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IMPACTS OF THE COVID-19 PANDEMIC ON METHODS AND RECURRENCE OF SELF-HARM AMONG BRAZILIAN ADOLESCENTS

IMPACTOS DA PANDEMIA DE COVID-19 NOS MÉTODOS E NA RECORRÊNCIA DE AUTOLESÃO ENTRE ADOLESCENTES BRASILEIROS

IMPACTOS DE LA PANDEMIA DE COVID-19 EN LOS MÉTODOS Y LA RECURRENCIA DE AUTOLESIONES ENTRE ADOLESCENTES BRASILEÑOS

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ABSTRACT: This study analyzed predictors of recurrence and methods of self-harm among Brazilian adolescents, considering demographic, contextual, and violence-related variables across the pre-pandemic, pandemic, and post-pandemic periods. This is a cross-sectional epidemiological study comprising 78,658 self-harm notifications recorded in the Information System for Notifiable Diseases (Sistema de Informação de Agravos de Notificação [SINAN]) between 2018 and 2022, covering seven [7]Brazilian states. Descriptive analyses and multiple logistic regressions examined associations between recurrence, self-harm methods, demographic variables, and exposure to other forms of violence. Self-harm predominantly affected adolescents who were female, white, living in urban areas, and exposed to domestic violence. Poisoning/intoxication and sharp objects were the most frequent methods, while 47.7% of cases were recurrent. The pandemic period showed a reduction in overall notifications but an increase in more lethal methods, especially hanging. Recurrence was more frequent among boys, adolescents with disabilities or mental disorders, and those exposed to multiple types of violence. The predictive models indicated strong associations between exposure to interpersonal violence and the methods used for self-harm.

Keywords: Self-harm. Adolescent. Recurrence.

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RESUMO: Este estudo analisou preditores de recorrência e de métodos de autolesão entre adolescentes brasileiros, considerando variáveis demográficas, contextuais e relacionadas à violência nos períodos pré, durante e pós-pandemia. Trata-se de um estudo epidemiológico transversal com 78.658 notificações de autolesão registradas no Sistema de Informação de Agravos de Notificação (SINAN) entre 2018 e 2022, abrangendo sete estados brasileiros. Análises descritivas e regressões logísticas múltiplas examinaram associações entre recorrência, métodos de autolesão, variáveis demográficas e exposição a outras formas de violência. A autolesão afetou predominantemente adolescentes do sexo feminino, brancos, residentes em áreas urbanas e expostos à violência doméstica. Intoxicação/envenenamento e perfurocortantes foram os métodos mais frequentes, enquanto 47,7% dos casos foram recorrentes. O período pandêmico mostrou redução nas notificações gerais, mas aumento de métodos mais letais, especialmente o enforcamento. A recorrência foi mais frequente entre meninos, adolescentes com deficiência ou transtornos mentais e aqueles expostos a múltiplos tipos de violência. Os modelos preditivos indicaram fortes associações entre exposição a violências interpessoais e os métodos utilizados para a autolesão.

Palavras-chave: Autolesão. Adolescente. Recorrência.

RESUMEN: Este estudio analizó los predictores de recurrencia y de los métodos de autolesión entre adolescentes brasileños, considerando variables demográficas, contextuales y relacionadas con la violencia en los períodos anterior, durante y posterior a la pandemia. Se trata de un estudio epidemiológico transversal, basado en 78.658 notificaciones de autolesión registradas en el Sistema de Información de Agravios de Notificación (SINAN), entre 2018 y 2022, en siete unidades federativas brasileñas. Se realizaron análisis descriptivos y regresiones logísticas múltiples para investigar las asociaciones entre recurrencia, métodos de autolesión, características sociodemográficas y exposición a la violencia. Predominaron los adolescentes de sexo femenino, blancos y residentes en áreas urbanas. La intoxicación/envenenamiento y los objetos punzocortantes fueron los métodos más frecuentes, y el 47,7% de los casos fueron recurrentes. Durante el período de distanciamiento social, se observaron menos notificaciones, pero un mayor uso de métodos potencialmente más letales, especialmente el ahorcamiento. La recurrencia presentó mayores probabilidades entre los varones, los adolescentes con discapacidad o trastorno mental y aquellos expuestos a múltiples formas de violencia. Los modelos evidenciaron asociaciones entre violencia interpersonal, recurrencia y métodos de autolesión.

