

Prevalence and Correlates of Self-Injury among Adolescents: A Cross-Sectional Study

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Abstract: *Introduction:* Non-suicidal self-injury (NSSI) is defined as a deliberate and voluntary self-inflicted physical damage without suicidal intent. However, the risk of suicide is significantly higher among those who have previously engaged in NSSI. Adolescents are at risk for developing this type of behavior, as elevated levels of impulsivity and emotional reactivity are present due to brain developmental processes.

Methods: A cross-sectional survey that collected data from a sample of 140 adolescents from two Brazilian public schools in August of 2018. The prevalence of self-injury was calculated, and related factors were analyzed, such as sex, socioeconomic status, age of onset, recurrence, intention to die and healthcare assistance.

Results: The prevalence of self-injury was 25% ($n = 35$) in the sample. Girls were seven times more likely to practice self-injury than boys ($OR\ 7.42$; 95% CI 2.80-19.66; $p < 0.001$). However, boys were more likely to have intention to die, recurrence, absence of pain, and no healthcare assistance. The age of onset was 13 to 15 years for most cases. More than one third of participants reported multiple episodes of self-injury (five episodes or more) and they were 13 times more likely to have intention to die ($OR\ 13.2$; 95% CI 1.44-120.69; $p = 0.010$). Only one person reported using medication on a daily basis (selective serotonin reuptake inhibitor) and 28.6% reported undergoing professional healthcare assistance.

Conclusion: Self-injury is a prevalent behavior in adolescents, that potentially results in psychological and physical impairments. Further research to achieve a better understanding of clinical and epidemiological features of self-injury is essential so that more effective preventive and therapeutic interventions can be developed to target the needs of young people worldwide.

Keywords: Non-suicidal self-injury, deliberate self-harm, self-mutilation, self-injurious behavior, self-destructive behavior.

INTRODUCTION

Non-suicidal self-injury (NSSI) is defined as deliberate and voluntary self-inflicted physical damage without suicidal intent. Current evidence suggests that adolescence is a vulnerable phase for developing NSSI, as elevated levels of impulsivity and emotional reactivity are present due to brain developmental processes [1]. The age of onset is usually around 13 to 15 years, with a decrease in prevalence by adulthood [2,3]. The World Health Organization considers adolescents to be between 10 and 19 years old.

Adolescents who deliberately harm themselves are of clinical concern, not only because it may result in disabilities, but also because it appears to be a predictor for later suicide, with evidence that at least a quarter of patients who commit suicide have previously engaged in non-suicidal self-injury [4,5]. According to the World Health Organization, suicide is the third leading cause of death among adolescents aged between 15 and 19 years worldwide [6].

A systematic review that examined fifty-two studies from different countries found a mean lifetime prevalence of NSSI of 18.0% [7]. Brunner *et al.* assessed eleven European countries finding an overall lifetime prevalence of 27.6% [8]. Giletta *et al.* described a prevalence of 24.0% among adolescents from Italy, the Netherlands, and the United States [9]. Brazil is lacking epidemiological studies on self-injury, and therefore, prevalence remains uncertain.

The most common methods of NSSI are cutting, hitting, scratching, biting, and burning. Different methods can be used in association [10-12]. There is evidence that self-injury is a strategy of emotional regulation, with the intention of reducing negative feelings experienced by the person. Accordingly, NSSI tends to be repetitive with numerous episodes over time [12-14]. In a study of more than 28,000 Irish patients who arrived at an emergency room due to self-injury, 19.2% experienced recurrence [15].

Personal characteristics such as pessimism, insecurity, low self-esteem, impulsivity, and emotional instability seem to be related to a higher risk of self-injury. Association with substance abuse is also common. In addition, several studies have shown that self-injury is more prevalent among people who have

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suffered bullying and abuse, such as physical violence, emotional violence, sexual abuse, and neglect, or who are inserted in a context of dysfunctional family relationships [12,13,16,17].

The main obstacle to the treatment of these people seems to be the low demand for health care. An Irish study revealed that only 11.3% of adolescents sought hospital care because of a self-injury episode [18]. There is growing evidence of the effectiveness of psychotherapeutic treatments for NSSI in adolescents [1]. Regarding pharmacological interventions, studies demonstrate possible benefits from using atypical antipsychotics, selective serotonin reuptake inhibitor, serotonin–norepinephrine reuptake inhibitor, and naltrexone in reducing NSSI [11].

