

Original Article/Artículo original

## Non-suicidal self-injury in medical students: frequency and associated factors

### Autolesiones no suicidas en estudiantes de medicina: frecuencia y factores asociados

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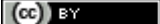
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## ABSTRACT

**Introduction:** the mental health of medical students has been extensively researched, showing that they are part of a group vulnerable to the development of mental disorders.

**Objective:** the aim of this research was to determine the frequency of NSSI and its associated factors in medical students in Paraguay.

**Methodology:** this was a descriptive and cross-sectional study. An online survey was launched to assess depression, anxiety, and self-harm, the PHQ-2, the GAD-7 and SHQ scales were used, respectively.

**Results:** we received responses from 330 medical students. Of the participants, 71.2 % were female. 46.4% of the participants were identified as having depression (PHQ-2  $\geq$  3) and 37.3 % as having anxiety (GAD-7  $\geq$ 10). The frequency of NSSI was 27 % (n = 89). The main factors associated with NSSI were a previous diagnosis of a mental disorder (which increased the likelihood of NSSI by 3.76 times) and/ or a history of physical or sexual abuse (with a 3.75-fold increase).

**Conclusion:** this research found the presence of NSSI in almost 3 out of 10 of the medical students surveyed. The main factors associated with self-injurious behavior were a previous diagnosis of a mental disorder and/or a history of physical or sexual abuse.

**Keywords:** non-suicidal Self-injury, Self-harm, Depression, Anxiety, Medical Students.

## RESUMEN

**Introducción:** la salud mental de los estudiantes de medicina ha sido ampliamente investigada, demostrando que forman parte de un grupo vulnerable al desarrollo de trastornos mentales.

**Objetivo:** el objetivo de esta investigación fue determinar la frecuencia de NSSI y sus factores asociados en estudiantes de medicina del Paraguay.

**Metodología:** este fue un estudio descriptivo y transversal. Se lanzó una encuesta online para evaluar depresión, ansiedad y autolesiones, se utilizaron las escalas PHQ-2, GAD-7 y SHQ, respectivamente.

**Resultados:** recibimos respuestas de 330 estudiantes de medicina. De los participantes, el 71,2 % eran mujeres. Se identificó que el 46,4 % de los participantes padecía depresión (PHQ-2  $\geq$  3) y el

37,3 % ansiedad (GAD-7  $\geq 10$ ). La frecuencia de NSSI fue del 27 % (n = 89). Los principales factores asociados a NSSI fueron un diagnóstico previo de un trastorno mental (que aumentó la probabilidad de NSSI en 3,76 veces) y/o una historia de abuso físico o sexual (con un aumento de 3,75 veces).

**Conclusión:** esta investigación encontró la presencia de NSSI en casi 3 de cada 10 de los estudiantes de medicina encuestados. Los principales factores asociados con la conducta autolesiva fueron un diagnóstico previo de un trastorno mental y/o antecedentes de abuso físico o sexual.

**Palabras clave:** autolesiones no suicidas, autolesiones, depresión, ansiedad, estudiantes de medicina.

## INTRODUCTION

The mental health of medical students has been extensively researched, showing that they are part of a group vulnerable to the development of mental disorders and a strong impact on individual, institutional, and sociocultural levels<sup>(1)</sup>. Higher levels of anxiety and depression have been reported in medical students compared to the general population<sup>(2,3)</sup>, as well as burnout and alcohol and substance abuse<sup>(4)</sup>. It should be noted that students' level of well-being is a common global concern and its impairment can lead to mental illness<sup>(5-9)</sup>.

Self-injury comprises behaviors aimed at physical harm to oneself, regardless of the type of injury inflicted or the motive for the injury. For practical and reporting purposes, a distinction is made between non-suicidal acts of self-injury and suicide attempts<sup>(10)</sup>. The focus of this article is on non-suicidal self-injury.

