

Non-suicidal self-injuries in a sample of Mexican university students

Everardo Castro Silva,¹ Corina Benjet,² Francisco Juárez García,² Samuel Jurado Cárdenas,¹ María Emilia Lucio Gómez-Maqueo,¹ Alejandra Valencia Cruz¹

¹ Facultad de Psicología, Universidad Nacional Autónoma de México, Ciudad de México, México.

² Dirección de Investigaciones Epidemiológicas y Psicosociales, Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Ciudad de México, México.

Correspondence:

Everardo Castro Silva
Facultad de Psicología, Universidad Nacional Autónoma de México.
Av. Universidad 3004, Copilco-Universidad, Ciudad Universitaria, C.P. 04510, Ciudad de México, México.
Phone: +52 (55) 1385-5035
Email: curgos@hotmail.com

Received first version: August 16, 2016

Second version: September 4, 2017

Accepted: September 7, 2017

doi:10.17711/SM.0185-3325.2017.025

ABSTRACT

Introduction. Non-suicidal self-injuries (NSSI) are a worldwide health problem that affects principally young people, and can impact negatively the mental and physical health of those that self-injure. **Objective.** To examine the frequency of NSSI in 564 undergraduate students (132 male, 432 female) from Mexico City and the association of NSSI with depressive symptoms, anxiety, impulsivity, self-efficacy, and emotion regulation. **Method.** A convenience sample of 564 undergraduate students (aged 17-26 years) from eight universities in the Mexico City metropolitan area completed a survey in their classrooms. **Results.** Of the total sample, 30.9% had experimented at some point in their lifetime with NSSI on one to four occasions, while 26.9% had recurrent NSSI (i.e., five or more occasions). Nearly eleven percent self-injured in the prior 12 months. The NSSI most often reported among those who self-injured was cutting oneself (48.0%). Recurrent self-injurers reported higher levels of depression and impulsivity, and less self-efficacy than those who had experimented with such behaviors or without any lifetime NSSI. While 54.4% perceived the need for professional help, only 18.1% sought professional services. **Discussion and conclusion.** NSSI is a hidden problem in the college population in Mexico City which needs to be addressed by university administrators and mental health professionals. Depressive symptomatology, impulsivity, and self-efficacy are factors that should be considered when developing preventive intervention strategies.

Keywords: Depressive symptoms, anxiety, mental health, self-injurious behavior, university students.

RESUMEN

Introducción. Las autolesiones no suicidas (ANS) son un problema mundial de salud que afecta principalmente a jóvenes, y puede impactar de manera negativa la salud mental y física de la persona que se autolesiona. **Objetivo.** Examinar la frecuencia de ANS en 564 estudiantes de licenciatura (132 hombres, 432 mujeres) de la Ciudad de México y la asociación de las ANS con síntomas depresivos, ansiedad, impulsividad, autoeficacia y regulación emocional. **Método.** Una muestra de conveniencia de 564 estudiantes universitarios (edades 17-26 años) de ocho universidades del área metropolitana de la Ciudad de México completó una encuesta en sus salones de clases. **Resultados.** Del total de la muestra, 30.9% se habían infligido ANS de manera experimental de una a cuatro ocasiones, mientras que 26.9% presentaron ANS recurrentes (cinco o más ocasiones) en algún momento en su vida. Casi once por ciento reportaron ANS en los 12 meses previos. Las ANS reportadas con mayor frecuencia entre aquellos que se autolesionaron fueron cortarse a sí mismos (48.0%). Las personas con autolesiones recurrentes reportaron mayores niveles de depresión e impulsividad, y menos autoeficacia que aquellas que habían experimentado con estos comportamientos o sin ninguna historia de ANS en su vida. Aunque 54.4% percibían la necesidad de atención, solo 18.1% buscaron servicios profesionales. **Discusión y conclusión.** Las ANS son una problemática oculta en la población universitaria de la Ciudad de México, la cual necesita ser atendida por las autoridades universitarias y los profesionales de la salud. La sintomatología depresiva, impulsividad y autoeficacia son factores que se deben considerar para desarrollar estrategias preventivas.

Palabras clave: Sintomatología depresiva, ansiedad, salud mental, conductas autolesivas, estudiantes universitarios.

INTRODUCTION

Mental health problems are as prevalent among university students as they are in their non-university-attending same age peers (Blanco et al., 2008). In a study of surveys carried out in 21 countries, an estimated 20% of university students met criteria for a mental disorder (Auerbach et al., 2016). In the case of the Mexican university population, Melo-Carrillo, Van Oudenhove and López-Avila (2012) found that among Mexican medical students 36.29% of the students scored positive for depressive symptoms. In another study, there was a significant increase in the consumption of both alcohol and tobacco in transitioning from secondary school to university (Alvear-Galindo et al., 2015). Other mental health problems that have been researched among Mexican university students are eating disorders, suicide ideation, drinking problems, and post-traumatic stress disorder (Chávez-Rosales, Camacho, Maya, & Márquez, 2012; Díaz et al., 2008; Mendoza, Márquez, Guadarrama, & Ramos, 2013; Moreno & Ortiz, 2009; Rosales, Córdova, & Ramos, 2012). However, as far as we know, non-suicidal self-injuries (NSSI) have not been studied in the Mexican university population.