Palabras clave: Autolesión. Adolescente. Recurrencia.

INTRODUCTION

Suicide is a complex, multifactorial phenomenon and a major global public health concern (ORNELL F, et al., 2022; WEAVER ND, et al., 2025). According to the World Health Organization (WHO, 2025b), it is the third leading cause of death among adolescents and young people aged 15-29, ranking second among females and third among males. Most suicides occur in low- and middle-income countries (73%), and although global suicide rates have declined in recent decades, the issue remains a serious public health problem (WHO, 2025b). Despite this reduction, suicide continues to be underestimated and underreported due to social and cultural stigma, limiting recognition of the problem and weakening epidemiological surveillance (ALVES FJO, et al., 2024; WEAVER ND, et al., 2025).

Violence, as defined by the WHO (2002), refers to the intentional use of physical force or power against oneself, another person, or a community, with a high likelihood of resulting in injury, death, psychological harm, or impaired development. Among the different manifestations of violence, self-harm, focus of the present study includes suicidal behaviors such as ideation, planning, and attempts, as well as self-injurious acts with or without suicidal intent (WHO, 2002). It is estimated that for every suicide death there are more than 20 attempts, highlighting the magnitude and urgency of addressing this phenomenon (ALVES FJO, et al., 2024).

Although suicide and non-suicidal self-injury are distinct phenomena, both share trajectories of psychological suffering along a continuum of mental health risk in adolescence (NOCK MK, 2016). Self-injury refers to intentional behaviors directed against oneself that may or may not result in tissue damage, ranging from milder forms such as scratching or interfering with wound healing to potentially lethal methods, including cutting, hanging, and poisoning (NOCK MK, 2009; NOCK MK, 2010; VELOSO-BESIO C, et al., 2023). These behaviors often function as maladaptive emotion regulation strategies in response to adverse experiences such as intense distress, family conflict, interpersonal difficulties, and everyday stressors (NOCK MK, 2010). Many adolescents report engaging in self-injury to obtain temporary emotional relief, a dynamic described as addictive due to the reinforcing cycle of pain and relief (NOCK MK, 2010).

In Brazil, self-inflicted injuries have been subject to compulsory reporting in the Notifiable Health Conditions Information System (SINAN) since 2011, although the system does not distinguish suicidal intent from self-harm (BRASIL, 2024). Despite this limitation, SINAN provides important evidence on the epidemiological profile of self-harm among Brazilian adolescents. In 2021, 114,159 cases of self-directed violence were recorded, 70.3% involving females. The most frequent self-harm methods was poisoning/intoxication (67.1%), followed by sharp objects (17.9%) and hanging (6.6%). Men had a 3.3-fold higher risk of self-harm by hanging and a 7.2-fold higher risk by firearm compared with women, while Indigenous populations presented higher proportions of these methods (BRASIL, 2024).

Over recent decades, self-harm among adolescents has become a growing public health concern. The COVID-19 pandemic worsened mental health indicators worldwide, and infectious disease outbreaks are recognized as factors that intensify suicidal and self-injurious behaviors, particularly in contexts of socioeconomic vulnerability (ALVES FJO, et al., 2024;

SOARES FC, et al., 2022; WHO, 2025a). Globally, suicide rates declined by 36% between 2000 and 2019; however, they increased by 17% in the Americas, with Brazil showing a rise of 43% (ALVES FJO, et al., 2024). During the pandemic, although overall suicide rates in Brazil remained relatively stable, increases were observed among adolescents, especially girls, Black youth, and residents of peripheral areas (ORNELL F, et al., 2022).

The Brazilian pandemic context was characterized by worsening social vulnerabilities. Poverty and food insecurity increased, disproportionately affecting populations already experiencing socioeconomic inequalities (NASSIF PIRES L, et al., 2021). Prolonged school closures widened educational disparities and negatively affected the social and emotional development of children and adolescents (NASSIF PIRES LN, et al., 2021). At the same time, domestic violence and unemployment increased, revealing the fragility of social protection systems and the limited reach of public policies during the crisis (SOUZA LJ e FARIAS RCP, 2022). Furthermore, the absence of effective violence-prevention strategies deepened ethno-racial and gender inequalities, disproportionately affecting women, Black populations, and socially vulnerable groups (ALLOATTI MN e MATOS OAL, 2023; DANTAS ESO, et al., 2023). These dynamics highlight the intersection between social determinants of health and historical inequalities in Brazil.