Non-suicidal self-injury (NSSI) refers to the intentional self-inflicted destruction of body tissue without suicidal intention, in the absence of lethal intent and for reasons not socially sanctioned<sup>(11,12)</sup>. These behaviors can vary over time and manifest in different forms, such as cutting, burning, scratching, self-hitting, and medication overdose<sup>(13)</sup>. Cutting is the most frequent and repetitive form of NSSI<sup>(14, 15)</sup>.

NSSI is clinically important as it can be a symptom of a mental disorder, especially anxiety and depression, and can increase the risk of suicide by a factor of ten<sup>(16)</sup>. Hence the importance of early detection in a vulnerable population such as medical students to identify the presence of an underlying mental illness requiring timely and specific treatment. Taking into account all of the above, the objective of this research was to determine the frequency of NSSI and its associated factors in medical students in Paraguay.

## METODOLOGY

Participants were recruited through an Internet-based survey, disseminated through social media, during November 2022. All participants received complete information about the aim of the study, privacy, and data-processing. No payment was offered for completing the survey. Subjects were medical students, older than 18 years, that accepted to participate in the study.

The Internet-based survey approach was used taking into account that there is supporting evidence that responses to online surveys may provide similar findings to those reported through “in person” sampling<sup>(17,18)</sup>.

The sample size was calculated using the *Epidat* epidemiological package. Assuming an expected frequency of NSSI of 14.3 %<sup>(19)</sup>, a confidence level of 95 %, and a precision of 3.8 %, the minimum sample was established in 327 participants. Finally, 330 subjects were surveyed.

In this research, all measures, conditions, data exclusions, and procedure for the determination of the sample size, to the best of our knowledge, have been reported.

### Measures

#### *Demographics*

Participants were asked to provide information on their sex (male, female), University type (public or private), year of study.

#### *Health status*

Participants reported whether they had a history of a mental disorder, exposure to physical or sexual abuse, violence in their romantic relationship, witnessing family violence, and/or being a victim of bullying. They were also asked to report whether there was a family history of mental health or substance misuse difficulties.

#### *Patient Health Questionnaire-2 (PHQ-2)*

Originally developed by Kroenke, Spitzer and Williams<sup>(20)</sup>, the PHQ-2 contains the first two items of the nine-item Patient Health Questionnaire (PHQ-9)<sup>(21)</sup>, which assess the presence of depressed mood and anhedonia during the past two weeks and which are considered core symptoms of depressive disorders. These symptoms were measured on a 4-point Likert-type scale with the following possible responses: 0 = not at all, 1 = several days, 2 = more than half the days and 3 = almost every day. The PHQ-2 score ranges from 0 to 6. A score  $\geq 3$  is indicative of depression, with 83 % sensitivity and 92 % specificity for major depression<sup>(20)</sup>. In this study we used the Spanish version of Torales et al, which has demonstrated adequate reliability in previous studies (Cronbach's  $\alpha = 0.833$ )<sup>(22)</sup>. Cronbach's alpha for the current sample is 0.769.

#### *Generalized Anxiety Disorder-7 (GAD-7) questionnaire*

The GAD-7 questionnaire is a one-dimensional self-administered scale designed to assess the presence of the symptoms of Generalized Anxiety Disorder (GAD). The GAD-7 represents an anxiety measure based on seven items which are scored from zero to three. The whole scale score can range from 0 to 21 and cut-off scores for mild, moderate and severe anxiety symptoms are 5, 10 and 15, respectively. A score of 10 or higher on the GAD-7 represents a reasonable cut point for identifying cases of GAD<sup>(23)</sup>. In this research, we used the Spanish validation of Garcia-Campayo et al., which shows good psychometric properties and excellent internal consistency ( $\alpha = 0.936$ )<sup>(24)</sup>. Cronbach's alpha for the current sample is 0.884.

