

Adolescent non-suicidal self-injury (NSSI) in German-speaking countries: comparing prevalence rates from three community samples

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Abstract

Purpose Non-suicidal self-injury (NSSI) has been recognized as a significant mental health problem in adolescence with high prevalence rates. To date, there are few studies that compare rates of adolescent NSSI between different countries. Thus far no prevalence rates of adolescent NSSI have been reported for Austrian or Swiss community samples.

Methods This study aimed to assess and compare rates of adolescent NSSI in school samples from Austria, Germany and Switzerland using the same assessment instrument (Ottawa Self-Injury Inventory; OSI).

Results Within these countries, 6-month prevalence rates between 7.6 and 14.6 % were found, with rates showing

significant differences between countries ($\chi^2 = 16.54$, $p = 0.02$).

Conclusions These results demonstrate with some variability the significant rates of NSSI in youth in a cross-country study.

Keywords Non-suicidal self-injury · NSSI · Deliberate self-harm · Prevalence · Adolescents

Introduction

Non-suicidal self-injury (NSSI) is a significant health concern among adolescents with rates around 19 % in community samples [1] and rates between 32 and 50 % in hospitalized adolescents [2]. When reviewing prevalence rates in the literature, comparability is impaired by differing definitions and/or combining non-suicidal and suicidal intent. Terms most widely used to describe self-injuring behaviour include NSSI and deliberate self-harm (DSH). Whereas NSSI is defined as “purposely inflicting injury that results in immediate tissue damage, done without suicidal intent and not socially sanctioned within one’s culture” ([3], p. 4), DSH also includes indirect forms of self-harm such as ingesting higher doses of medication than prescribed and is not specific regarding suicidal intent [4, 5]. Currently, NSSI is not in the classificatory systems of DSM-IV or ICD-10 as a distinct entity, but does exist as a symptom of borderline personality disorder (BPD). Recently, attempts have been undertaken to include a NSSI disorder in the upcoming DSM-5 [6–8]. NSSI usually starts around the age of 12–14 years [9], with declining rates in early adulthood [10]. It was reported from a community sample, that, in adolescents, NSSI was associated with both legal and illegal drug use, aggressive behaviour, poor

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family relationships, somatic complaints, poor school performance and social isolation [11].

Multi-country studies thus far have mainly focused on comparing rates of DSH. Portzky et al. [12] showed a 2.8 times higher rate of DSH comparing 4,431 Belgian versus 4,458 Dutch adolescents (life-time prevalence: 10.4 vs. 4.1 %, respectively). It has been argued that rates of DSH vary due to differing rates of suicidal behaviour by country [13], as DSH includes diverse self-injuring behaviours, regardless of their suicidal intent, and rates of suicide attempts show the same pattern for Belgium and the Netherlands. In a large cross-national comparison ($n = 30,477$, age range 14–17 years) of seven countries (Australia, Belgium, England, Hungary, Ireland, the Netherlands, Norway), rates of DSH were reported as part of the Child and Adolescent Self-harm in Europe (CASE) study [4]. The authors reported a 1-year DSH prevalence of 8.9 % for females and 2.6 % for males and a lifetime prevalence of 13.5 and 4.3 %, respectively. Lifetime prevalence rates between 2.4 and 6.5 % for males and between 5.7 and 17.0 % for females have been reported [4]. Another study reported on DSH rates from an adolescent US and Australian sample ($n = 3,332$) with a combined 1-year prevalence of 3.7 % definite DSH and 5.0 % probable DSH, but did not differentiate rates between the countries [14].

Recently, a systematic review reported a mean lifetime prevalence rate of 18.8 % in adolescents across 53 studies [1]. However, comparison of rates is weakened by the usage of different assessment tools and strategies. To date, few studies have compared rates of NSSI in adolescent samples between countries using the same assessment instruments [13, 15]. In a study comparing a sample of German high school students ($n = 665$) and an age matched sample of 540 students from the U.S. Midwest no difference of NSSI prevalence was found [13]. In the preliminary reporting of the “Saving and Empowering Young Lives in Europe” (SEYLE) study, which compared risky behaviour in adolescents from 11 European countries, the highest rates of repetitive NSSI were from Germany [15]. To the best of our knowledge, there are no additional cross-country comparisons of NSSI, nor are there any reports of NSSI prevalence rates from Austrian or Swiss adolescents.