Although there is consensus that the COVID-19 pandemic affected the mental health of children and adolescents, evidence regarding its impact on self-harm remains mixed. In Brazil, some studies reported reductions in hospitalization rates combined with proportional increases in suicide deaths during the pandemic (CABRAL S, et al., 2023; GOMES FILHO CH, et al., 2022), while others found no significant changes in notifications among children and adolescents (SGOBBI FM, et al., 2022). Internationally, a meta-analysis identified increases in suicidal ideation and suicide attempts but not in suicide mortality rates (YAN Y, et al., 2023). Consequently, recent research has sought to characterize the epidemiological profile of self-harm among Brazilian adolescents, focusing on recurrence, methods used, victim characteristics, and associated contextual factors (BRITO FAMD, et al., 2021; CABRAL S, et al., 2023; CIVIERO JCZ e TORRES JRP, 2024; FATTAH N e LIMA MS, 2020; GOMES FILHO CH, et al., 2022; LEITE FMC, et al., 2022; SGOBBI FM, et al., 2022).

The recurrence of self-inflicted injuries has emerged as an important indicator of persistent psychological distress among adolescents. Evidence shows that a substantial proportion of reported cases involves individuals with a previous history of self-harm. In

Brazil, analyses of SINAN indicate that recurrent cases account for approximately four in every ten notifications of self-directed violence (BRASIL, 2024). Similarly, Fattah N and Lima MS (2020) found that 41% of notifications in a southern state involved individuals with previous episodes of self-harm or suicide attempts, with higher rates among female adolescents aged 15–19 years. In Espírito Santo, Leite FMC, et al. (2022) observed recurrent violence in 46.4% of adolescent cases, with higher prevalence among girls (PR = 1.26), adolescents aged 10–14 (PR = 1.20), and those with disabilities or mental disorders (PR = 1.52). The home was the main setting of repeated episodes, emphasizing the domestic environment as an important context of vulnerability. These findings indicate that recurrence reflects ongoing exposure to cumulative risk factors, including interpersonal violence, structural inequalities, and limited access to psychosocial care (HOLLAND KM, et al., 2017; UDDIN R, et al., 2019; YAN Y, et al., 2023).

Regarding methods of self-harm, Brito FAMD, et al. (2021) analyzed notifications between 2009 and 2016 and identified a substantial increase in recorded cases from 2.1 to 25.7 per 100,000 adolescents. Notifications were more frequent among girls aged 15–19 years and occurred predominantly in the home environment. Poisoning was the most frequent self-harm methods, followed by sharp objects, with a marked increase among female adolescents. The authors also highlighted limitations in the quality of notifications and in the training of health professionals to identify and report cases, emphasizing the need to strengthen prevention and follow-up strategies.

Other Brazilian studies have described consistent patterns of inequality in self-harm notifications, particularly regarding gender, race/color, and geographic context. Female adolescents aged 15–19 and those identified as Black or Brown are among the most affected groups, with poisoning and cutting as the most common methods and the home as the main place of occurrence (CIVIERO JCZ e TORRES JRP, 2024; FATTAH N e LIMA MS, 2020; LEITE FMC, et al., 2022). These patterns reinforce the role of structural inequalities and intersectionality in shaping psychosocial vulnerability, highlighting the importance of public policies that explicitly address gender identity, ethnic-racial dimensions, and sexual diversity (WEAVER ND, et al., 2025).

Evidence also demonstrates strong associations between self-injurious behavior, exposure to interpersonal violence, mental disorders, and social inequalities (LEITE FMC, et al., 2022). A retrospective cohort study conducted in Taiwan found that adolescents exposed to

violence had significantly higher risks of suicide and mental disorders than those without such experiences (SUNG C, et al., 2025). Over a 15-year follow-up period, suicide rates were significantly higher among adolescents who had experienced violence, even after adjusting for sex, age, area of residence, and psychiatric comorbidities. Among victimized adolescents, the most frequent suicide methods were poisoning, hanging, firearm use, and sharp instruments (SUNG C, et al., 2025). These findings highlight the importance of understanding how victimization experiences affect adolescent mental health and emphasize the need for targeted psychological interventions and prevention policies.

