



Review article

Nonsuicidal self-injury in undergraduate students: a cross-sectional study and association with suicidal behavior

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ABSTRACT

The objective of this study was to investigate nonsuicidal self-injury (NSSI) in graduates and correlate NSSI with sociodemographic profile, suicidal behavior, and prior mental health disorders. The study is part of a larger survey investigating sociodemographic profile, quality of life and mental health in undergraduates from one of Brazil's largest universities. A bespoke questionnaire was devised about NSSI based on the DSM5 diagnostic criteria. The data were analyzed using the statistical analysis package SPSS.

A total of 6.906 university students took part in the study. Regarding NSSI, 17.8% of students reported at least one episode in their lifetime, and 35% reported age at NSSI onset of 14–16 years. Self-injurious behavior was associated with female gender, self-reported black skin color, dissatisfaction with the chosen course, history of bullying and prior mental disorder. There was a ten times greater risk of suicidal behavior among self-injurers and this risk was higher still for recurrent NSSI.

1. Introduction

Non-suicidal self-injury (NSSI) can be defined as direct damage to a tissue in the body, without the individual's declared or known intention of suicide (Nock, 2009). NSSI behavior involves cuts or injuries to the skin, as well as burns, scrapes, bumps, or bumps to parts of the body. Self-injury practitioners are documented to report immediate relief from tension and distress and describe the behavior as the physical communication of emotional pain. In addition, other goals of NSSI are to seek help from others and resist suicidal thoughts (Klonsky, 2007).

Some theories try to explain the motivation for NSSI among teenagers and young people, as it is a painful behavior that goes against human instincts to avoid pain. One of the theories concerns emotional dysregulation, in which individuals who practice self-injury would have less skill and more reactivity when dealing with negative emotions and, when injured, receive an immediate relief reinforcement. However, this hypothesis about greater reactivity immediately before the self-injurious act has not been confirmed by longitudinal studies (Hooley and Franklin, 2018).

Self-injurious behavior is known to be associated with other mental

disorders, such as Borderline Personality Disorder, depression, anxiety disorders, and eating disorders (Nock et al., 2006; Peterson et al., 2008). Jacobson and Gould (2007) showed rates of depressive disorder of 41 to 58% among adolescents with NSSI. However, there is no significant difference in the association of NSSI between the disorders, suggesting that it is a transdiagnostic phenomenon (Bentley et al., 2017). NSSI is related to an increased risk of suicidal ideation and attempts (Plener et al., 2015), demonstrating a higher risk when compared to anxiety, depression and personality disorders analyzed separately (Klonsky et al., 2013).

A period of greatest concern due to the association with increased risk of distress and mental disorders is the entry of young people into universities (Auerbach et al., 2018). Studying in an academic environment marks the transition from adolescence to adult life. Within this setting, young adults can develop their professional, personal and social skills. Although not yet a formally recognized a diagnosis, nonsuicidal self-injury (NSSI) represents a health concern on university campuses owing to its high prevalence in this age group. Nonsuicidal self-injury can be defined as direct damage to body tissue without conscious or declared suicidal intent by the individual.

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The systematic review by Swannell et al. (2014) reported a 20% prevalence of self-injury in university students. In a study analyzing NSSI incidence in college students, Kiekens et al. (2019) found a rate of 10.3% in the first year and 15.6% in the first 2 years. An analysis of recurrent self-injury, i.e. over 5 episodes in the past year, revealed an NSSI rate of 7.0% in college students (Zetterqvist, 2015). This self-mutilation behavior, when repetitive, has been associated with greater severity and higher likelihood of seeking professional help (Zetterqvist, 2015; Kiekens et al., 2018).

There is a dearth of studies on NSSI among Brazilian university students in the literature. This study aims to investigate and analyze NSSI in the student population of one of the largest Brazilian universities and to correlate NSSI with sociodemographic profile, academic characteristics, associated disorders and suicidal behavior. The research with Brazilian university students is not only aimed at replicating studies carried out in other countries. The objective of this study is to understand the self-harming behavior in a Brazilian public university that has diversity in the modalities of admission, such as racial quotas and socioeconomic bonuses, and which, despite this, can be a representative sample of class privileges and socioeconomic inequality.