Recent efforts to address gaps in the current knowledge have culminated in the inclusion of NSSI in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a condition for future studies [19]. This represents an important step towards the recognition of this disorder as a new diagnostic entity, which would promote communication and research on etiology, treatment and prognosis [1,3,11].

Bearing in mind that self-injury can result in significant clinical and functional impairment for adolescents, the aim of this research is to quantify the prevalence and investigate related factors, such as sex, socioeconomic status, age of onset, recurrence, intention to die and healthcare assistance.

METHODS

Study Design and Sample

This study is based on a cross-sectional survey that collected data from a sample of 140 adolescents from two Brazilian public schools in August 2018. Both schools were located in *Ceilândia*, an urban area in the suburbs of the Federal District. The researchers selected these schools according to the ease of access and communication with the principal of each school. The classrooms were indicated by the staff members.

Inclusion criteria included students aged between 10 and 19 years old, from the selected schools and classrooms, present at school on the day of the questionnaire application, who voluntarily agreed to participate in the research and whose legal caretaker had signed the Informed Consent Form. There were no exclusion criteria.

Data Collection and Analyses

Data was collected using an anonymous questionnaire, in which the participants themselves filled out the answers, without exposing their answers to the interviewer or other people. The questionnaire was divided in two sections. The first section included: age, school grade, sex, number of bathrooms at home (in order to assess socioeconomic status, being 1 bathroom the lowest, 2 bathrooms the middle and 3 or more bathrooms the highest), “do you know what self-injury is?”, “do you know someone that practices or has practiced self-injury?”, “have you ever considered self-injuring?”, “have you ever practiced self-injury?”. If the participant answered “yes” to the last question, it was requested to move on to the second section of the questionnaire, that inquired about age of onset, methods of self-injuring, parts of the body, feelings before and after self-injuring, intention to die, recurrence, presence of pain, precipitating factors, regular medication intake and professional healthcare assistance (primary care physician, psychiatrist, psychologist or psychotherapist).

Data analyses were performed using Microsoft Excel 2010® and GraphPad InStat 3®. Descriptive analyses were made to evaluate the distribution of the variables. The variables were all categorical and were presented with frequency and/or percentage calculations. The prevalence of self-injury of the sample was calculated. The association between two variables was calculated using odds ratio (OR), 95% confidence interval (95% CI) and p-value, based on the Chi-square test, Chi-square for a trend or two-sided Fisher’s exact test. Missing data were excluded from comparative analyses.

Ethics and Funding

This research was carried out in compliance with Resolution Number 466/2012 of the Brazilian National Health Council (CNS), after having been submitted for approval by the Ethics Committee of FEPECS/SES - DF, through *Plataforma Brasil* (CAAE: 93352218.1.0000.5553).

The risks of this research were related to the constraint in providing answers in the interview instrument. To address this, there was total anonymity and confidentiality of the data. Participants who expressed a need for assistance were offered free clinical support by the researchers, that are pediatricians.

The benefits came exclusively from the contribution to the improvement of scientific knowledge for the medical field.

All participants, the school staff, and researchers were volunteers and the resources were financed by the researchers themselves (for example, printing questionnaires). There were no conflicts of interest.

RESULTS

Descriptive Analysis

By defining the sample error at 5%, the confidence level at 95%, and the minimum expected prevalence for self-injury at 10%, the sample should comprise at least 139 adolescents.

On the day of data collection, 149 students were present at the schools. Of these, 9 students (6.0%) did not want to participate (returned a blank questionnaire or did not return it). Thus, the sample was comprised of 140 participants.

The proportion of boys and girls was similar (50.0% and 47.1%, respectively, and 2.9% left the sex field blank). The ages ranged from 13 to 19 years, with the largest group being of 15 year-olds (42.1%) attending the 9th grade (74.2%). Almost half of the participants belonged to the group with the lowest socioeconomic status (49.3%). The detailed distribution of socioeconomic variables can be seen in Table 1.

Among the 140 adolescents, 129 (92.1%) answered that they know what self-injury is and 104 (74.3%) answered that they know someone who practices or has practiced self-injury.

The prevalence of self-injury was 25.0% ($n = 35$). The age of onset was 13 to 15 years for most cases (82.9%), and the other part of the sample reported an earlier onset, aged 12 or less (17.1%).

