulation that physical activity as an intervention for NSSI or self-harm. 11 years back, Nock, M.W, 2007 report on the results of a single-case study demonstrating the effectiveness of physical exercise as

a treatment for Non suicidal self-injury (NSSI). A 26-year-old woman with a 13-year history of ongoing psychological and pharmacological treatment for persistent non suicidal self-injury, including one inpatient hospitalization for on suicidal self-injury within a past year from study. She was receiving twice-weekly outpatient psychotherapy for the duration of this study. In an initial baseline assessment, she reported 2.25 episodes of NSSI per week over the previous month of study, including self-hitting and head-banging. She is provided with a 60-minute workout video, instructing her to exercise three times per week and to exercise in response to Non suicidal self-injury (NSSI) urges at any time. She is also provided a daily assessment form in which she recorded mood and self-injurious urges (both on 0-9 scales) and behaviors. The frequency of her non suicidal self-injury decreased immediately after the introduction of exercise to 0.37 times per week during a five-week experimental phase. She then independently discontinued exercise. During this quasi-experimental return to baseline, Non suicidal self-injury increased to 2.33 times per week. When exercise was re-introduced, Non suicidal self-injury decreased to 0.00 times per week for the remainder of the study. An 8-week follow-up interview revealed sustained improvement in her mental and physical well-being and a decrease in body weight by 20 pounds.

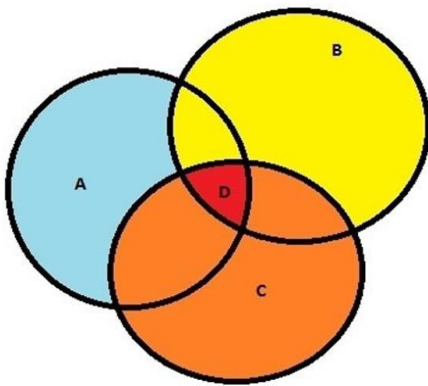
Boone et al., 2015 in their study with sample from two high schools (n = 95) and one university (n = 72) in US concluded that the amount of physical activity in which youth engage seems to impact their mental health. The findings suggest that physical activity may possess a protective nature against self-harm behaviors, especially in individuals with depressive symptoms.

But unfortunately, sedentary lifestyle is increasing and active living is reducing in the adolescents. Four out of five adolescents (11-17 years) globally, do not get enough physical activity shows a report by the WHO. A report by Indian Council of Medical Research (ICMR) shows physical inactivity is very common in India with 54.4% people found.

Results From India's 2016 Report Card on Physical Activity for Children and Youth by PHFI (Public health foundation of India), a member WHO says - Based on existing evidence, it appears that most Indian children do not achieve recommended levels of

physical activity and spend most of their day in sedentary pursuits. It also identifies gaps in both investments and research that need to be addressed before understanding the complete picture of active living in children and youth in India. A study among children aged 3 to 11 years (n = 1680) in 7 major urban centers in India which showed that only 17% of children met Physical Activity guidelines (Gulati et al., 2014).

There was a significant decline in moderate-to-vigorous physical activity over a single year follow up, largely due to a decrease in physical activity at school. There appears to be a gap between State educational policies that promote physical well-being of school-going children and actual practice (Swaminathan et al., 2011). Global exercise levels did not improve significantly between 2001 and 2016, and the WHO is not on track to meet its 2025 target of reducing physical inactivity by 10 percent (Regina et al., 2018).



A: Physical activity provides a channel to de-stress and alleviate pent up emotions.

B: Active living in adolescents is decreasing.

C: Incidence of self harm in adolescents is on rise.

D: May be a decline in/missing physical activity which is a way to release tension in the body and mind, is making them go for these poor channels to let off their steam.

Active living is a way of life that integrates physical activity in to daily routines. From the studies available we can find that both increase in the incidence of self-harm behavior and decrease in the active living is happening at the same time in adolescents. So may be a decline in physical activity in schools and colleges and the less priority it's being given and the understanding of physical activity as a means to stay physically fit rather than a way to protect both physical and mental health and lack of awareness of its pro-mental health benefits and as a healthy coping strategy to de-stress and have relief from emotional pain is

making them adapt poor coping strategies like self-injury to alleviate their emotional pains and accidentally leading to deaths in the cases of NSSI(Non suicidal self-injury). May be the reason behind the low prevalence and less incidence of self-harm behaviors and other similar mental illnesses in the older generation is due to their active living. Sedentary lifestyle is less prevalent in those days and people are often involved in physical activities for their daily needs to occupation. Taking part in physical activities allows students to relieve their academic stress and anxiety. Physical activities give them an environment to breathe out their stress. By exercising and breathing deeply, we provide extra air to our lungs which in turn provides more oxygen to the brain; this makes the brain feel relaxed and stress free. Apart from self – harm reduction, there are several other added mental health benefits by involving in physical activity. Aerobic exercises, including jogging, swimming, cycling, walking, gardening, and dancing, have been proved to reduce anxiety and depression (Guszkowska M et al., 2014). Wendy A. Suzuki, 2018 during her TEDx talks elaborated on the science of how working out, boosts your mood and memory and protects your brain against neurodegenerative diseases like Alzheimer's. Increasing physical activity volume was associated with higher levels of happiness (Richards et al., 2015). Physical activity has been shown to have a positive influence on our self-esteem and self-worth (Lindwall M et al., 2014). Physical activity gets teens out of their heads and into their bodies and they create a sense of productivity along with having a channel for outlet. Physical activity is not being given the deserved importance in schools and colleges and there is a need to change this in order to address the physical and mental health issues arising in children and adolescents.

CONCLUSION

Physical activity of sufficient intensity to release endorphins can be used as an alternate health coping strategy instead of poor coping strategies like NSSI (Non suicidal self-Injury) to get relief from pain and induce positive feel. Not only as an intervention to reduce such behaviors but also a prevention for the same can be done by encouraging physical activities by prioritizing them in the educational system and also in the social and family system. The increase in

sedentary lifestyle and decline in active living and also increase in the self-harm behaviors are happening simultaneously and so may be a lack of space and a positive channel (like sports, dance and other forms of physical activities) to let off their steam is unknowingly making the adolescents go for these poor channels to have an outlet for unburdening their pent-up energies and emotions. An awareness of mental health benefits of physical activity requires to be acknowledged as it is in case of physical health benefits.

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