NSSI, conceptualized as the deliberate destruction or alteration of body tissue without the intent to die (Klonsky, 2007), like cutting or burning oneself, is a growing public health problem worldwide. NSSI are used for a variety of functions or motivations, like affect-regulation or self-punishment (Klonsky, 2007). It has also been hypothesized that the brain structures involved in processing the cognitive and emotional components of pain are altered in those that engage in NSSI indicated by an anomaly in the integration of pain as a conscious experience conceived of as unpleasant (Mendoza & Pellicer, 2002). Most research in this area has been conducted with adolescents (Jutengren, Kerr, & Statin, 2011; Whitlock, Eckenrode, & Silverman, 2006; You, Leung, & Fu, 2011) and university students (Tsypes, Lane, Paul, & Whitlock, 2016; Whitlock et al., 2011; Yurkowski et al., 2015). The international prevalence in young adults (from Asia, Australia/New Zealand, Canada, Europe, United Kingdom, and the USA) is 13.4% (Swannell, Martin, Page, Hasking, & St John, 2014). NSSI can have negative consequences, like scars and infections, guilt, shame, and possible rejection of parents and peers (Wilkinson & Goodyer, 2011). Also, high rates of NSSI have been associated with severe psychopathology, such as depression, anxiety, borderline personality, drug abuse, and eating disorders as well as an increased risk of suicidal attempts (Bresin & Gordon, 2013; Klonsky & Olino, 2008). Some studies have reported that few people seek professional help for NSSI, which limits the possibility of intervention (Whitlock et al., 2006).

Some of the research on college students has found relations between NSSI and different psychological variables. Yurkowski et al. (2015) found that the quality of parent-child relationships had a more relevant impact on

prediction of NSSI than the quality of peer relations, and that the feelings of alienation of both parents and peers had indirect effects on NSSI through deficits of emotion regulation. Another study in university students found that there is a continuum between NSSI and suicidal self-injury, and the differences are in degree rather than in kind (Orlando, Broman-Fulks, Whitlock, Curtin, & Michael, 2015). Whitlock et al. (2011) report that in a sample of college students the lifetime prevalence of NSSI was 15.3%. Females were more likely to self-injure because they were upset or in the hopes that somebody would notice them, whereas males were more likely to report anger or intoxication as a motivation. Also, disclosure of NSSI was low among both sexes, because only 8.9% disclosed their self-injuries to a mental health professional. Kharsati and Bhola (2014) found that the most common method of NSSI was self-hitting (15.2%), followed by cutting or carving skin (13.2%). Self-efficacy has been found to be related to depressive and anxiety symptoms and in one study to mediate the relation of stressful life events with depression and anxiety symptoms (Maciejewski, Prigerson, & Mazure, 2000; Muris, 2002). We therefore consider that self-efficacy could be a relevant variable in the study of NSSI.

Currently, there is limited data from developing countries, which hinders the efforts to have a broader picture of the problem and coordinate efforts to address this health issue (Muehlenkamp, Claes, Havertape, & Plener, 2012). There is scarce information from Latin America in general and Mexico in particular; in Mexican adolescents some studies have found prevalences between 5.6 to 17.1% (Albores-Gallo et al., 2014; González-Forteza et al., 2005). One study in a clinical sample with adolescents found that self-injury was present in high frequencies in female patients, with low socioeconomic status and a history of family violence (Ulloa, Contreras, Paniagua, & Figueroa, 2013). Currently we do not have any estimates of the prevalence of NSSI in Mexico in the general population of young adults, or in the college population in particular. It is important to have more information about how NSSI are present in the Mexican population in order to guide relevant strategies of intervention.

Therefore, the objective of the current investigation is to evaluate a sample of university students in Mexico City, a group for which there is no prior data that we are aware of with regards to NSSI, in terms of frequency, types of self-injury, gender differences, and correlations with psychological variables like depressive symptoms, anxiety symptoms, impulsivity, self-efficacy, and emotional regulation.

METHOD

Sample

A convenience sample of 564 undergraduate students (aged 17 to 26 years) from eight universities and different areas

of study (mostly from psychology) in the Mexico City metropolitan area participated in a survey administered in their classrooms between 2012 and 2013. Two universities were public and six private. To calculate the sample, we used the golden rule, i.e., 10% of the population of approximately 6,000 undergraduate students (Ávila et al., 2009).

Measures

Non-suicidal self-injury: NSSI were assessed using the 16 questions about self-injurious behaviors of the Deliberate Self-Harm Inventory (DSHI) by Gratz (2001). The answer format was modified to indicate, for each NSSI behavior, the lifetime frequency of the behavior, on a 5-point scale (0, 1, 2-4, 5-10, 11, or more occasions). To adapt the scale to Mexico, the scale was translated by two bilingual psychologists, one a native Spanish speaker and the other a native English speaker. They reached a consensus for possible discrepancies in the translations. Also, two questions were added: one asked how many times during the last 12 months they had self-injured, and the other asked their age the first time they engaged in self-injury (which was then categorized as 10 years of age or less, between 11-17 years of age, and 18 years of age or older in order to evaluate if onset was before, during, or after adolescence given that the preponderance of the literature on NSSI is from adolescent samples).

Depressive symptoms: Depressive symptoms were assessed with the Center for Epidemiologic Studies Depression Scale (CES-D) which measures depressive symptomatology during the previous week (Radloff, 1977). The CES-D consists of 20 items measuring on a 4-point Likert scale the numbers of days in which the symptom was present: 0, 1-2, 3-4, or 5-7 days. In Mexico, this scale has been used extensively in research with adolescents and adults, showing adequate reliability (Cronbach's alphas between .79 and .86) and concurrent validity (Benjet, Hernandez-Guzman, Terce-ro-Quintanilla, Hernández-Roque, & Chartt-Leon, 1999; González-Forteza, Wagner-Echeagaray, & Jiménez-Tapia, 2012). In this study, Cronbach's alpha was .90.

Anxiety symptoms: The Generalized Anxiety Disorder 7-item Scale (GAD-7) by Spitzer, Kroenke, Williams, and Lowe (2006) was employed to measure generalized anxiety in the prior two weeks. It is a 7-item Likert type scale with four response options: never, several days, over half the days and nearly every day. The Spanish language version was adapted by García-Campayo et al. (2010), finding good internal consistency (Cronbach's alpha of .93) and strong content, criteria, and concurrent validity as assessed by interrater agreement, ROC curve analysis, and associations with other measures of anxiety and impairment. Cronbach's alpha for the scale in this study was .87.