In the questions that followed, more than one option could be selected by the participant. The predominant method of self-injury was cutting (91.4%), followed by biting (14.3%), and hitting (11.4%). The most common site was the arm (85.7%), followed by the leg (34.3%), neck (2.9%), and other (2.9%).

More than half of the adolescents practicing self-injury in the sample reported that, before the first episode, they had experienced feelings of sadness (60.0%) and anger (54.3%). Others reported feelings of emptiness (48.6%), guilt (40.0%), loss of control

(37.1%), rejection (28.6%), anxiety (25.7%), and other (5.7%).

The main feeling experienced by adolescents after self-injuring was relief (60.0%), followed by guilt (34.3%), sadness (34.3%), well-being (20.0%), shame (17.1%), and other (2.9%). Almost half reported not feeling pain when self-injuring (48.6%).

The reasons identified by the participants as triggers were sadness and easy crying for no reason (51.4%), difficulty in relating to their families (48.6%), difficulty in relating to friends (31.4%), abandonment or rejection (28.6%), learning difficulties (8.5%), suffered violence (2.9%), and others (8.5%).

Out of these 35 adolescents, more than a third reported having self-injured more than five times (34.3%). The majority of adolescents who self-injured themselves reported having intention to die (60.0%). Only one participant reported using medication on a daily basis (2.9%), that was a selective serotonin reuptake inhibitor. Only 10 participants (28.6%) reported to be undergoing professional healthcare assistance (primary care physician, psychiatrist, psychologist or psychotherapist).

Comparative Analysis

Of those 35 adolescents who reported having practiced self-injury, 77.1% were girls, 17.1% were boys and 5.7% left the sex field blank. Girls were 7 times more likely to practice self-injury when compared to boys (OR 7.42; 95% CI 2.80-19.66; $p < 0.001$). Nonetheless, girls were almost four times more likely to have early onset than boys, at 12 years of age or less (OR 3.93; 95% CI 0.19-79.58; $p = 0.563$).

On the other hand, boys seem to be more likely to have the intention to die, to have multiple episodes of self-injury (five or more), not to feel pain when self-injuring, and not having any kind of professional healthcare assistance (see Tables 2 and 3).

There seems to be a trend of the greater the socioeconomic status, the lower the prevalence of self-injury ($p = 0.473$). The group with the lowest economic power showed a 66% increase in the chance of practicing self-injury, when compared to the group with the highest economic power (OR 1.66; 95% CI 0.42-6.52; $p = 0.543$). Moreover, the group with the lowest economic power were 23% less likely to have healthcare assistance (OR 0.77; 95% CI 0.06-10.50; $p = 1.000$).

Table 1: Distribution of Socioeconomic Indicators in the Overall Sample, by Presence of Self-Injury Practice

	Do you practice self-injury? n (% row)			p-value
	No	Yes	Blank	
Overall [N=140]	100 (71.4)	35 (25.0)	5 (3.5)	-
Age (years)				
13	14 (63.7)	5 (22.7)	3 (13.6)	0.428 ¹
14	28 (68.3)	13 (31.7)	0	
15	47 (79.7)	10 (16.9)	2 (3.4)	
16	8 (66.7)	4 (33.3)	0	
17-19	2 (100.0)	0	0	
Blank	1 (25.0)	3 (75.0)	0	-
Sex				
Female	37 (56.1)	27 (40.9)	2 (3.0)	<0.001 ¹
Male	61 (87.1)	6 (8.6)	3 (4.3)	
Blank	2 (50.0)	2 (50.0)	0	-
Socioeconomic status				
Lowest	47 (68.1)	18 (26.1)	4 (5.8)	0.473 ²
Medium	27 (75.0)	9 (25.0)	0	
Highest	13 (81.3)	3 (18.7)	0	
Blank	13 (68.4)	5 (26.3)	1 (5.3)	-

¹Based on Chi-square Test.²Based on *Chi-square Test for a Trend*. Excluding blank answers.

There was evidence that those who present multiple episodes of self-injury are 13 times more likely to have the intention to die (OR 13.2; 95% CI 1.44-120.69; $p = 0.010$). Still, this group is 90% less likely to experience pain (OR 0.10; 95% CI 0.02-0.61; $p = 0.010$) and 86% less likely to have healthcare assistance (OR 0.14; 95% CI 0.02-1.29; $p = 0.112$).