2. Methods

2.1. Participants

Participation was on a voluntary basis and a non-randomized intentional sample of undergraduate students was assessed, with no restrictions on course type, course year/semester or campus, with eligible areas of study including the exact sciences, arts, humanities, health sciences and biology, through full-time, night or morning study modalities. Students who were not comfortable answering the questionnaire or that stated they did not have a good grasp of the Portuguese language were excluded from the study. All study participants read and signed the free and informed consent form, previously approved by the Research Ethics Committee.

2.2. Procedures

The present study was part of a larger project investigating socio-demographic and cultural profiles, personal and social identity, spirituality, quality of life, use of alcohol or other psychoactive substances, as well as physical and mental health of students at one of Brazil's largest universities. The study commenced in 2016 and involved a multidisciplinary team of researchers who devised the project questionnaire to be applied to students.

A paper and pencil questionnaire (hardcopy) was applied through face-to-face interviews held during the 2 semesters of 2017 up to the end of the 1st semester of 2018. All interview sessions were overseen by members of the research team and by undergraduates involved in the science initiation project. The conducting of the study and application of the questionnaire had the support of the Central Committee for Undergraduate studies and the Dean's Office for Undergraduate education of the university. The schedule for applying the questionnaire was arranged after agreement by the lecturers of the different subjects taught, who were invited to take in the study by e-mail and subsequently set aside a time during their class for survey completion.

The study project and free and informed consent form were approved on 01/02/2017 by the local Research Ethics Committee under permit no 1.903.287 (CAAE 62765316.6.0000.5404).

2.3. Instruments

An observational cross-sectional study was conducted. The questionnaire collected information on sociodemographic, political, religious and cultural aspects, and included questions on mental health and quality of life. Sociodemographic profile was determined by the

socioeconomic level questionnaire (Brazil Economic Classification Criteria – 2015) of the Brazilian Association of Research Companies (ABEP). The questionnaire on suicidal behavior contained questions about thinking, planning and attempting suicide throughout life, with answers “yes or no”.

The questionnaire probing “nonsuicidal self-injury” – NSSI – was developed by the researchers based on the criteria defined in DSM 5. The researchers chose to develop an unprecedented questionnaire that could address the DSM 5 criteria, since at the time of the research, there was no validated questionnaire in Portuguese that addressed the topic according to the manual.

The rate of self-injury was investigated by posing the initial question: “have you ever deliberately cut yourself without the intent to kill yourself?”. If answering “Yes”, the student then answered the other questions determining the characteristics of the NSSI, including frequency, function, age at onset and discontinuation, concern over the behavior, and seeking of professional help. In addition to the above questions, students were given the opportunity to outline how they learned about self-harming.

The data collected were tabulated in an Excel spreadsheet and the spreadsheet was double-checked by 3 other researchers as an error reduction measure. After tabulation and review, the data were treated statistically by creating a database using the statistical package SPSS for Windows (version 22).

The data for discrete variables were expressed as frequency (absolute number and percentage), while data for variables with a continuous distribution were expressed as measures of position and dispersion. Subsequently, analyses were carried out exploring associations of presence/absence of NSSI (dependent variable) with gender, history of bullying, religiosity and spirituality, previous mental disorders and suicidal behavior, using the chi-square test, odds ratio and adopting a 5% significance level ($p\text{-value} \leq 0.05$) and Cramer's V test, selecting variables with greater strength of association, minimizing the chance of the findings being random. The chi-square test was applied to determine the association of sporadic and recurrent NSSI (over 5 episodes in the past year) with mental disorder, previous psychological and psychiatric treatment and suicidal behavior. The analysis of the open question on how self-injurers had learned how to engage in NSSI was performed by pooling similar terms.

3. Results

A total of 6,906 participants took part in the study. Two students were excluded: 1 upon request of the participant, and the second due to incomplete filling out of the questionnaire. Regarding participant age, based on the 6,875 (99.6%) valid responses, age ranged from 15 to 66 years, with median of 12 years, interquartile range of 4, 25th percentile of 19 years and 75th percentile of 23 years. With regard to nationality of the sample, 6,819 (98.9%) subjects were Brazilian. For gender, 3,309 (48.1%) participants were female and 3,569 (51.2%) male. The data for other sociodemographic variables collected are given in Table 1.