Impulsivity: We measured impulsivity with the Plutchik Impulsivity Scale (IS) by Plutchik and Van (1989). This 13-item questionnaire assesses impulsivity on a 4-point Likert

scale (never, sometimes, often, almost always). In Mexico, this scale has been used in clinical populations who self-harm, with a reported internal consistency of .66 and adequate validity (Páez et al., 1996). In our sample Cronbach's alpha was .79.

Emotion regulation: We used the Emotion Regulation Scale to assess differences in two emotion regulation strategies: cognitive reappraisal and expressive suppression (Gross & John, 2003). 10 items are measured on a 7-point Likert scale, from 1 (strongly disagree) to 7 (strongly agree). Cabello, Salguero, Fernández-Berrocal, and Gross (2013) translated and adapted the scale to Spanish. They reported a two-factor structure with adequate internal consistency; the Cronbach's alphas were .75 for Expressive Suppression and .79 for Cognitive Reappraisal. Test-retest reliability over three months was .66 ($p < .0001$). Cronbach's alphas in this sample were .78 for cognitive reappraisal and .71 for expressive suppression.

Self-efficacy: The General Self-Efficacy Scale (Bäßler & Schwarzer, 1996) is a 10-item questionnaire measured on a 4-point Likert scale (not at all true, hardly true, moderately true, exactly true) and adapted to Spanish by Sanjuán, Pérez, and Bermúdez (2000) who reported good internal consistency (.87) and predictive validity. Cronbach's alpha in this study was .84.

Perceived need and help-seeking: Three questions were asked to measure whether those with NSSI perceived the need for professional psychological or psychiatric attention (Do you consider that your behaviors require psychological or psychiatric attention?), whether they ever sought professional psychological or psychiatric attention for NSSIs (Have you ever sought psychological or psychiatric help for your self-injury behavior?), and whether they were ever hospitalized or required medical attention for NSSIs (Did your self-injury behavior ever result in hospitalization or was serious enough to require medical treatment?). Answers were dichotomous (yes or no).

Procedure

After receiving authorization from the university, the students were contacted during school time. Following a brief introduction about the main aim of the study and obtaining informed consent, students completed the questionnaire battery collectively in their classrooms. Afterwards, information regarding services for psychological support was provided to each student.

Ethical considerations

Participants gave written informed consent. The study was approved by the Ethics committee of the Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz (National Institute of Psychiatry).

Table 1
Socio-demographic characteristics of the sample, 2012-2013

	<i>n</i>	%
Sex1		
Female	432	76.5
Male	132	23.4
Age (years)		
17 - 19	254	43.6
20 - 26	329	56.4
Area of study		
Psychology	499	85.6
Pedagogy	37	6.3
Medicine	33	5.7
Nursery	14	2.4

Note: There were 583 students, but 19 students' didn't report their sex.

Statistical analyses

All analyses were conducted with SPSS software, version 22 (SPSS Inc., Chicago, IL). First, descriptive analyses were conducted to estimate frequency for each individual type of NSSI and for any lifetime NSSI. Sex differences in having engaged in each type of NSSI were evaluated with the Chi square test. Participants were then categorized as having never engaged in NSSI, having experimented with NSSI (those engaging in the behavior one to four times), or having recurrent NSSI (five or more incidents of NSSI). The classification of experimental and recurrent NSSI is for the sum of all NSSI behaviors. This classification of NSSI was based on that of Sarno, Madeddu, and Gratz (2010).

Second, we conducted ANOVAs to analyze differences among those who have never engaged in NSSI, those who had experimented with NSSI, and those with recurrent NSSI with regards to psychological factors: depressive symptomatology, anxiety, impulsivity, self-efficacy, and emotional regulation (cognitive reappraisal and expressive suppression). The interaction of gender with NSSI group was evaluated for each psychological factor. When effects were found to be significant, post hoc comparisons (Tukey) were conducted to determine which groups differed.

Third, we performed a multinomial logistic regression to estimate the probability of NSSI given relevant clinical characteristics (using a one standard deviation cut-off point on the psychological factors). The multivariate model in-

cluded all the variables simultaneously in the same model. Finally, we performed chi squared tests to determine differences in perceptions of need and help seeking between experimental and recurrent self-injurers.

RESULTS

As shown in Table 1, the sample contained more female subjects (76.5%), most were psychology students (85.4%), and were largely young adults between 20 and 26 years of age (56.4%).

With respect to NSSI, during the prior 12 months, 10.9% of the sample self-injured between 1 and 50 times. The age of onset for NSSI among those with at least one self-injury was: 18.5% before the age of 11, 74.1% between 11 and 17 years of age, and 7.4% after 17 years of age. The frequencies of lifetime NSSI are shown in Table 2. Of the total sample, 42.1% never had any self-injury, whereas 30.9% experimented with NSSI at some point in their life and 26.9% engaged in the behavior recurrently. The most frequent NSSI behaviors in the sample among those who self-injure (Table 3) were self-cutting (48.0%), carving words into skin (44.6%), severe scratching (39.1%), punching self (39.1%), sticking sharp objects into skin (37.6%), and carving pictures into skin (33%). While there were no gender differences in overall self-injurious behaviors, more females engaged in self-cutting than males ($\chi^2 = 7.13; p < .01$) and more males engaged in burning themselves with cigarettes than females ($\chi^2 = 6.65; p < .01$).