Despite advances in the literature, important gaps remain regarding the temporal dynamics of self-harm and the effects of critical events such as the COVID-19 pandemic on recurrence and methods used (YAN Y, et al., 2023). In addition, the interaction between sociodemographic characteristics, exposure to other forms of violence, and contextual factors of occurrence remains insufficiently explored. Repeated exposure to multiple forms of violence, known as polyvictimization, has been associated with greater psychological vulnerability and increased risk of revictimization (SUNG C, et al., 2025). In this context, the present study aimed to test predictive models for recurrence and for the methods employed in adolescent self-harm (hanging, blunt objects, sharp instruments, hot substances/thermal injury, and poisoning/intoxication, as well as firearms), taking into account the pandemic period (pre, during, and post-COVID-19), exposure to other forms of violence, location and area of occurrence, and demographic variables (sex, age, race/ethnicity identification, schooling, and the presence of disability or mental disorder). By identifying associated patterns and factors, we seek to provide empirical evidence to inform improved prevention strategies, early intervention, and the improvement of public policies targeted at adolescent mental health.

METHODS

This is an ecological study with an epidemiological survey design that used notifications of self-directed violence among adolescents aged 10 - 19 years recorded in Brazil's Notifiable Health Conditions Information System (SINAN) of the Unified Health System (SUS). Data on notifications of self-harm among adolescents were collected from SINAN via the State Health Surveillance Secretariats-specifically, the Noncommunicable Diseases and Injuries Surveillance Units-in seven Brazilian states (Amazonas, Pará, Ceará, the Federal District, São Paulo, Rio de Janeiro, and Rio Grande do Sul), spread across the country's five macro-regions.

Each state provided a database containing all Individual Notification Forms (FIN-SINAN) filed by health professionals for cases of self-directed violence against adolescents between 2018 and 2022. The data collection is part of a multicenter, multimethod study on family violence in Brazil that includes secondary analyses of official records, surveys on individual and family indicators, and qualitative interviews. The chosen time frame encompasses a recent period of notifications of self-harm in the Brazilian context, expanding the available evidence beyond a prior national study that described notifications recorded by health professionals between 2018 and 2021 (SGOBBI FM, et al., 2022). Data analysis was conducted in 2023.

Initially, suspected or confirmed cases of violence are recorded by professionals in public or private health services using the FIN-SINAN form, which comprises 69 items distributed across eight categories: general data; individual notification; household information; information about the person assisted; characteristics of the occurrence; types of violence; information on the probable perpetrator; and referral information. Forms are completed based on psychosocial and clinical assessments conducted by professionals, following the specific guidance in the FIN-SINAN manual (BRASIL, 2016). For each variable, professionals selected from predefined response options in addition to "unknown" and "not applicable." The "unknown" option was used when information was unavailable (e.g., unconscious victims or absence of an accompanying person), whereas "not applicable" was used when the question did not pertain to the victim (e.g., pregnancy items for male individuals). Importantly, these alternatives were not considered missing data.

Subsequently, municipal, state, and federal surveillance intermediaries transfer the data to SINAN Net, an application developed by DataSUS/MS. SINAN Net is used to collect, transmit, and consolidate data obtained daily by the epidemiological surveillance system for conditions of compulsory notification, providing essential information for decision-making and for analyzing the population's morbidity profile within SUS (BRASIL, 2016). As part of evidence-informed decision-making practices, some of the collected information is publicly available at https://datasus.saude.gov.br/informacoes-de-saude-tabnet/. In Brazil, compulsory notification of self-harm and other forms of violence against adolescents is regulated by Ordinance No. 104/2011 and is mandatory for professionals in both the public and private health networks. Data collection follows the guidelines of the "Instruction Sheet for Reporting Interpersonal and Self-Inflicted Violence" (BRASIL, 2016), which standardizes completion and

reporting procedures. Access to the full database was authorized by the Research Ethics Committee (CAAE: [OMITTED FOR BLIND REVIEW]).