A total of 6,662 (96.5%) responses were included for determining the prevalence of NSSI, whereas 244 (3.5%) were excluded owing to missing data. Of the valid answers, 1,188 (17.8%) students reported at least one NSSI episode over their lifetime. Around 35.0% of this group stated they had first self-harmed at an age of between 14 and 16 years.

Of self-injurers, 752 (63.7%) were female and 430 (36.3%) male. On separate analysis by gender, 752 (24.4%) of the 3,217 female students stated they had self-injured at some point in their lifetime versus 430 (12.5%) of the 3420 males. An association of NSSI with gender was evident, with a higher prevalence of self-harming seen among females.

Considering socioeconomic level, as determined by the ABEP, 6,662 participants were categorized into 6 different classes: A, B1, B2, C1, C2, D/E, based on analyses of goods owned, family income and maternal education. The highest NSSI rates were found in classes B and C. By socioeconomic class, 341 (18.7%) of the 1,821 class B2 students

Table 1
Characteristics of study participants (n=6906).

Characteristics	No. (%)
Gender	
Female	3,309 (48.1)
Male	3,569 (51.6)
Age	3,403 (49.6)
15-20 years	2,636 (38.4)
21-24 years >24 years	836 (12.0)
Skin color/Ethnicity	5,020 (73.3)
White	1,178 (17.2)
Brown	388 (5.7)
Black	36 (0.5)
Indigenous	119 (1.7)
Others	
Paternal education	31 (0.5)
None	606 (8.8)
Basic / Primary incomplete	679 (9.9)
Primary complete / Secondary incomplete	2,131 (31.1)
Secondary complete / Higher incomplete	2,096 (30.6)
Higher complete	1,208 (17.6)
Graduate level	103 (1.5)
Others	
Maternal education	18 (0.3)
None	528 (7.3)
Basic / Primary incomplete	588 (8.5)
Primary complete / Secondary incomplete	2,082 (30.3)
Secondary complete / Higher incomplete	2,279 (33.1)
Higher complete	1,358 (19.7)
Graduate level	26 (0.4)
Others	
Areas of knowledge	1,924 (27.8)
Arts and Humanities	769 (11.1)
Basic Sciences	1,594 (23.1)
Health Sciences	2,317 (33.5)
Exact Science and Technology	307 (4.4)
Vocational	

reported NSSI, 142 (20.3%) of the 699 class C1 students, and 54 (22.4%) of the 241 class C2 students. The lowest rate of NSSI was reported among the 53 students of classes D/E, with 8 (15.1%) students in this socio-economic group reporting the behavior.

In terms of skin color, of the group of 368 students self-reporting as black, 85 (23.15%) engaged in NSSI. The results for individuals who self-reported as being white or brown were not significant, where 856 (17.6%) white students reported NSSI and 209 (18.3%) brown students. Similarly, no association of NSSI with indigenous, oriental or arabic ethnicity was found.

Of the 3,801 students who reporting having some religiosity or spirituality, 584 (15.4%) reported at least one NSSI episode versus 575 (21.2%) of the 2,707 students not exhibiting religiosity or spirituality. There was an association of NSSI with religiosity and spirituality, where lower rates of the behavior occurred among students reporting some form of spirituality and religiosity.

With regard to discipline studied and NSSI occurrence, 412 (22.4%) of the 1836 Arts and Humanities students reported NSSI, 243 (15.7%) of the 1,550 students on Health Sciences courses, 290 (12.9%) of the 2242 studying Exact Sciences and Technologies, and 174 (23.5%) out of the 741 students on Basic Sciences courses reported NSSI.

Regarding the correlation between history of bullying and NSSI, students subjected to severe bullying and reporting at least one episode of self-harming had an odds ratio of 2.4 (95%CI 2.2-2.8) compared to those reporting no NSSI. A similar pattern was revealed for NSSI among students that received financial support from the UNICAMP, such as social, transport, housing, student artist, business research or obligatory apprenticeship grants, where this group had a 1.3 (95%CI 1.2-1.5) times greater chance of an episode of NSSI.