#### *Self-Harm Questionnaire (SHQ)*

The SHQ is a 15-item self-administered questionnaire that identifies the presence of self-injurious thoughts and behaviors in young people. The first three questions are screening questions to determine the presence of self-injury and the remaining questions focus on specific aspects of self-injurious behavior: last episode, method used to self-injure, motivation, experience during self-injury, purpose of self-injury, presence of substance use during the act, planning and execution of the act, and presence of communication of the episode to another person<sup>(25)</sup>. In this study we used the version of García-Mijares *et al.*<sup>(16)</sup>, which has been validated in Spanish.

#### **Data analysis**

Data was collected in a spreadsheet and processed with the statistical package RStudio, version 1.2.5033. Descriptive statistics were performed for all variables: reporting any categorical variable with frequencies and percentages, and the numerical variables with measures of central tendency and dispersion. Chi-square tests were used to establish associations and odds ratios were calculated as appropriate.

#### **Ethical considerations**

The study was approved by the Department of Psychiatry of the Universidad Nacional de Asunción (Reference Number: 27/2021). Data was treated with confidentiality, equality, and justice, respecting the Helsinki principles. Participants who required feedback from the survey were invited to write down their email address and then received information or specific helpful suggestions. Informed consent was obtained.

## **RESULTS**

We surveyed 330 medical students, aged between 18 and 35 (mean =  $23 \pm 3$  years; median = 22 years). Of the participants, 71.2 % were female. The frequency of NSSI was 27 % (n = 89). No relationship was found between demographics and NSSI. **Table 1** shows these results in detail.

**Table 1:** Medical students' demographics and NSSI (n = 330).

Demographics	NSSI – No (n = 241)		NSSI – Yes (n = 89)		Total		p value
	n	%	n	%	n	%	
<b>Sex</b>							
Male	74	30.7	21	23.6	95	28.8	0.206
Female	167	69.3	68	76.4	235	71.2	
<b>Year at University</b>							
First	60	24.9	23	25.8	83	25.2	0.156
Second	45	18.7	12	13.5	57	17.3	
Third	53	22.0	20	22.5	73	22.1	
Fourth	22	9.1	17	19.1	39	11.8	
Fifth	30	12.4	10	11.2	40	12.1	
Sixth	31	12.9	7	7.9	38	11.5	
<b>University type</b>							
Public	99	41.1	42	47.2	141	42.7	0.319
Private	142	58.9	47	52.8	189	57.3	

The PHQ-2 and GAD-7 scales showed good internal validity ( $\alpha = 0.769$  and  $\alpha = 0.884$ , respectively). According to the cut-off points of these scales, 46.4 % of the participants were identified as having depression and 37.3 % as having anxiety. An association was found between depression and NSSI, as well between anxiety and NSSI (Table 2).

**Table 2:** Depression, anxiety and NSSI (n = 330).

Mental health status	NSSI – No (n = 241)		NSSI – Yes (n = 89)		Total		p value
	n	%	n	%	n	%	
<b>Depression*</b>							
Yes	101	41.9	52	58.4	153	46.4	0.008
No	140	58.1	37	41.6	177	53.6	
<b>Anxiety**</b>							
Yes	75	31.1	48	53.9	123	37.3	<.0001
No	166	68.9	41	46.1	207	62.7	
*PHQ-2 $\geq 3$ **GAD-7 $\geq 10$							

When asked whether they had been previously diagnosed with a mental disorder, 25.2 % (n = 83) of the participants answered in the affirmative. Of these, 13.6 % had a previous diagnosis of anxiety, 5.8 % of depression, and 3.3 % of borderline personality disorder. As for treatment, 13.9 % mentioned being in psychological treatment, 4.8 % in psychiatric treatment, and 8.8 % in both types of treatment. Of the 89 students with NSSI, 57.9 % had had suicidal ideation at least once. 53.9 % of these students mentioned that the last time they self-injured was less than one year ago and the most frequently used method was cutting their skin (67.4 %). Overdose or poison consumption was observed in 15.7 % of