Table 4 shows the means of the psychological characteristics (depressive symptoms, anxious symptoms, impulsivity, self-efficacy, cognitive reappraisal, and expressive suppression) by NSSI group and sex. The recurrent group had the highest levels of depressive symptomatology, anxiety, and impulsivity. Females had higher levels of depression and anxiety than males in all groups. Results of the ANOVAs are also presented on Table 4 showing a significant group effect for depressive symptoms, anxiety, impulsivity, and self-efficacy, a gender effect for depressive symptoms, anxiety, and self-efficacy, and an interaction effect for depressive symptoms only. Post hoc analyses reveal that those with recurrent NSSI had more elevated levels of anxiety, depression, and impulsivity and lower self-efficacy compared with those with experimental NSSI

Table 2
Frequencies of NSSI in the total sample and by sex, 2012-2013

	Male		Female		Total		χ^2	<i>p</i>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Without self-injury	(59)	45.11	(178)	41.20	(237)	42.12	.6	.72
Experimental (1 - 4 times)	(39)	29.32	(136)	31.48	(175)	30.97		
Recurrent (> 4 times)	(34)	25.56	(118)	27.31	(152)	26.90		

Table 3
Frequencies of specific NSSI behaviors among those who self-injure by sex, 2012-2013

	Male		Female		Total		χ^2	p
	n	%	n	%	n	%		
Cutting	(25)	34.2	(132)	51.9	(157)	48.0	7.1	< .01
Carving words into skin	(29)	39.7	(117)	46.0	(146)	44.6	.9	.33
Severe scratching	(26)	35.6	(102)	40.1	(128)	39.1	.5	.48
Punching self	(33)	45.2	(95)	37.4	(128)	39.1	1.5	.22
Sticking sharp objects into skin	(28)	38.3	(95)	37.4	(123)	37.6	.0	.88
Carving pictures into skin	(24)	32.8	(84)	33.0	(108)	33.0	.0	.97
Head Banging	(22)	30.1	(56)	22.0	(78)	23.9	2.0	.15
Interference with wound healing	(12)	16.4	(59)	23.2	(71)	21.7	1.5	.21
Burning with lighter or match	(17)	23.2	(53)	20.8	(70)	21.4	.2	.65
Biting	(10)	13.6	(53)	20.8	(63)	19.3	1.9	.17
Rubbing glass into skin	(9)	12.3	(39)	15.3	(48)	14.7	.4	.52
Burning with cigarettes	(15)	20.5	(24)	9.4	(39)	11.9	6.7	.01
Rubbing sandpaper on skin	(3)	4.1	(15)	5.9	(18)	5.5	.4	.55
Using bleach to scrub skin	(4)	5.4	(11)	4.3	(15)	4.6	.2	.67
Breaking bones	(4)	5.4	(12)	4.7	(16)	4.9	.1	.79
Dripping acid on skin	(2)	2.7	(2)	.7	(4)	1.2	1.8	.18

and those without NSSI. There were no significant differences between the experimental and non-NSSI groups for these characteristics. With regards to the interaction effect for depressive symptoms, only females, but not males in the recurrent group had higher levels of depressive symptoms. The three groups exhibited no significant differences in emotional regulation (either cognitive reappraisal or expressive suppression).

To estimate the odds of being in the experimental or recurrent groups of NSSI given high rates in the psychological correlates, a multivariate logistic regression analysis was conducted (Table 5). Those without NSSI were the comparison group for odds ratios (ORs). Those with elevated levels of depressive symptomatology had 1.7 times the odds of experimental self-injury (95% CI [.09, 2.76]) and 2.2 times of recurrent self-injury (95% CI [1.34, 3.60]). Subjects with high impulsivity were 2.78 times more likely to have engaged in recurrent self-injury (95% CI [1.74, 4.45]), while those with high self-efficacy had half the odds of recurrent self-injury (95% CI [.30, .78]). No significant associations for emotional regulation and anxiety were found.

Finally, we evaluated, the perception of need for psychological or psychiatric attention, actually seeking psychological or psychiatric attention, and hospitalization or medical attention for NSSI (Table 6). While 54.4% of those who engaged in self-injury perceived the need for psychological or psychiatric help, only 18.1% sought psychological or psychiatric attention, and 53.1% required hospitalization or medical attention. A greater proportion of those with recurrent NSSI sought psychological or psychiatric attention than those with experimental NSSI, whereas there was no difference between the recurrent and experimental groups with regards to perceived need or required hospitalization or medical attention.

DISCUSSION AND CONCLUSION

We found high lifetime frequencies of NSSI in this sample of Mexican university students, with 57.8% having reported at least one occasion of self-injury. This lifetime estimate is higher than others reported in college samples from other

Table 4
Means of psychological factors by sex and self-injury category, 2012-2013

Variable	Without NSSI		Experimental (1 - 4 times)		Recurrent (> 4 times)		Two-way ANOVA					
	Male	Female	Male	Female	Male	Female	Group		Gender		Interaction	
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	F (df)	p	F (df)	p	F (df)	p
Depression	11.8 (9.3)	12.5 (8.8)	10.7 (8.2)	16.8 (10.1)	14.7 (8.3)	21.0(10.8)	12.1 (2)	< .01	20.1 (1)	< .01	4.0 (2)	.01
Anxiety	5.4 (5.2)	6.4 (4.6)	4.7 (3.7)	7.6 (5.2)	7.1 (4.0)	9.4 (5.2)	8.2 (2)	< .01	17.4 (1)	< .01	1.7 (2)	.19
Impulsivity	12.4 (5.1)	12.1 (5.0)	13.3 (4.8)	13.9 (4.8)	16.5 (5.5)	16.4 (5.9)	21.2 (2)	< .01	.0 (1)	.88	.3 (2)	.73
Self-efficacy	31.1 (4.4)	29.8 (4.1)	30.8 (3.9)	29.2 (3.9)	30.2 (3.7)	27.0 (4.7)	6.1 (2)	< .01	22.2 (1)	< .01	1.9 (2)	.15
Expressive suppression	13.4 (4.5)	12.1 (5.1)	13.7 (5.1)	12.7 (5.4)	13.8 (5.8)	14.0 (5.2)	1.6 (2)	.21	1.8 (1)	.17	.8 (1)	.46
Cognitive reappraisal	23.6 (6.5)	21.8 (7.2)	21.4 (8.0)	22.5 (6.7)	24.5 (5.9)	22.5 (6.4)	1.5 (2)	.23	1.6 (1)	0.21	2.1 (2)	.12