For the question on course satisfaction, 6,602 (95.6%) students provided a response. Of the 5631 students stating satisfaction with their chosen course, 960 (17.0%) reported at least one episode of NSSI during

their life time. However, of the 971 students dissatisfied with their course, 212 (21.8%) reported NSSI. Thus, there was an association between course satisfaction and NSSI, with lower rates among satisfied students.

With regard to the association of NSSI with previous mental disorders and suicidal behavior, the results of this analysis are given in [Table 2](#), showing significant associations with all variables.

Applying the DSM 5 diagnostic criteria for NSSI to students reporting this behavior revealed that 538 (48.5%) individuals had engaged in 5 or more episodes of self-injury in the past year. The application of the cut-off of 5 episodes a year defined in the DSM 5 diagnostic criteria for NSSI revealed greater clinical severity in clinical than in non-recurrent cases of NSSI. The number of students with sporadic or recurrent episodes of NSSI, and associations with previous mental disorder, history of seeking psychological or psychiatric treatment, suicidal thoughts and attempted suicide, are shown in [Table 3](#).

With regard to the objective of the behavior, 963 (84.9%) students engaging in self-injury stated they sought relief from negative emotions or to vent feelings of anger, while 406 (35.6%) self-harmed in an effort to resist suicidal thoughts. Of the 916 students with NSSI who answered the question about regrets over the behavior, 450 (49.1%) stated feeling regretful after the self-harm act.

For feelings connected with NSSI, 576 (51.7%) of the students engaging in NSSI were concerned about the behavior and 461 (42.0%) sought professional help. Of the students who sought professional help, 246 expounded further on the experience, with 108 (43.2%) describing psychological or psychiatric help as effective and positive. The remaining 87 (34.9%) failed to seek help for unknown reasons, or due to feelings of shame, financial difficulties or lack of family support.

Regarding the questions on how self-injurers had learned how to engage in the behavior, 913 students gave valid answers. Responses with similar meaning were pooled into 4 groups: 324 (35.4%) had learned the behavior "on their own", 243 (26.6%) on social media platforms, TV programs or series, cinema or songs, 93 (10.2%) through friends or family members and 253 (27.8%) in other ways.

4. Discussion

This article is the first extensive Brazilian study of university students investigating the prevalence and associated characteristics of non-suicidal self-injurious behavior (NSSI) in this population. The study has some limitations, such as the fact that clear questions probing continuity or discontinuity of NSSI behavior were lacking in the present analysis, although this shortcoming did not detract from the quality of the investigation as a whole.

The meta-analysis by [Swannell et al. \(2014\)](#) included studies conducted in the university student population and revealed differences in estimated prevalences of NSSI when comparing young adults from the community against samples of university students, with higher rates found in the latter group. This finding justifies the concern and need for studying self-injury in the Brazilian university student population.

The results of the present study revealed a high prevalence (17.8%) of at least one episode of NSSI. Previous studies carried out in other countries have reported a range of different NSSI rates. The investigation of [Kiekens et al. \(2018\)](#) involving 4,565 incoming college students of one of Belgium's largest universities found a prevalence of self-injury of 17.7%, similar to the rate identified in the present sample. By contrast, the study of [Muehlenkamp et al. \(2018\)](#) found that 1,143 (27.4%) first and second-year students of North American universities in the Mid-West had at least one NSSI episode.

Regarding age of onset of NSSI, studies have shown that peak incidence occurs at 14-15 years ([Gandhi et al., 2018](#); [Plener et al., 2015](#)), corroborated by the present study. Some authors have described greater severity of the clinical condition in cases with earlier onset, as demonstrated by the study of [Muehlenkamp et al. \(2018\)](#). The study showed higher rates of self-injury and greater association with suicidal behavior

Table 2

Association of NSSI with mental disorder and suicidal behavior.