the participants. After self-injury, 40.4% reported feeling "better", 36 % felt the same and 23.6 % felt worse. In terms of motivation, 36 % did it to stop feeling bad, 21.3 % to punish themselves, 11.2 % to feel better, 10.1 % to avoid doing something else, and the rest to show someone else how they felt. The main factors associated with NSSI were having a previous diagnosis of a mental disorder (which increased the likelihood of NSSI by 3.76 times) and a history of physical or sexual abuse (with a 3.75-fold increase). The only factors that did not have a significant association with NSSI were family history of substance misuse and witnessing family violence. Table 3 shows these results in detail.

**Table 3:** Factors associated to NSSI in medical students (n = 330).

Associated factors	NSSI – No (n = 241)		NSSI – Yes (n = 89)		Total		OR	p value
	n	%	n	%	n	%		
Family history of substance abuse	53	22.0	23	25.8	76	23.0	1.24	0.461
Family history of mental disorder	78	32.4	44	49.4	122	37.0	2.04	0.004
Previous mental disorder diagnosis	43	17.8	40	44.9	83	25.2	3.76	<0.001
History of physical or sexual abuse	37	15.4	36	40.4	73	22.1	3.75	<0.001
History of violence in a romantic relationship	33	13.7	26	29.2	59	17.9	2.60	0.001
Witness of family violence	65	27.0	29	32.6	94	28.5	1.31	0.316
History of bullying	93	38.6	47	52.8	140	42.4	1.78	0.020
Depression*	101	41.9	52	58.4	153	46.4	1.95	0.008
Anxiety**	75	31.1	48	53.9	123	37.3	2.59	<0.001
*PHQ-2 ≥3 **GAD-7 ≥10								

## DISCUSSION

This research found the presence of NSSI in almost 3 out of 10 of the medical students surveyed, with the main associated factors being a previous diagnosis of a mental disorder and/ or a history of physical or sexual abuse. To the best of our knowledge, this is the first study of its kind in Latin America.

Although NSSI has been extensively studied in adolescents (where its frequency is approximately (17.8 %)<sup>(26-28)</sup>, its high frequency among prisoners, asylum seekers, veterans of the armed forces, some cultural minority groups and persons belonging to sexual minorities should not be overlooked<sup>(15)</sup>. Likewise, medical students are a high-risk group for the development of this disorder<sup>(29,30)</sup>.



The frequency of self-injury found in this study was 27 %. This is higher than that reported in Chinese medical students, who reported a frequency between 9.6 % and 15.1 %<sup>(31,32)</sup>. This difference could be explained partly or largely by the COVID-19 pandemic, in which an increase in mental disorders and an aggravation of mental disorders in this population have been evidenced<sup>(33)</sup>, as well in the general<sup>(34)</sup> and clinical population<sup>(35)</sup>.

Female respondents had higher rates of self-injury than males. This difference was not statistically significant, possibly because of the smaller number of males. It should be noted, however, that available evidence confirms that the frequency of NSSI is generally higher in women<sup>(36)</sup>. A relationship was found between anxiety and depression and NSSI, which is in line with other studies that mention a close relationship between these mental disorders and self-injury behaviors<sup>(24)</sup>. Some studies have gone further by trying to identify predictors that correlate positively with the presence of NSSI in people with depression, such as loss of appetite, present and past suicidal ideation, high acting out, substance use, among others. These data are of central value when analyzing the personal history of people who self-injure<sup>(37)</sup>.

Scores on the PHQ-2 and the GAD-7 showed that 37.3 % of the participants had some type of mental disorder (anxiety or depression). However, only 25.2 % had had a clinical diagnosis made by a psychologist or psychiatrist. This strongly suggests that there are medical students struggling with problems related to their mental health without any kind of diagnosis, which of course results in a lack of treatment and worsening symptoms. Stigma plays a central role, with even among medical students themselves reporting more negative attitudes towards people who self-injure. They even suggest a component of manipulation, which arouses anger and less willingness to help<sup>(38)</sup>, which ends up reinforcing the lack of help-seeking behaviors.