Comparing different countries and mental health and youth welfare systems is important, as it is one possibility to describe and compare different ways of prevention and intervention and find out essential and specific predictors for successful treatments and effective prevention in different mental health systems. As the literature on DSH has shown huge differences of prevalence rates even between neighbouring countries, it remains unclear, whether these differences are present with regards to NSSI as well. As it can be hypothesized, that DSH prevalence might be influenced by prevalence rates of suicidality, it is

worthwhile to pursue comparing rates of NSSI and setting them into context with the available data from DSH and suicide research. The use of a standardized tool, that is open-accessible to researchers, can strongly support the field of epidemiological research allowing for more valid comparisons between different nations. Since NSSI seems to have become a world-wide phenomenon among adolescents [1], but only few studies are available from non-westernized countries so far, making an assessment tool available, might support creating a world-wide picture of NSSI. The aim of this study was to assess and compare rates of adolescent NSSI in school populations from three German-speaking countries within close geographic proximity, using the same assessment instrument.

Methods

Study procedures

Study samples were assessed independently in Austria, Germany and Switzerland by researchers at the Universities of Vienna (CJF, BR), Ulm (PLP) and Basel (MS).

All parts of the studies received IRB approval in their respective country. In all countries, adolescents could only take part in the study with the approval of their caregivers. This was secured by collecting signed informed consent forms from the caregivers and signed assent forms from the students before handing out the questionnaires. The survey was promoted in the classroom as a study of NSSI and information was provided to adolescents in their classrooms. Assessment took place during summer term, so that answers pertaining to 1-month prevalence referred to school and not vacation time. The anonymous questionnaires were conducted by paper and pencil and collected by the researchers who were present to answer any questions while participants filled out the questionnaires. Only students reporting NSSI were included in the further analysis of the OSI.

Participants

Students in the ninth grade from different schools in the respective countries were asked to participate in the current study. Out of a sample of 1,339 students (mean age 14.99, SD 0.79) who participated in the study, 252 (18.8 %) completed the OSI (mean age 14.98, SD 0.81) and identified themselves as having injured themselves within the last month or within the last 6 months (see Table 1 for details). More female students participated in the overall study ($\chi^2 = 2$, $p < 0.01$). A trend was seen towards more females reporting NSSI, although this was not statistically significant ($\chi^2 = 5.57$, $p = 0.06$).

Table 1 Gender and age of participants of the study and for students with NSSI

Participants	Austria <i>n</i> (%)	Germany <i>n</i> (%)	Switzerland <i>n</i> (%)	Total <i>n</i> (%)
Male	54 (23.8)	285 (42.9)	234 (52.3)	573 (42.8)
Female	173 (76.2)	380 (57.1)	213 (47.7)	766 (57.2)
Total	227	665	447	1,339
Mean age (SD)	15.60 (0.91)	14.81 (0.66)	14.96 (0.74)	14.99 (0.79)
Participants with NSSI				
Male	3 (10.7)	55 (29.9)	8 (20)	66 (26.2)
Female	25 (89.3)	129 (70.1)	32 (80)	186 (73.8)
Total	28	184	40	252
Mean age (SD)	15.79 (0.96)	14.82 (0.69)	15.13 (0.88)	14.98 (0.81)

Assessment

Ottawa self-injury inventory (OSI; [16]). The OSI is a 21-item self-report questionnaire assessing for NSSI in great detail. The OSI addresses 1- and 6-month prevalence of occasional and repetitive NSSI as well as the context of NSSI, functions, alternative coping strategies and potential addictive features. 1- and 6-month prevalence are assessed by asking how often acts of NSSI were present within this timeframe (“How often in the past month/in the past 6 months have you actually injured yourself without the intention to kill yourself?”).

This questionnaire has been used in both inpatient [16] and community samples [17] and is recommended as a thorough assessment, which may assist in treatment planning [18]. Good test re-test reliability has been shown in an adolescent outpatient sample [19]. Recently, Cloutier et al. [20] reported a four-factor structure with loadings between 0.79 and 0.66 and an internal consistency of 0.89. When we assessed the internal consistency in our German version of the OSI, we found internal consistency to be satisfactory, with a Cronbach’s Alpha between 0.86 and 0.89 for the factor structure proposed by Cloutier et al. [20]. We adopted a translation and re-translation procedure using a bilingual native speaker for retranslation to assure for comparability with the original scale. As the OSI assesses potential addictive features of NSSI, participants were asked for DSM-IV criteria for addiction with regards to NSSI. Due to school authorities’ requests and IRB regulations, not all questions in the OSI were utilized in all countries, i.e., it was not possible to obtain data on suicidal ideation and attempts from the Swiss sample. This study therefore compares items that were recorded across all three countries.