Finally, adolescents who intend to die are 50% less likely to have professional healthcare assistance (OR 0.50; 95% CI 0.11-2.25; $p = 0.450$).

DISCUSSION

Summary of the Main Findings

One in four adolescents reported having practiced self-injury. This considerably high prevalence is consistent with similar studies from other countries [7-9]. The results suggested a correlation between sex and self-injury: prevalence was higher among girls, who seem to start at a younger age than boys. On the other hand, in boys it seems more severe, with a higher

Table 2: Distribution of Socioeconomic Indicators by Age of Onset, Intention to Die, Number of Episodes, Presence of Pain and Healthcare Assistance, Excluding Blank Responses [n=35]

n (%)	Sex		Socioeconomic status		
	Female	Male	Lowest	Medium	Highest
Age of onset (years)					
12 or less	6 (22.2)	0	3 (16.7)	1 (11.1)	0
13-15	21 (77.8)	6 (100.0)	15 (83.3)	8 (88.9)	3 (100.0)
16 or more	0	0	0	0	0
Intention to die					
No	12 (46.2)	1 (16.7)	7 (41.2)	3 (33.3)	1 (33.3)
Yes	14 (53.8)	5 (83.3)	10 (58.8)	6 (66.7)	2 (66.7)
Number of episodes					
Up to 5	20 (74.1)	3 (50.0)	11 (61.1)	7 (77.8)	2 (66.7)
>5	7 (25.9)	3 (50.0)	7 (38.9)	2 (22.2)	1 (33.3)
Pain					
No	11 (44.0)	3 (50.0)	10 (62.5)	2 (22.2)	1 (33.3)
Yes	14 (56.0)	3 (50.0)	6 (37.5)	7 (77.8)	2 (66.7)
Healthcare assistance					
No	18 (66.7)	5 (83.3)	13 (72.2)	6 (66.7)	2 (66.7)
Yes	9 (33.3)	1 (16.7)	5 (27.8)	3 (33.3)	1 (33.3)

Table 3: Analysis of the Correlation between Sex and Early Onset (12 Years of Age or Less), Intention to Die, Recurrence (more than 5 Episodes), Presence of Pain and Healthcare Assistance

	Sex		p-value
	Female	Male	
	OR (95% CI)		
Early onset ¹	3.93 (0.19-79.58)		reference
Intention to die	0.23 (0.02-2.29)		reference
Recurrence	0.35 (0.05-2.16)		reference
Pain	1.27 (0.21-7.58)		reference
Healthcare assistance	2.50 (0.25-24.73)		reference

Based on Two-sided Fisher's Exact Test.

¹As there were categories with "zero" observations, "0.5" was added to each value, to make the calculations possible.

Table 4: Analysis of the Correlation between Socioeconomic Status and Early Onset (12 Years of Age or Less), Intention to Die, Recurrence (More than Five Episodes), Presence of Pain and Healthcare Assistance

	Socioeconomic status				
	Lowest		Medium		Highest
	OR (95% CI)	p-value	OR (95%)	p-value	-
Early onset ¹	1.58 (0.07-38.12)	1.000	1.23 (0.04-38.33)	1.000	reference
Intention to die	0.71 (0.05-9.50)	1.000	1.00 (0.06-15.99)	1.000	reference
Recurrence	1.27 (0.10-16.82)	1.000	0.57 (0.03-10.08)	1.000	reference
Pain	0.30 (0.02-4.01)	0.546	1.75 (0.10-30.86)	1.000	reference
Healthcare assistance	0.77 (0.06-10.50)	1.000	1.00 (0.06-15.99)	1.000	reference

Based on Two-sided Fisher's Exact Test.

¹As there were categories with "zero" observations, "0.5" was added to each value, to make the calculations possible.

likelihood of intention to die, recurrence, absence of pain, and no healthcare assistance. In accordance with other studies, the most common method of self-injury was cutting the arms [1,10,18].

This research showed a trend that the higher the socioeconomic status, the lower the prevalence of self-injury. There is evidence that support that socioeconomic deprivation is related to self-injury rates [17]. Several predictors of self-injury are also more prevalent in settings of poverty, such as physical violence, sexual abuse, and neglect, possibly acting as cumulative risk factors [16]. Moreover, the access to mental health care may also be hampered in unfavorable social conditions.