Table 5
Results of a multivariate logistic regression analysis to evaluate the odds of experimental and recurrent self-injury given high levels of depression, anxiety, impulsivity, expressive suppression and cognitive reappraisal

Variables	Experimental NSSI N (175)			Recurrent NSSI N (152)		
	OR	95% CI	p	OR	95% CI	p
Depression	1.73	1.09 - 2.76	.02	2.20	1.34 - 3.60	.01
Anxiety	.76	.35 - 1.62	.47	.69	.32 - 1.47	.33
Impulsivity	1.37	.89 - 2.11	.14	2.78	1.74 - 4.45	.01
Self-efficacy	.84	.56 - 1.28	.43	.49	.30 - .78	.01
Expressive suppression	1.13	.59 - 1.34	.54	1.38	.88 - 2.17	.15
Cognitive reappraisal	.89	.59 - 1.34	.60	.90	.57 - 1.41	.66

Note: OR = Odds Ratio; 95% CI = 95% Confidence Interval.

countries that range from 7-35% (Duggan, Toste, & Heath, 2012; Gratz, 2001; Muehlenkamp et al., 2012; Whitlock & Knox, 2009). These studies in general have few or no Mexicans in their samples.

Given the emphasis on adolescent samples in much of the prior literature, it is interesting to note that the proportion of these emerging adults with NSSI in the prior 12 months, only 10.9%, was much lower than the lifetime proportion. These 12-month estimates are in the range found in other countries of 7.3% to 45.5% during the prior 12 months (Duggan et al., 2012; Muehlenkamp et al., 2012; Whitlock et al., 2006). This suggests that while a greater proportion of adolescents engage in NSSI than young adults, this continues to be a problem in emerging adulthood. This is further evidenced by the reported ages of onset. While most university students with a history of NSSI (74.1%) began to self-injure in adolescence (between 11 and 17 years of age), less (18.5%) reported initiating in childhood (before age 11) and even fewer (7.4%) initiated as young adults (18 years or older). As was the case in other studies, the most common self-injury behavior was cutting (Claes, Klonsky, Muehlenkamp, Kuppens, & Vandereycken, 2010; Klonsky, 2011).

Some have suggested that the number of persons that self-injure has risen in the last decade, especially among adolescents and young adults, although this may be due to greater attention on this behavior from the media and researchers (Auerbach et al., 2016; Klonsky, 2007). Multiple factors may account for the elevated rates of NSSI

among young adults. In Western societies, there is an increase in the acceptance of tattoos and piercings, and even if these behaviors are not considered NSSI, body modification, along with chats and web sites dedicated to self-injury, may have an impact upon the “normalization” of self-injury behavior (Favazza, 2009). Peer learning and the media can be relevant for the increase of NSSI, because the number of references to self-injury has increased in songs, movies, press, and internet during the last decade (Favazza, 2009). Internet sites that share or promote experiences of NSSI have risen and this could influence emotionally vulnerable young adults (Favazza, 2009; Whitlock et al., 2006). The increased exposure to NSSI may increase the probability for self-injury in such a way that social influences in college students should be taken into account (Muehlenkamp, Hoff, Licht, Azure, & Hasenzahl, 2008). Multiple factors can affect the vulnerability of young adults, from emotional regulation problems, body image, depression, impulsivity, child abuse, anxiety, substance abuse, borderline personality disorder, and suicide attempts among other factors (Brown, 2009; Duggan et al., 2012; Klonsky, 2007; Klonsky & Olino, 2008; MacLaren & Best, 2010).

Adolescence and young adulthood are stages that involve new responsibilities, more demands and stressors, and physical, cognitive, and neurological changes, so it is possible that young people are particularly vulnerable to the development of NSSI when they cannot cope with environmental demands. NSSI appear to fulfill different functions

Table 6
Perceived need, help seeking and medical attention in experimental, recurrent and all self-injurers

	All self-injurers		Experimental		Recurrent		χ^2	p
	n	%	n	%	n	%		
Perceived need for professional help ^a (n = 239)	(130)	54.4	(51)	39.2	(79)	60.8	3.02	.08
Sought psychological or psychiatric services ^b (n = 243)	(44)	18.1	(11)	25.0	(33)	75.0	8.90	< .01
Required hospitalization or medical attention ^b (n = 243)	(129)	53.1	(56)	43.4	(73)	56.6	.57	.45

Note: ^a In this table only the yes answer is shown. Of those who self-injured, 88 did not answer these questions; ^b In this table only the yes answer is shown. Of those who self-injured, 84 did not answer this question.

such as the emotional regulation of affective states, like depression, because when they self-injure many people report a decrease of negative mood, and a temporary relief, which influences the repetition of the behavior (Klonsky, 2007). Persons with NSSI appear to have more risk factors and difficulties responding in more adaptive ways to problems (Favazza, 2009), presenting more psychological disorders, or problems than those without self-injuries (Brown, 2009; Cerutti, Manca, Presaghi, & Gratz, 2011; Klonsky & Olino, 2008; Whitlock et al., 2006).