History of Mental Disorder	Have you ever deliberately cut yourself without the intent to kill yourself?			Total valid answers	p-value	Cramér's V	Odds Ratio (95% CI)
	No	Yes	Unanswered				
No	4,226	543		4,769	<0.001	0.266	4.0 (3.5-4.5)
Yes	1,214	627		1,841			
Unanswered			296				
Total valid answers	5,440	1,170		6,610			
Suicidal thoughts							
No	4,414	439		4,853	<0.001	0.376	7.1 (6.2-8.1)
Yes	1,054	745		1,799			
Unanswered			254				
Total valid answers	5,468	1,184		6,652			
Suicide planning							
No	5,190	844		6,034	<0.001	0.313	7.7 (6.4-9.2)
Yes	268	335		603			
Unanswered			269				
Total valid answers	5,458	1,179		6,637			
Attempted suicide							
No	5,306	953		6,259	<0.001	0.289	10.1 (8.0-12.7)
Yes	124	226		350			
Unanswered			297				
Total valid answers	5,430	1,179		6,609			

Table 3

Association of sporadic and recurrent NSSI with mental disorder, psychological/psychiatric treatment and suicidal behavior - 2018.

	How many episodes of NSSI have you had in past year?				Total valid answers	Unanswered	p-value	Cramér's V	Odds Ratio (95% CI)
	< 5	%	≥ 5	%					
History of Mental Disorder									
No	296	58.4	211	41.6	1095	5816	<0.001	0.124	1.6 (1.3-2.1)
Yes	270	45.9	318	54.1					
Total valid answers									
Unanswered									
Prior Psychological treatment									
No	274	59.1	190	40.9	1105	5806	<0.001	0.127	1.7 (1.3-2.1)
Yes	296	46.2	345	53.8					
Total valid answers									
Unanswered									
Prior Psychiatric treatment									
No	445	56.1	348	43.9	1101	5810	<0.001	0.134	1.8 (1.4-2.4)
Yes	127	41.2	181	58.8					
Total valid answers									
Unanswered									
Suicidal thoughts									
No	272	66.3	138	33.7	1106	5805	<0.001	0.226	2.6 (2.0-3.3)
Yes	299	43.0	397	57.0					
Total valid answers									
Unanswered									
Attempted suicide									
No	485	53.9	414	46.1	1102	5809	0.002	0.094	1.6 (1.2-2.2)
Yes	85	41.9	118	58.1					
Total valid answers									
Unanswered									

among individuals with NSSI onset at age under 12 years. In the present study, 108 (9.0%) respondents reported NSSI onset at ages younger than 12 years. Taken together, the findings of the present study and those of previous investigations, highlight the need for early detection and investigation of self-harming behavior.

In this study, NSSI prevalence was higher among females, and a significant association between NSSI and reported gender was evident. In terms of gender preference, the systematic review conducted by Swannell et al. (2014) showed similar prevalences in males and females. The authors suggested the traditional concept of self-injury being a “female disease” may have stemmed from earlier studies which typically involved only in-patients or cases diagnosed with Borderline Personality Disorder (BPD). Another hypothesis is that self-injury surveys explored only cutting, yet males tend to employ other methods of self-harming. The first question of the questionnaire applied in the present study referred only to the terms cutting, hurting, burning and injuring and did

not investigate other types of self-harming, such as hitting or striking other parts of the body against walls or objects, whose inclusion might have increased the rate measured in males.

With regard to self-reported skin color, a limitation of the present study was that respondents were able to answer more than one question on ethnicity or race. Notwithstanding this issue, a relatively higher rate of self-injury was found among students who self-reported as having black skin. Among students who self-reported as having white or brown skin color, or as being of indigenous, oriental or arabic ethnicity, no statistically significant relationship was found with NSSI. Akin to the present study, a study investigating NSSI in 1931 adolescents from rural schools in Mississippi, USA, by Gratz et al. (2012), found a higher rate of NSSI in blacks than whites, particularly in black males. Gollust et al. (2008), in a study of university students, reported a lower prevalence of self-injury among black women.

By contrast, the results of a systematic review by Rojas-Velasquez

et al. (2020) of studies published between 2000 and 2018 that were conducted in the USA, found a dearth of data on NSSI for racial minority groups. According to the author, there was no association between self-reported skin color and greater NSSI in most of the studies reviewed, but a higher prevalence of NSSI in white adolescents and young adults was evident. Neeleman et al. (2001) suggested NSSI prevalence in minority groups varies by area studied, and tends to be lower in areas with higher ethnic density. Although results in the literature are conflicting, NSSI behavior appears to be associated with feelings of not belonging to a social group or with discrimination faced in the academic environment.