A family history of poor mental health has been associated with a more than doubling of rates of NSSI. This could be explained by genetics as if one has a family history the risk of suffering oneself is higher. Therefore, this factor is associated more with having one's own diagnosis than with self-injury itself<sup>(39)</sup>. The diagnosis of a mental disorder itself increases the chances of self-injury by almost four times, with depression, anxiety, and borderline personality disorder being the main conditions implicated<sup>(40)</sup>.

Physical or sexual abuse also increases almost four times the chance of NSSI. A history of sexual abuse is a statistically significant risk factor for suicide and non-suicidal self-injury, although it is general and nonspecific according to some authors as the temporality and cause-effect of these events cannot be determined<sup>(41)</sup>.



Having been, or being, in a dating relationship where violence is present increases the chances of self-injury almost three times. This is in line with other research that mentions that dating violence (before 17 years of age) is one of the strongest predictors of self-harm<sup>(42)</sup>. Witnessing domestic violence and having been a victim of bullying also increase the odds by almost 2 times, and these predictors can be explained by a type of revictimization<sup>(42)</sup>.

The prevalence and nature of self-harm is changing over time, but it continues to heavily predict suicide<sup>(43)</sup>. In our study, 57.9 % of the participants with NSSI had thought at least once about committing suicide. It is known that the intention or having thought about suicide increases the risk of committing suicide. According to reports, the overall combined prevalence of suicidal ideation is 11.1 %, with variation between 7.4 % and 24.2 %<sup>(44)</sup>. The higher values found in our investigation could be explained by the fact that we did not use a scale to assess suicidal risk, but a direct question that is part of the Self-Harm Questionnaire.

In Paraguay, the average medical undergraduate education lasts 6 years, after which the rotating internship is followed by the specialty (and more years of subspecialty). This can lead to an increasing level of stress<sup>(45)</sup>. A heavy workload, lack of sleep, complex patient management, poor learning environments, financial worries, information overload, and career planning are commonly encountered factors that end up making people vulnerable to depression<sup>(46)</sup>. Knowing these factors allows for effective interventions to be designed and for staff to be trained to help reduce rates of depression<sup>(47)</sup>. Interventions are not always well received by students, who have limited time for them<sup>(48)</sup>. It is crucial that those involved in the training of future physicians understand the needs of this student body and provide tools for medical students to become physicians in a sensitive and non-stigmatizing manner<sup>(49)</sup>. This is especially important given that the COVID-19 pandemic has diminished the sense of wellbeing of this group<sup>(50)</sup>.

Decision-makers must direct resources to provide individual interventions for those students who need support to cope with the psychological distress that leads them to self-harm. These interventions should also include strategies to cope with the challenges of the medical curriculum, as well as to address structural determinants of student stress, such as academic course loads and exam schedules<sup>(51)</sup>.

Limitations of this study may include that the subjects were predominantly female, and that this overrepresentation could have influenced the results. There may be a self-selection bias among those who completed the survey. This is a cross-sectional study and cannot examine cause and effect. Also, the impact that isolation and other restrictive measures related to the COVID-19 pandemic on NSSI

was not considered in our analysis. Finally, it was not possible to match those students with and without self-injury in order to find significant differences. This could explain why no relationships with demographic factors were found.

### **Availability of data and materials:**

The manuscript contains all the evidence supporting the findings. Upon reasonable request, the corresponding author can provide more complete details and a dataset.

### **Conflict of interests**

The authors declare no conflict of interest.

### **Financing:**

The authors declare that they receive no external funding and have no commercial conflicts of interest.

### **Author contribution statement:**

Barrios I, Melgarejo O, Torales J, García D: participated in the conception and design of the article, as well as in the drafting of the article and approval of the final version.