Data analysis

Data analysis was performed by using Chi-square tests to compare rates of NSSI between samples. If the cell counts were less than five, Fisher’s exact tests were used instead of

Chi-square test, so no Chi-square values are reported in those cases. Analysis was performed using SPSS Version 19.

Results

In comparing self-injury acts, significant differences appeared between countries both for 1- ($p = 0.03$) and 6-month prevalence rates ($p = 0.02$), with highest rates reported in Germany and lowest in Switzerland. Thoughts about NSSI did differ significantly between countries, both within the last month (Fisher’s exact test = 40.48, $p < 0.01$), and within the last 6 months (Fisher’s exact test = 63.66, $p < 0.01$) (see Table 2 for details).

Participants were asked how they first encountered the idea to injure themselves with most stating that it was their own idea (42.9 %), followed by having had heard about it from others (17.1 %), by seeing it happen in a movie or on television (4.4 %) or reading about it (3.6 %). The majority indicated that they let some people know about their NSSI (48.4 %), while 29 % reported not telling anyone and only 2.4 % answering that they let know most people about it (missing 20.2 %). The majority did not report that the urge to self-injure was distressing (Table 2).

With regards to events leading up to NSSI, participants were asked whether they injured themselves after stressful things had happened, with 29 % stating never, 42.9 % stating sometimes, 10.7 % stating usually and 3.6 % always. Asked for stressful situations leading up to NSSI (multiple answers possible), 74 participants stated abandonment, 47 failures, 26 loss, 21 rejection and 32 stated other reasons. Most of the participants answered that thinking about NSSI did not necessarily lead to action (69.4 %), with only 10.3 % stating that NSSI always followed after thinking about NSSI (no answer 20.2 %). Time between thinking about NSSI and a self-injuring act was typically (42.5 %) short (less than 1–5 min), with fewer participants reporting longer dwelling on the thoughts

Table 2 Rates of NSSI acts, urges or thoughts to NSSI and characteristics of urges to self-injure by country and combined

	Austria (%)	Germany (%)	Switzerland (%)	Total (%)
NSSI acts: 1 month				
None	211 (93)	599 (90.1)	426 (95.3)	1,236 (92.3)
Once	14 (6.2)	46 (6.9)	14 (3.1)	74 (5.5)
Weekly	1 (0.4)	16 (2.4)	6 (1.3)	23 (1.7)
Daily	1 (0.4)	4 (0.6)	1 (0.2)	6 (0.4)
NSSI acts: 6 month				
None	202 (89)	572 (86)	413 (92.4)	1,187 (88.6)
1–5 times	20 (8.8)	71 (10.7)	22 (4.9)	113 (8.4)
Monthly	2 (0.9)	13 (2)	4 (0.9)	19 (1.4)
Weekly	3 (1.3)	9 (1.4)	7 (1.6)	19 (1.4)
Daily	0 (0)	0 (0)	1 (0.2)	1 (0.1)
NSSI thoughts 1 month				
None	205 (90.3)	546 (82.1)	419 (93.7)	1,170 (87.4)
Once	14 (6.2)	92 (13.8)	18 (4)	124 (9.3)
Weekly	4 (1.8)	21 (3.2)	8 (1.8)	33 (2.5)
Daily	4 (1.8)	6 (0.9)	2 (0.4)	12 (0.9)
NSSI thoughts 6 months				
None	199 (87.7)	505 (75.9)	409 (91.5)	1,113 (83.1)
1–5 times	15 (6.6)	123 (18.5)	19 (1.3)	157 (11.7)
Monthly	5 (2.2)	15 (2.3)	11 (2.5)	31 (2.3)
Weekly	5 (2.2)	15 (2.3)	5 (1.1)	25 (1.9)
Daily	3 (1.3)	7 (1.1)	3 (0.7)	13 (1)
Urge to self-injure is distressing				
No	15 (53.6)	103 (56)	15 (37.5)	133 (52.8)
Yes	13 (46.4)	56 (30.4)	23 (57.5)	92 (36.5)
No answer	0 (0)	25 (13.6)	2 (5)	27 (10.7)
Urge to self-injure is comforting				
No	20 (71.4)	129 (70.1)	22 (55)	171 (67.9)
Yes	8 (28.6)	24 (13)	16 (40)	48 (19)
No answer	0 (0)	31 (16.8)	2 (40)	33 (13.1)
Urge to self-injure is invasive				
No	14 (50)	93 (50.5)	20 (50)	127 (50.4)
Yes	14 (50)	61 (33.2)	19 (47.5)	94 (37.3)
No answer	0 (0)	30 (16.3)	1 (2.5)	31 (12.3)

(20.3 % between 6 min and 1 h and 14.6 % letting pass hours to days between thoughts and actions). After an NSSI act, 16.7 % stated that they never experienced a release of tension, 33.7 % sometimes, 12.7 % usually and 11.9 % always. Asked whether they experienced physical pain when injuring themselves, 13.1 % reported never feeling pain, 43.3 % sometimes, 9.9 % usually and only 11.5 % stated that they always felt pain.