In the present study, the odds of NSSI were found to be lower in students who reported engaging in religiosity or spirituality. In a study of 14,385 Canadian college students, Kress et al. (2015) found spirituality/religiosity, life satisfaction, and life meaning to be protective factors for NSSI. Similarly, Good et al. (2017) showed a two-way relationship between NSSI and doubts and/or questions over spirituality/religiosity in a sample of 1,132 college students from central Canada. According to the authors, greater doubts over spirituality and/or religiosity predicted higher engagement in self-injury and vice-versa.

Another significant association identified in the present study was between history of bullying and NSSI. Students engaging in NSSI behavior were more likely to have been subject to bullying at some point in their lives. The study conducted by Li et al. (2020) of primary and middle school students from rural provinces of China found similar results. According to the authors, students who reported being bullied had a greater tendency of presenting NSSI relative to students not subjected to bullying.

With regard to other illnesses, a strong association of NSSI with prior mental disorders, suicidal thoughts, suicide planning and attempted suicides was found in the present study. This relationship has been previously reported in the literature. Klonsky et al. (2013) explored the association of NSSI with attempted suicide in a sample of university students and compared the association of attempted suicide in students with NSSI, suicidal ideation and other psychiatric disorders such as anxiety, depression and BPD. The authors suggested NSSI ranked second only to suicidal ideation, concluding that the relationship between NSSI and attempted suicide is particularly strong.

In addition to the external factors associated with NSSI, the specific characteristics of the behavior itself influence the severity of the condition. According to Kiekens et al. (2018), the diagnostic cut-off defined by "Criteria A" of the DSM 5 (≥ 5 self-injury episodes in past year) was the factor most associated with differences in prevalence and occurrence of the behavior. In the present study, when applying only Criteria A of the DSM 5, a stronger association was found between recurrent NSSI and previous mental disorder and suicidal behavior than between sporadic NSSI and these conditions. This finding highlights the importance of in-depth investigation of this behavior in patients engaging in repetitive self-mutilation.

Regarding the seeking of medical attention for the problem, the literature demonstrates a link between greater NSSI severity and seeking of professional help. Studies have shown that DSM-5 diagnosed patients (i.e. more severe cases) sought more help than single or sporadic NSSI patients or clinical control subjects (Zetterqvist, 2015; Lewis et al., 2012). These findings underscore the importance of inclusion of NSSI in the DSM 5 in order to promote standardization and diagnostic investigation and in recognition of the severity of the behavior, especially in cases fulfilling the criteria defined by the manual.

Concerning other characteristics underlying NSSI, this study showed that over 90% of self-injurers reported that the immediate purpose behind self-harming was to seek relief from negative emotions or achieve a positive emotional state. This result is consistent with the findings of previous studies showing that emotional regulation was the main reason cited by self-injurers (Klonsky, 2007; Hooley and Franklin, 2018). Determining the characteristics related to self-harm acts is as

important as identifying the underlying diagnosis, given that some aspects are more strongly associated with suicidal behavior and can also allow interventions to address the meaning of the behavior for the individual.

Another novel finding in this study relates to the descriptive question on how students learned self-harming behavior. In contrast with reports in the literature, the present study found that NSSI was not a solitary behavior, since over 60% of the students stated they had learned the behavior from friends, family member or on social media platforms. Social media networks as a source for the behavior has become a focus of the International Society for the Study of Self-injury (ISSS), which has acknowledged the emergence of self-injurious behavior on the internet and the need to further investigate this area.

The data collected in this study serve to address a gap in the literature by exploring NSSI in Brazilian university students. Moreover, the study represents the largest Brazilian study on the subject in the literature to date, conferring greater reliability to the results found.

With regard to the sociodemographic and student data, some of the contributions warrant attention, such as the description of NSSI and associated features in ethnic or racial minority groups. There is clearly a need for further studies addressing this topic.

Regarding NSSI management, both the behavior characteristics and DSM5 diagnostic criteria should be investigated in clinical settings, given that such cases are associated with greater severity and risk of suicide. To this end, in-depth investigation of NSSI in clinical consultations should involve questions gathering information on the number of NSSI episodes in the past year and on the meaning of the self-harm act for the individual. Early detection of NSSI can be crucial in limiting sequelae and in preventing more serious cases of self-harm.

Declaration of Competing Interest

None.

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