Amarrilla D, Zárate K, Castaldelli-Maia JM, Ventriglio A, Caycho-Rodríguez T: participated in the collection of results, analysis, and interpretation of data, and in the critical revision of the manuscript and approval of the final version. Barrios I: provided statistical advice.

The authors are fully aware of the final content of the manuscript and authorize its publication.

## **REFERENCES**

1. Carrieri D, Pearson M, Mattick K, Papoutsi C, Briscoe S, Wong G, *et al.* Interventions to minimise doctors' mental ill-health and its impacts on the workforce and patient care: the care under pressure realist review. *Health Serv Deliv Res NIHR.* 2020;8(19): 1-132. doi 10.3310/hsdr08190.
2. Barrios I, Miltos V, Piris A, Piris G, Ramírez C, Rodríguez J, *et al.* Tamizaje de salud mental mediante el test M.I.N.I. en estudiantes del ciclo básico de medicina de la Universidad Nacional de Asunción. *An Fac Cienc Médicas.* 2015;48(1):59–68.
3. Torales J, Kadhum M, Zárate G, Barrios I, González I, Farrell SM, *et al.* Wellbeing and mental health among medical students in Paraguay. *Int Rev Psychiatry.* 2019;31(7–8):598–602.
4. Castaldelli-Maia JM, Lewis T, Marques Dos Santos N, Picon F, Kadhum M, Farrell SM, *et al.* Stressors, psychological distress, and mental health problems amongst Brazilian medical students. *Int Rev Psychiatry Abingdon Engl.* 2019;31(7–8):603–7.

5. Almeida T, Kadhum M, Farrell SM, Ventriglio A, Molodynski A. A descriptive study of mental health and wellbeing among medical students in Portugal. *Int Rev Psychiatry Abingdon Engl.* 2019;31(7–8):574–8.
6. Awad F, Awad M, Mattick K, Dieppe P. Mental health in medical students: time to act. *Clin Teach.* 2019;16(4):312–6.
7. Chau SWH, Lewis T, Ng R, Chen JY, Farrell SM, Molodynski A, *et al.* Wellbeing and mental health amongst medical students from Hong Kong. *Int Rev Psychiatry Abingdon Engl.* 2019;31(7–8):626–9.
8. Masri R, Kadhum M, Farrell SM, Khamees A, Al-Taiar H, Molodynski A. Wellbeing and mental health amongst medical students in Jordan: a descriptive study. *Int Rev Psychiatry Abingdon Engl.* 2019;31(7–8):619–25.
9. Molodynski A, Lewis T, Kadhum M, Farrell SM, Lemtiri Chelieh M, Falcão De Almeida T, *et al.* Cultural variations in wellbeing, burnout and substance use amongst medical students in twelve countries. *Int Rev Psychiatry.* 2021;33(1–2):37–42.
10. Hawton K, Saunders KEA, O'Connor RC. Self-harm and suicide in adolescents. *Lancet Lond Engl.* 2012;379(9834):2373–82.
11. American Psychiatric Association. Manual diagnóstico y estadístico de los trastornos mentales: DSM-5. Buenos Aires: Editorial Médica Panamericana; 2019.
12. Nock MK. Self-Injury. *Annu Rev Clin Psychol.* 2010;6(1):339–63.
13. Klonsky ED, Muehlenkamp JJ. Self-injury: a research review for the practitioner. *J Clin Psychol.* 2007;63(11):1045–56.
14. Mollà L, Batlle Vila S, Treen D, López J, Sanz N, Martín LM, *et al.* Autolesiones no suicidas en adolescentes: revisión de los tratamientos psicológicos. *Rev Psicopatología Psicol Clínica.* 2015;20(1):51–61.
15. Royal College of Psychiatrists. Self-harm, suicide and risk: helping people who self-harm Final report of a working group. College Report CR158 [Internet]. London; 2010. Available from: [https://www.rcpsych.ac.uk/docs/default-source/improving-care/better-mh-policy/college-reports/college-report-cr158.pdf?sfvrsn=fcf95b93\\_2](https://www.rcpsych.ac.uk/docs/default-source/improving-care/better-mh-policy/college-reports/college-report-cr158.pdf?sfvrsn=fcf95b93_2)
16. García-Mijares JF, Alejo-Galarza G de J, Mayorga-Colunga SR, Guerrero-Herrera LF, Ramírez-GarcíaLuna JL, García-Mijares JF, *et al.* Validación al español del Self-Harm Questionnaire para detección de autolesionismo en adolescentes. *Salud Ment.* 2015;38(4):287–92.
17. Krantz JH, Dalal R. Validity of Web-Based Psychological Research. In: *Psychological Experiments on the Internet.* Elsevier; 2000. p. 35–60.