In terms of addictive features, a fifth of students with NSSI reported that the severity had increased (Table 3). A proportion (21 %) of students endorsed at least three items for addictive features, with no differences found between countries (Fisher's exact test: $p = 0.392$). Students were asked to grade on a five-point Likert scale how motivated they felt to stop NSSI, with 26 (10.32 %) of the students stating that they felt not motivated at all and 77 (30.56 %) considering themselves to be extremely motivated. When asked if there was anything that helped when trying to resist and abstain from NSSI, only 23 (9.13 %) reported that they had never tried to resist. Helpful activities included (in descending order): reading/writing/music/dance (90, 35.71 %), exercise/sports (79, 31.35 %), watching television/playing video or computer games (74, 29.37 %), talking with someone (73, 28.97 %), doing anything to keep hands busy (49, 19.44 %), doing things to relax (e.g. hot bath, yoga, deep breathing) (47, 18.65 %), and other things (36, 14.29 %). A number of students reported using alcohol/street drugs to avoid acting of NSSI thoughts (40, 15.87 %).

Discussion

This study is the first to compare prevalence rates of NSSI in all German-speaking countries using the same assessment instrument in adolescent school samples. Overall, 18.8 % of the participants reported having injured themselves within the last 6 months. This finding is in line with reports from other countries [1] for studies on the lifetime prevalence of NSSI in adolescents in community samples. In a previous study on DSH in Germany, 10.9 % of the adolescent sample reported a 1-year prevalence of occasional DSH (1–3 times) and 4 % of repetitive DSH (4 or more times) [21]. In this study, 10.7 % of adolescents reported NSSI one to five times within the last 6 months and 3.4 % reported injuring themselves more often, thus suggesting that there is high consistency in rates of repetition of DSH and NSSI, a finding that has been reported from a systematic review of prevalence studies of NSSI and DSH in adolescence [1] as well.

In comparing the three countries studied, the highest rates of NSSI, both for 1- and 6-month prevalence, were reported in Germany and lowest were reported in Switzerland. This is in line with recent findings from the SEYLE study (comparison of 11 participating European countries and Israel) showing that repetitive NSSI is most prevalent in adolescents from Germany [15]. Despite similar rates of NSSI having been reported in a comparison of US and German adolescents [13], differences between neighbouring countries have been demonstrated previous with regards to DSH [12]. One argument for a lower

Table 3 Addictive features of NSSI

	Austria (%)	Germany (%)	Switzerland (%)	Total (%)
NSSI occurs more often	3 (10.71)	28 (15.22)	10 (25)	41 (16.27)
Severity increases	10 (35.71)	27 (14.67)	15 (37.5)	52 (20.63)
Need for more frequent or intense NSSI for same effect	6 (21.43)	16 (8.7)	6 (15)	28 (11.11)
NSSI or thinking consumes significant amount of time	4 (14.29)	17 (9.24)	11 (27.5)	32 (12.7)
Inability to stop	7 (25)	19 (10.33)	12 (30)	38 (15.08)
Continuation despite recognizing harmfulness	7 (25)	28 (15.22)	14 (35)	49 (19.44)
Other important activities reduced or stopped for NSSI	3 (10.71)	9 (4.89)	2 (5)	14 (5.56)

Percentages refer to students with NSSI in the different groups

prevalence of NSSI in Switzerland could be that private grammar schools took part in the Swiss study. The rate of students in private grammar schools in the sample matches the rate in the school statistics of the canton Basel city. For this reason, it was important to include this sample to admit the actual prevalence in Basel. However, a study by Yates et al. [22] showed that even in the middle and upper class in the USA, NSSI was very frequent (37.2 %) and it was reported from a German sample that type of housing, the financial situation or the type of schooling was not associated with repetitive DSH [21].