In this research, we considered depressive symptoms, anxious symptoms, impulsivity, self-efficacy, and emotional regulation as relevant factors to understand NSSI. From the risk factors analyzed in this investigation, depression had the greatest association with experimental NSSI. Self-injuries among experimenters may be attempts to modify and find temporary relief to negative mood (Klonsky, 2009). Among those who engage in recurrent NSSI, depression, impulsivity, and low self-efficacy are significantly associated with self-injury. Contrary to what we expected, emotional regulation (cognitive reappraisal and expressive suppression) was not significant in any analyses. This is different from some studies (Klonsky, 2007; Nock, 2009) where deficits in emotional regulation were associated with NSSI. It may be that the emotional regulation areas of this scale (Gross & John, 2003) that we used are not particularly relevant for the study of self-injury in this sample. It is possible that the emerging adults in our sample who self-injure can think of adaptive strategies to solve problems, but tend to choose more often maladaptive strategies (Nock & Mendes, 2008), in such a way that the differences between those without self-injury and those with NSSI are in other areas of emotional regulation. These areas might be impulse control difficulties, awareness of one's own emotions, or the difficulty to perform tasks when negative emotions are felt (Gratz & Roemer, 2004).

Limitations

The results presented here should be considered in light of some limitations. The sample contained more female participants and students of psychology than the overall college population. While females did not report more overall NSSI, we do not know whether psychology students have more or less NSSI than students from other areas. So, the next step is to replicate results with a representative sample to determine the prevalence of NSSI in Mexican university students. Furthermore, the cross-sectional design precludes interpretations of causality. Finally, the large proportion of missing data for the questions on perceived need and service use suggests the need for caution in interpreting these results. We have no information to determine whether this missing data contribute to an upward or downward bias in these estimates.

Implications

Despite these limitations, the results of this study are valuable for several reasons. It is the first approximation to the understanding of self-injury in university students in Mexico. In our sample, we found a very high lifetime frequency of NSSI, as well as a substantial group who continues to self-injure after adolescence, as well as a group who initiated NSSI as emerging adults. Because there is a lack of information about these behaviors in Mexico and other countries of Latin America compared with the USA and Europe, most teachers, university authorities, and health professionals in contact with young adult students do not have any strategies to detect, prevent, or treat this problem. This is relevant not only in Mexico, but also in countries with significant Mexican immigrant populations, like the USA and Canada, to determine service needs and to develop intervention strategies, because NSSI behavior may be higher in these populations. Also, these NSSI behaviors found in this sample could be similar to other Latin American populations of college students.

Another relevant finding, similar to what has been documented elsewhere (Whitlock et al., 2006), is that most university students that self-injure do not seek professional psychological or psychiatric help for this behavior despite that roughly half recognized the need. This can be problematic not only because of the injuries and emotional problems as a consequence of self-injury, but also for the higher risk of suicide attempts that have been documented in individuals with NSSI (Wilkinson & Goodyer, 2011). Because the tendency is to avoid help, there are poor levels of engagement with health professional among individuals who self-injure and many go undetected by friends, teachers, and health professionals (Whitlock et al., 2006; Whitlock & Knox, 2009). This may be even truer in the context of Mexico and other Latin American countries where there is less awareness of the NSSI problem. In our research, the authorities of these universities were not aware that NSSI could happen at the college level, believing that NSSI was a behavior that occurred primarily in adolescents. Few public policies to address NSSI among university students likely contribute to low rates of disclosure and help seeking.

The importance of NSSI as a public health problem must be addressed by the relevant authorities, especially in the Mexican context, in order to implement public policies to assess the real dimension of the problem through national and regional surveys, and to design prevention and treatment strategies that are culturally relevant. These findings suggest that depressive symptomatology, impulsivity, and self-efficacy are factors that should be considered when developing strategies for preventing or reducing self-injury, though further research is needed to understand whether they play a causal role in the development and/or maintenance of the behavior. Compared to other countries, like

the USA, Canada or the European Union, Latin America needs to address this mental health problem and conduct more research in different groups and populations to have an accurate global view of these behaviors and how to address them.

Funding

None.

Conflicts of interest

The authors declared they have no conflicts of interest.