18. Gosling SD, Vazire S, Srivastava S, John OP. Should We trust web-based studies? a comparative analysis of six preconceptions about internet questionnaires. *Am Psychol.* 2004;59(2):93–104.
19. Allroggen M, Kleinrahm R, Rau TAD, Weninger L, Ludolph AG, Plener PL. Nonsuicidal self-injury and its relation to personality traits in medical students. *J Nerv Ment Dis.* 2014;202(4):300–4.
20. Kroenke K, Spitzer RL, Williams JBW. The Patient health questionnaire-2: validity of a two-item depression screener. *Med Care.* 2003;41(11):1284–92.
21. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med.* 2001;16(9):606–13.
22. Torales J, Barrios I, Ayala N, O’Higgins M, Palacios JM, Ríos-González C, *et al.* Ansiedad y depresión en relación a noticias sobre COVID-19: un estudio en población general paraguaya. *Rev Salud Publica Parag.* 2021;11(1):67–73.
23. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A Brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med.* 2006;166(10):1092.
24. Forrester RL, Slater H, Jomar K, Mitzman S, Taylor PJ. Self-esteem and non-suicidal self-injury in adulthood: a systematic review. *J Affect Disord.* 2017;221:172–83. doi: 10.1016/j.jad.2017.06.027.
25. Ougrin D, Boege I. Brief report: The self harm questionnaire: a new tool designed to improve identification of self harm in adolescents. *J Adolesc.* 2013;36(1):221–5.
26. Meszaros G, Horvath LO, Balazs J. Self-injury and externalizing pathology: a systematic literature review. *BMC Psychiatry.* 2017;17(1):160.
27. Donath C, Bergmann MC, Kliem S, Hillemacher T, Baier D. Epidemiology of suicidal ideation, suicide attempts, and direct self-injurious behavior in adolescents with a migration background: a representative study. *BMC Pediatr.* 2019;19:45.
28. Coppersmith DDL, Nada-Raja S, Beautrais AL. Non-Suicidal self-injury and suicide attempts in a New Zealand birth cohort. *J Affect Disord.* 2017;221:89–96.
29. Zeng W, Chen R, Wang X, Zhang Q, Deng W. Prevalence of mental health problems among medical students in China: a meta-analysis. *Medicine (Baltimore).* 2019;98(18):e15337.
30. Pacheco JP, Giacomini HT, Tam WW, Ribeiro TB, Arab C, Bezerra IM, *et al.* Mental health problems among medical students in Brazil: a systematic review and meta-analysis. *Rev Bras Psiquiatr.* 2017;39(4):369–78.
31. Wang Y, Zhao Y, Liu L, Chen Y, Ai D, Yao Y, *et al.* The current situation of internet addiction and its impact on sleep quality and self-injury behavior in chinese medical students. *Psychiatry Investig.* 2020;17(3):237–42.
32. Wu D, Rockett IRH, Yang T, Feng X, Jiang S, Yu L. Deliberate self-harm among Chinese medical students: a population-based study. *J Affect Disord.* 2016;202:137–44.