The prevalence of intention to die was considerably high (60% of adolescents who practiced self-injury). Current literature defines self-injury as a non-suicidal behavior that seeks a transitory relief from psychological distress. However, self-injury and suicide share common risk factors, such as depression, substance abuse, history of sexual abuse or physical violence, family dysfunction. Moreover, self-injuring could be a gateway allowing adolescents to acquire the capacity for suicide [2].

Given that self-injury is commonly associated with other psychiatric disorders [4,9,10,20], it is possible that some of the interviewed adolescents had associated psychiatric disorders, such as depression, even if not formally diagnosed, and would probably benefit from psychotherapy and pharmacological interventions.

Almost half of the participants reported not feeling pain when practicing self-injury, especially those with recurrent episodes. This finding endorses the possible contribution of the opioid system, either through the mechanism of dependence on endogenous opioids or through increased tolerance to painful stimuli. Furthermore, there are studies pointing to the role of other neurobiological pathways regarding the perception and processing of physical pain, such as dopaminergic and serotonergic systems [1,10,21].

More than one third of the participants presented recurrence of self-injury episodes. This may be underestimated, since most participants were between 13 and 15 years old. It is possible that, if participants were older, the recurrence rate would be even higher. The impact of this result deserves to be highlighted, given that these adolescents are 13 times more likely to have intention to die and are 86% less likely to have healthcare assistance.

The most alarming result was that only 28.6% of the cases reported having professional healthcare assistance (primary care physician, psychiatrist, psychologist or psychotherapist). Self-injury is a very prevalent behavior, which has enormous potential to offer psychological and physical impairment to adolescents, which are mostly unattended. Therefore, self-injury urgently needs to be properly addressed in the context of public health.

STRENGTHS AND LIMITATIONS

The strengths of the study include reaching the sample size calculated to measure the prevalence of

self-injury, the high response rate (94%), the small amount of missing data, especially regarding the main scope of the study (out of the 140 participants, only five did not answer the question "Have you ever practiced self-injury?"), and that anonymous responding potentially reduced the occurrence of information bias.

The limitations of the study are that the cross-sectional design does not allow to infer causality, and that the retrospective design can result in recall bias. The sample size was calculated to allow the quantification of the prevalence of self-injury; however, the number of observations in each category was small for most subanalyses, increasing the chance of sample error, as shown in the large confidence intervals and high p-values. Although it is unlikely, there is a risk of selection bias considering that we used convenience sampling in our choice of schools and classrooms.

CONCLUSION

Self-injury is a prevalent behavior that has huge potential to offer chronic damage and risk to the adolescents, and they are mostly unattended from the perspective of public health. Further research to achieve a better understanding of clinical and epidemiological features of self-injury is essential to develop more effective preventive and therapeutic interventions targeting the needs of young people worldwide.