REFERENCES

- Albores-Gallo, L., Méndez-Santos, J. L., Xóchitl-García, L. A., Delgadillo-González, Y., Chávez-Flores, C. I., & Martínez, O. L. (2014). Nonsuicidal self-injury in a community sample of older children and adolescents of Mexico City. *Actas Españolas de Psiquiatría*, 42(4), 159-168.
- Alvear-Galindo, M. G., Yamamoto-Kimura, L. T., Morán-Álvarez, I. C., Rodríguez-Pérez, A., Solís-Torres, C., Varela-Mejía, H. F., & Fajardo-Yamamoto, M. (2015). Tobacco use, alcohol consumption and family history, such as risk of chronic disorders in university students. *Revista Médica del Hospital General de Mexico*, 78(2), 67-72.
- Auerbach, R. P., Alonso, J., Axinn, W. G., Cuijpers, P., Ebert, D. D., Green, J. G., ... Bruffaerts, R. (2016). Mental disorders among college students in the World Health Organization World Mental Health Surveys. *Psychological Medicine*, 46(14), 2955-2970. doi: 10.1017/S0033291716001665
- Ávila, J. L., García, B., Hoover, M. L., Jiménez, E., Márquez, L., Valencia, A., & Vega, L. (2009). Planeación y desarrollo del proyecto de investigación. In B. García (Ed.), *Manual de métodos de investigación para las Ciencias Sociales. Un enfoque de enseñanza basado en proyectos* (pp. 28-30). México: El Manual Moderno.
- Bäbler, J., & Schwarzer, R. (1996). Evaluación de la autoeficacia: Adaptación española de la escala de autoeficacia general [Measuring generalized self-beliefs: A Spanish adaptation of the General Self-Efficacy scale]. Retrieved from <http://www.statisticssolutions.com/general-self-efficacy-sch/http://www.statisticssolutions.com/general-self-efficacy-sch/http://www.statisticssolutions.com/general-self-efficacy-sch/>
- Benjet, C., Hernandez-Guzman, L., Tercero-Quintanilla, G., Hernández-Roque, A., & Chartt-Leon, R. M. (1999). Validez y confiabilidad de las CES-D en Peropúberes. *Revista Mexicana de Psicología*, 16(1), 175-185.
- Blanco, C., Okuda, M., Wright, C., Hasin, D. S., Grant, B. F., Liu, S. M., & Olfson, M. (2008). Mental health of college students and their non-college-attending peers: Results from the national epidemiologic study on alcohol and related conditions. *Archives of General Psychiatry*, 65(12), 1429-1437.
- Bresin, K., & Gordon, K. H. (2013). Endogenous opioids and nonsuicidal self-injury: A mechanism of affect regulation. *Neuroscience & Biobehavioral Reviews*, 37(3), 374-383.
- Brown, S. A. (2009). Personality and non-suicidal deliberate self-harm: Trait differences among a non-clinical population. *Psychiatry Research*, 169(1), 28-32.
- Cabello, R., Salguero, J. M., Fernández-Berrocal, P., & Gross, J. J. (2013). A Spanish adaptation of the emotion regulation questionnaire. *European Journal of Psychological Assessment*, 29(4), 234-240.
- Cerutti, R., Manca, M., Presaghi, F., & Gratz, K. L. (2011). Prevalence and clinical correlates of deliberate self-harm among a community sample of Italian adolescents. *Journal of Adolescence*, 34(2), 337-347.
- Chávez-Rosales, E., Camacho, R. E., Maya, M. M., & Marquez, M. O. (2012). Eating behaviors and eating disorders symptomatology in nutrition students. *Mexican Journal of Eating Disorders*, 3(1), 29-37.
- Claes, L., Klonsky, E. D., Muehlenkamp, J., Kuppens, P., & Vandereycken, W. (2010). The affect-regulation function of nonsuicidal self-injury in eating-disordered patients: which affect states are regulated? *Comprehensive Psychiatry*, 51(4), 386-392.
- Díaz, M. A., Díaz, M. L. R., Hernández-Ávila, C. A., Narro, R. J., Fernández, V. H., & Solís, T. C. (2008). Prevalencia del consumo riesgoso y dañino de alcohol y factores de riesgo en estudiantes universitarios de primer ingreso. *Salud Mental*, 31(4), 271-282.
- Duggan, J. M., Toste, J. R., & Heath, N. L. (2012). An examination of the relationship between body image factors and non-suicidal self-injury in young adults: The mediating influence of emotion dysregulation. *Psychiatry Research*, 206(2-3), 256-264.
- Favazza, A. R. (2009). A cultural understanding of nonsuicidal self-injury. In M. K. Nock (Ed.), *Understanding NonSuicidal Self-Injury. Origins, Assessment, and Treatment* (pp. 19-35). Washington, DC: American Psychological Association.
- García-Campayo, J., Zamorano, E., Ruiz, M. A., Pardo, A., Páramo-Pérez, M., López-Gómez, V., ... Rejas, J. (2010). Cultural adaptation into Spanish of the generalized anxiety disorder-7 (GAD-7) scale as a screening tool. *Health and Quality of Life Outcomes*, 8:8. Retrieved from: <http://www.hqlo.com/content/8/1/8>
- González-Forzeza, C., Alvarez-Ruiz, M., Saldaña-Hernández, A., Carreño-García, S., Chávez-Hernández, A., & Pérez-Hernández, R. (2005). Prevalence of deliberate self-harm in teenage students in the state of Guanajuato, México. *Social Behavior and Personality*, 33(8), 777-792.
- González-Forzeza, C., Echeagaray, F. A. W., & Jiménez-Tapia, A. (2012). Escala de Depresión del Centro de Estudios Epidemiológicos (CES-D) en México: análisis bibliométrico. *Salud Mental*, 35(1), 13-20.
- Gratz, K. L. (2001). Measurement of deliberate self-harm: Preliminary data on the Deliberate Self-Harm Inventory. *Journal of Psychopathology and Behavioral Assessment*, 23(4): 253-263.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41-54.
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85(2), 348-362.
- Jutengren, G., Kerr, M., & Stattin, H. (2011). Adolescents' deliberate self-harm, interpersonal stress, and the moderating effects of self-regulation: A two-wave longitudinal analysis. *Journal of School Psychology*, 49(2), 249-264.
- Kharsati, N., & Bhola, P. (2014). Patterns of non-suicidal self-injurious behaviours among college students in India. *The International Journal of Social Psychiatry*, 61(1), 39-49.
- Klonsky, E. D., & Olino, T. M. (2008). Identifying clinically distinct subgroups of self-injurers among young adults: A latent class analysis. *Journal of Consulting and Clinical Psychology*, 76(1), 22-27.
- Klonsky, E. D. (2007). The functions of deliberate self-injury: A review of the evidence. *Clinical Psychology Review*, 27(2), 226-239.
- Klonsky, E. D. (2009). The functions of self-injury in young adults who cut themselves: Clarifying the evidence for affect-regulation. *Psychiatry Research*, 166(2-3), 260-268.
- Klonsky, E. D. (2011). Non-suicidal self-injury in United States adults: Prevalence, sociodemographics, topography and functions. *Psychological Medicine*, 41(9), 1981-1986.
- Maciejewski, P. K., Prigerson, H. G., & Mazure, C. M. (2000). Self-efficacy as a mediator between stressful life events and depressive symptoms: Differences based on history of prior depression. *British Journal of Psychiatry*, 176(4), 373-378. doi: 10.1192/bjp.176.4.373
- MacLaren, V. V., & Best, L. A. (2010). Nonsuicidal self-injury, potentially addictive behaviors, and the Five Factor Model in undergraduates. *Personality and Individual Differences*, 49(5), 521-525.
- Melo-Carrillo, A., Van Oudenhove, L., & Lopez-Avila, A. (2012). Depressive symptoms among Mexican medical students: High prevalence and the effect of a group psychoeducation intervention. *Journal of Affective Disorders*, 136(3), 1098-1103.
- Mendoza, M. S. A., Márquez, M. O., Guadarrama, G. R., & Ramos, L. L. E. (2013). Medición del Trastorno por Estrés Postraumático (TEPT) en universitarios mexicanos. *Salud Mental*, 36(6), 493-503.
- Mendoza, Y., & Pellicer, F. (2002). Percepción del dolor en el síndrome de comportamiento autolesivo. *Salud Mental*, 25(4), 10-16.
- Moreno, G. M. A., & Ortiz, V. G. R. (2009). Trastorno alimentario y su relación con