Whereas Portzky et al. [12] discussed a relationship between higher rates of DSH in Belgian adolescents and higher rates of suicide in this country, the trends found in our study do not correspond to the overall rate of suicide, according to the WHO, with Germany having the lowest rates (11.9/100,000 in 2006), Austria being in the middle (15.2/100,000 in 2009) and Switzerland having the highest rates (18/100,000 in 2007). Suicide rates in younger age groups cannot explain the reported pattern, with Austria having 0.9/100,000 suicides in the age group below 15 and 8.1/100,000 in the age group 15–24 years, Switzerland 0.5/100,000 in the age group below 15 and 12.2/100,000 in the age group between 15 and 24 and Germany, again, having the lowest rates (0.4/100,000 in the age group below 15 and 5.9/100,000 in the age group between 15 and 24), according to WHO statistics. Thus, the rates of NSSI in this study do not correspond with rates of suicide as reported by Portzky et al. [12]. One possible explanation is that in the study of Portzky et al. [12], DSH was assessed without regards to suicidal intent, whereas in our study participants were asked regarding NSSI (without suicidal intent).

Asked for events leading to NSSI, 71 % of the students stated that stressful events preceded NSSI “sometimes” to “always”. This may be best understood in the light of the integrated theoretical model of NSSI proposed by Nock [9], describing NSSI as an act to regulate upcoming stress. In a real-time ecological momentary assessment (EMA) study of 30 adolescent and young adults with NSSI, participants described feeling of rejection, anger, self-hate or a numb feeling before NSSI [23], which seems comparable to our findings. With regards to resisting the urge of NSSI (which a majority has tried to), participants most often actively or passively tried distracting themselves or communicating with others. This is consistent with the findings of Nock et al. [23] who reported that adolescents and young adults in their EMA study most often tried changing their thoughts, talking to someone or distracting themselves. This is an interesting and—seemingly consistent—finding, showing that active ways of coping, such as distraction or actively engaging others in communication, can help to stop acting on urges. This is relevant to therapy and could lend further evidence of the proposed role of sport in the treatment of NSSI [24].

Addictive features were found in a small but significant number of participants considering that this is a community-based sample. According to Nixon et al. [16], 97.6 % of their sample endorsed three or more addictive symptoms. Differences in these findings can be explained by the different samples. Whereas Nixon et al. [16] reported from a sample of adolescent psychiatric patients, we assessed a community sample of students that were able to attend school, thus showing a relatively high level of functioning. However, there seems to be a small subgroup who, even in this community sample, reported addictive properties of NSSI.

Interestingly, nearly 41 % stated that they felt “very” to “extremely” motivated to stop NSSI. This is an interesting finding, given that so far there are only few studies on the psychotherapeutic treatment of NSSI in adolescents, with often conflicting results, mounting up to rather little evidence [25]. The high number of adolescents injuring themselves but, feeling motivated to stop this behaviour should encourage efforts to develop new methods of treatment. An early intervention is also of utmost importance, given the finding, that patients with higher frequency of NSSI (who also had the longest history of NSSI) showed highest level of health and social care costs in the long run [26], thus trying to stop NSSI at a young age seems crucial.

Some limitations apply to the present study. First, not all questions could be assessed in all countries due to school authorities or IRB regulations. Based on this, we could only compare items that were assessed in the same way in all countries. Furthermore, sampling effects could not be excluded and differences in the school systems may have

some influences on sample characteristics. Secondly, it could be argued that the announcement of the project as a study on NSSI and suicidality could have led to either over- or undersampling of students with NSSI. Tigges et al. [27] found that there is a tendency for people affected by the behaviours in question to avoid such studies. However, rates collected in our study are comparable to rates reported from studies in Germany with different methodology [21].

In conclusion, this is the first study to assess and compare rates of NSSI in all German-speaking countries, using the same instrument. The high rates reported from our samples emphasize the need for new research and development of prevention, early intervention and treatment programs. Currently very limited research exists in this area [28–30]. Since NSSI has been described as a risk factor for suicidal behaviour in recent research [31], interventions aiming at decreasing NSSI may have the potential to have an impact on suicide attempts. It is important to understand more about the differences between countries in order to interpret international studies, especially if there are greater cultural distinctions between countries and translated questionnaires. A culturally informed way of assessment can contribute to a more reliable evaluation in future studies, allowing for larger sample sizes and differentiation of sub-groups. Information in regards to specific subgroups of NSSI can lead to the development of therapeutic interventions and prevention efforts specifically tailored for individual requirements. Information gained about cross-cultural differences may aid to foster an understanding on why NSSI prevalence is different even in neighbouring countries, hoping that these facts contribute to tailoring new ways of prevention.

Conflict of interest None.

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