33. Kaparounaki CK, Patsali ME, Mousa DPV, Papadopoulou EVK, Papadopoulou KKK, Fountoulakis KN. University students' mental health amidst the COVID-19 quarantine in Greece. *Psychiatry Res.* 2020;290:113111.
34. Torales J, O'Higgins M, Castaldelli-Maia JM, Ventriglio A. The outbreak of COVID-19 coronavirus and its impact on global mental health. *Int J Soc Psychiatry.* 2020;66(4):317–20.
35. Gentile A, Torales J, O'Higgins M, Figueredo P, Castaldelli-Maia JM, De Berardis D, *et al.* Phone-based outpatients' follow-up in mental health centers during the COVID-19 quarantine. *Int J Soc Psychiatry.* 2022;68(1):129-133.
36. Selenius H, Strand S. Experiences of self-injury and aggression among women admitted to forensic psychiatric care. *Nord J Psychiatry.* 2017;71(4):304–11.
37. Parker G, Malhi G, Mitchell P, Kotze B, Wilhelm K, Parker K. Self-harming in depressed patients: pattern analysis. *Aust N Z J Psychiatry.* 2005;39(10):899–906.
38. Law GU, Rostill-Brookes H, Goodman D. Public stigma in health and non-healthcare students: attributions, emotions and willingness to help with adolescent self-harm. *Int J Nurs Stud.* 2009;46(1):107–18.
39. Alexander Arguello P, Addington A, Borja S, Brady L, Dutka T, Gitik M, *et al.* From genetics to biology: advancing mental health research in the Genomics ERA. *Mol Psychiatry.* 2019;24(11):1576–82.
40. Vega D, Sintes A, Fernández M, Puntí J, Soler J, Santamarina P, *et al.* Review and update on non-suicidal self-injury: who, how and why? *Actas Esp Psiquiatr.* 2018;46(4):146–55.
41. Maniglio R. The role of child sexual abuse in the etiology of suicide and non-suicidal self-injury. *Acta Psychiatr Scand.* 2011;124(1):30–41.
42. Kiekens G, Hasking P, Claes L, Boyes M, Mortier P, Auerbach RP, *et al.* Predicting the incidence of non-suicidal self-injury in college students. *Eur Psychiatry.* 2019;59:44–51.
43. Kapur N, Gask L. Introduction to suicide and self-harm. *Psychiatry.* 2009;8(7):233–6.
44. Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, *et al.* Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: a systematic review and meta-analysis. *JAMA.* 2016;316(21):2214–36.
45. Menon P, Chaudhury S, Saldanha D, Sahu S, Singh V, Pathak V. Stress levels and its association with self-harm and risk-taking behavior in medical undergraduates. *Ind Psychiatry J.* 2018;27(1):41.
46. Goebert D, Thompson D, Takeshita J, Beach C, Bryson P, Ephgrave K, *et al.* Depressive symptoms in medical students and residents: a multischool study. *Acad Med J Assoc Am Med Coll.* 2009;84(2):236–41.

47. Thompson D, Goebert D, Takeshita J. A program for reducing depressive symptoms and suicidal ideation in medical students. *Acad Med J Assoc Am Med Coll.* 2010;85(10):1635–9.
48. MacArthur KR, Koley J, Wengel SP. Student Perceptions of a reflective writing-based wellness course: ‘good in theory, but...’ *Med Sci Educ.* 2021;31(3):1043–51.
49. Watson C, Ventriglio A, Bhugra D. A narrative review of suicide and suicidal behavior in medical students. *Indian J Psychiatry.* 2020;62(3):250–6.
50. Nikolis L, Wakim A, Adams W, Do PB. Medical student wellness in the United States during the COVID-19 pandemic: a nationwide survey. *BMC Med Educ.* 2021;21(1):401.
51. Heinen I, Bullinger M, Kocalevent RD. Perceived stress in first year medical students - associations with personal resources and emotional distress. *BMC Med Educ.* 2017 Jan 6;17(1):4.