- la imagen corporal y la autoestima en adolescentes. *Terapia Psicológica*, 27(2), 181-190.
- Muehlenkamp, J. J., Claes, L., Havertape, L., & Plener, P. L. (2012). International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. *Child and Adolescent Psychiatry and Mental Health*, 6:10.
- Muehlenkamp, J. J., Hoff, E. R., Licht, J. G., Azure, J. A., & Hasenzahl, S. J. (2008). Rates of non-suicidal self-injury: A cross-sectional analysis of exposure. *Current Psychology*, 27(4), 234-241.
- Muris, P. (2002). Relationships between self-efficacy and symptoms of anxiety disorders and depression in a normal adolescent sample. *Personality and Individual Differences*, 32(2), 337-348.
- Nock, M. K., & Mendes, W. B. (2008). Physiological arousal, distress tolerance, and social problem-solving deficits among adolescent self-injurers. *Journal of Consulting and Clinical Psychology*, 76(1), 28-38.
- Nock, M. K. (2009). Why do people hurt themselves? New insights into the nature and functions of self-injury. *Current Directions in Psychological Science*, 18(2), 78-83.
- Orlando, C. M., Broman-Fulks, J. J., Whitlock, J. L., Curtin, L., & Michael, K. D. (2015). Nonsuicidal self-injury and suicidal self-injury: A taxometric investigation. *Behavior Therapy*, 46(6), 824-833.
- Páez, F., Jiménez, A., López, A., Ariza, A. P. R., Soto, H. O., & Nicolini, H. (1996). Estudio de la validez al castellano de la Escala de Impulsividad de Plutchik. *Salud Mental*, 19(5), 10-12.
- Plutchik, R., & Van, P. H. (1989). The measurement of suicidality, aggressivity and impulsivity. *Progress in Neuropsychopharmacology and Biological Psychiatry*, 13(1), 23-34.
- Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in general population. *Applied Psychological Measurement*, 1(3), 385-401.
- Rosales, P. J., Córdova, O. M., & Ramos, C. R. (2012). Suicidal ideation in Mexican students: A model of multiple relation with variables of personal identification. *Psicología y Salud*, 22(1), 63-74.
- Sanjuán, P., Pérez, A. M., & Bermúdez, J. (2000). Escala de autoeficacia general: datos psicométricos de la adaptación para población española. *Psicothema*, 12(2), 509-513.
- Sarno, I., Madeddu, F., & Gratz, K. L. (2010). Self-injury, psychiatric symptoms, and defense mechanisms: Findings in an Italian nonclinical sample. *European Psychiatry*, 25(3), 136-145.
- Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of Internal Medicine*, 166(10), 1092-1097.
- Swannell, S. V., Martin, G. E., Page, A., Hasking, P., & St John, N. J. (2014). Prevalence of nonsuicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-regression. *Suicide Life Threat Behavior*, 44(3), 273-303.
- Tsypes, A., Lane, R., Paul, E., & Whitlock, J. (2016). Non-suicidal self-injury and suicidal thoughts and behaviors in heterosexual and sexual minority young adults. *Comprehensive Psychiatry*, 65, 32-43.
- Ulloa, F. R. E., Contreras, H. C., Paniagua, N. K., & Figueroa, G. V. (2013). Frecuencia de autolesiones y características clínicas asociadas en adolescentes que acudieron a un hospital psiquiátrico infantil. *Salud Mental*, 36(5), 417-420.
- Whitlock, J., & Knox, K. L. (2009). Intervention and Prevention in the Community. In M. K. Nixon & N. L. Heath (Eds.), *Self-Injury in Youth. The Essential Guide to Assessment and Intervention* (pp. 79-110). New York, NY: Taylor & Francis Group.
- Whitlock, J., Eckenrode, J., & Silverman, D. (2006). Self-injurious behaviors in a college population. *Pediatrics*, 117(6), 1939-1948.
- Whitlock, J., Muehlenkamp, J., Purington, A., Eckenrode, J., Barreira, P., Abrams, G. B., ... Knox, K. (2011). Nonsuicidal self-injury in a college population: General trends and sex differences. *Journal of American College Health*, 59(8), 691-698.
- Wilkinson, P., & Goodyer, I. (2011). Non-suicidal self-injury. *European Child and Adolescent Psychiatry*, 20(2), 103-108.
- You, J., Leung, F., & Fu, K. (2011). Exploring the reciprocal relations between non-suicidal self-injury, negative emotions and relationship problems in Chinese adolescents: A longitudinal cross-Lag study. *Journal of Abnormal Child Psychology*, 40(5), 829-36.
- Yurkowski, K., Martin, J., Levesque, C., Bureau, J. F., Lafontaine, M. F., & Cloutier, P. (2015). Emotion dysregulation mediates the influence of relationship difficulties on non-suicidal self-injury behavior in young adults. *Psychiatry Research*, 228(3) 871-878.