REFERENCES

- [1] Brown RC, Plenner PL. Non-suicidal Self-Injury in Adolescence. *Curr Psychiatry Rep* 2017; 19(20). <https://doi.org/10.1007/s11920-017-0767-9>
- [2] Grandclerc S, De Labrouhe D, Spodienkiewicz M, Lachal J, Moro MR. Relations between Nonsuicidal Self-Injury and Suicidal Behavior in Adolescence: A Systematic Review. *PLoS One* 2016; 4(11). <https://doi.org/10.1371/journal.pone.0153760>
- [3] Plener PL, Schumacher TS, Munz LM, Groschwitz RC. The longitudinal course of non-suicidal self-injury and deliberate self-harm: a systematic review of the literature. *Borderline Personal Disord Emot Dysregulation* 2015; 2(2). <https://doi.org/10.1186/s40479-014-0024-3>
- [4] Heerde JA, Toumbourou JW, Hemphill SA, Herrenkohl TI, Patton GC, Catalano RF. Incidence and course of adolescent deliberate self-harm in Victoria, Australia, and Washington State, USA. *J Adolesc Health* 2015; 57(5): 537-44. <https://doi.org/10.1016/j.jadohealth.2015.07.017>
- [5] Hawton K, James A. Suicide and deliberate self harm in young people. *BMJ* 2005; 330(7496): 891-4. <https://doi.org/10.1136/bmj.330.7496.891>
- [6] World Health Organization (WHO). Adolescent mental health [Internet] 2018 [cited 2018 Oct 4]. Available from: <http://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health>
- [7] Swannell SV, Martin GE, Page A, Hasking P, St John NJ. Prevalence of nonsuicidal self-injury in nonclinical samples: systematic review, meta-analysis and meta-regression. *Suicide Life Threat Behav* 2014; 44: 273-303. <https://doi.org/10.1111/sltb.12070>
- [8] Brunner R, Kaess M, Parzer P, Fischer G, Carli V, Hoven CW, *et al.* Life-time prevalence and psychosocial correlates of adolescent direct self-injurious behavior: a comparative study of findings in 11 European countries. *J Child Psychol Psychiatry* 2014; 55: 337-48. <https://doi.org/10.1111/jcpp.12166>
- [9] Giletta M, Scholte R, Engels R, Ciairano S, Prinstein M. Adolescent non-suicidal self-injury: A cross-national study of community samples from Italy, the Netherlands and the United States. *Psychiatry Res* 2015; 197(0): 66-72. <https://doi.org/10.1016/j.psychres.2012.02.009>
- [10] Giusti JS. Automutilação: características clínicas e comparação com pacientes com transtorno obsessivo-compulsivo. [dissertation]. São Paulo: Universidade de São Paulo 2013.
- [11] Turner BJ, Austin SB, Chapman AL. Treating Nonsuicidal Self-Injury: A Systematic Review of Psychological and Pharmacological Interventions. *Can J Psychiatry* 2014; 59(11): 576-85. <https://doi.org/10.1177/070674371405901103>
- [12] Pawłowska B, Potembska E, Zygo M, Olajossy M, Dziurzyńska E. Prevalence of self-injury performed by adolescents aged 16-19 years. *Psychiatr Pol* 2016; 50(1): 29-42. <https://doi.org/10.12740/PP/36501>
- [13] Cipriano A, Cella S, Cotrufo P. Nonsuicidal Self-injury: A Systematic Review. *Front Psychol* 2017; 8(1946). <https://doi.org/10.3389/fpsyg.2017.01946>
- [14] Pattison EM, Kahan J. The deliberate self-harm syndrome. *Am J Psychiatry* 1983; 140(7): 867-72. <https://doi.org/10.1176/ajp.140.7.867>
- [15] Bernardi M, McMahon E, Corcoran P, Griffin E, Arensman E. Risk of repeated self-harm and associated factors in children, adolescents and young adults. *BMC Psychiatry* 2016; 16(421). <https://doi.org/10.1186/s12888-016-1120-2>
- [16] Serafini G, Canepa G, Adavastro G, Nebbia J, Murri M, Erbuo D, *et al.* The Relationship between Childhood Maltreatment and Non-Suicidal Self-Injury: A Systematic Review. *Front Psychiatry* 2017; 8(149). <https://doi.org/10.3389/fpsyg.2017.00149>
- [17] Greydanus D, Shek D. Deliberate Self-harm and Suicide in Adolescents. *Keio J Med* 2009; 58(3): 144-51. <https://doi.org/10.2302/kjm.58.144>
- [18] Morey C, Corcoran P, Arensman E, Perry I. The prevalence of self-reported deliberate self harm in Irish adolescents. *BMC Public Health* 2008; 8(79). <https://doi.org/10.1186/1471-2458-8-79>
- [19] American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*. 5th ed. 2013. <https://doi.org/10.1176/appi.books.9780890425596>
- [20] Castilho P, Gouveia JP, Bento E. Auto-criticismo, vergonha interna e dissociação: a sua contribuição para a patoplastia do auto-dano em adolescentes. *Psicologica* 2010; 11(52): 331-60. https://doi.org/10.14195/1647-8606_52-2_14
- [21] Osuch E, Ford K, Wrath A, Bartha R, Neufeld R. Functional MRI of pain application in youth who engaged in repetitive non-suicidal self-injury vs. psychiatric controls. *Psychiatry Res* 2014; 223(2): 104-12. <https://doi.org/10.1016/j.psychresns.2014.05.003>

Received on 11-11-2022

Accepted on 15-12-2022

Published on 29-12-2022

<https://doi.org/10.12970/2310-8231.2022.10.02>

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