The sample included 78,658 suspected or confirmed cases of self-harm among adolescents aged 10 to 19 years, recorded between 2018 and 2022. The mean age was 15.8 years (SD = 2.2). Most cases involved female (78.7%), white (51.7%) or brown (30.8%) individuals, and those without physical, auditory, or visual disabilities (78.1%). A total of 1.5% of the sample reported mental disabilities, while 21.7% presented with a mental disorder. Regarding education, adolescents were predominantly enrolled in primary (31.0%) or secondary (35.8%) education. Most cases occur in urban zones (92.8%), with residences being the primary place of occurrence (84.4%). Reports were distributed across different periods of social isolation: before (46.3%), during (11.7%), and after (42.0%). Exposure to other forms of violence was also reported, including physical violence (27.2%), psychological violence (5.5%), negligence (1.3%), sexual violence (0.2%), and torture (0.5%). Various means of aggression were identified, most frequently poisoning/intoxication (56.0%) and sharp objects (28.5%), followed by hanging (4.2%), blunt objects (2.0%), hot substances/objects (0.7%), and firearms (0.3%). Recurrence of self-harm was observed in nearly half of the cases (47.7%). Sociodemographic and contextual information on the reported cases is summarized in (Table 1).

Table 1. Sociodemographic characteristics of the sample (N = 78,658).

Variable	N	(%)
Gender		
Male	16748	(21,3)
Female	61895	(78,7)
Ignored	15	(0,0)
Missing	0	
Ager		
10	609	(0,7)
11	1714	(2,1)
12	4053	(5,1)
13	7139	(9,0)
14	9585	(12,1)
15	11254	(14,3)
16	12048	(15,3)
17	11545	(14,6)
18	10426	(13,2)
19	10285	(13,0)
Race/ethnicity identification		
White	40557	(51,7)
Black	5190	(6,6)
Yellow	470	(0,6)
Brown	24175	(30,8)
Indigenous	511	(0,7)

Ignored	7523	(9,6)
Missing	232	
Physical Auditory and Visual Disability		
Yes	399	(0,5)
No	60476	(78,1)
Ignored	16519	(21,3)
Missing	1264	
Mental Disability		
Yes	1178	(1,5)
No	59721	(77,1)
Ignored	16519	(21,3)
Missing	1240	
Mental Disorder		
Yes	16918	(21,7)
No	44609	(57,2)
Ignored	16517	(21,2)
Missing	614	
Schooling		
Primary Education	23437	(31,0)
Secondary Education	27062	(35,8)
Incomplete Higher Education	1373	(1,8)
Ignored	23721	(31,4)
Missing	3065	
Occurrence Zone		
Rural	3662	(4,9)
Urban	69059	(92,8)
Peri-urban	408	(0,5)
Ignored	1319	(1,8)
Missing	4210	
Place of occurrence		
Bar or similar	142	(0,2)
Commercial/Services	235	(0,3)
School	2095	(2,7)
Collective housing	774	(1,0)
Industry/Construction	24	(0,0)
Sports facility	63	(0,1)
Residence	66319	(84,4)
Public road	2546	(3,2)
Other	1621	(2,1)
Ignored	4803	(6,1)
Missing	36	
Period of social isolation		
Before	36415	(46,3)
During	9177	(11,7)
After	33066	(42,0)
Missing	0	
Exposure to other forms of violence		
Physical		
Yes	12409	(27,2)
No	32641	(71,7)
Ignored	465	(1,0)
Missing	77	
Psychological		
Yes	2522	(5,5)
No	42180	(92,8)
Ignored	732	(1,6)
Missing	158	

Neglect		
Yes	611	(1,3)
No	44047	(96,9)
Ignored	752	(1,6)
Missing	182	
Sexual		
Yes	117	(0,2)
No	44537	(98,0)
Ignored	748	(1,6)
Missing	190	
Torture		
Yes	264	(0,5)
No	44396	(97,7)
Ignored	741	(1,6)
Missing	191	
Means of Aggression – Hanging		
Yes	3274	(4,2)
No	73012	(94,1)
Ignored	1282	(1,7)
Missing	1090	
Means of Aggression – Blunt object		
Yes	1544	(2,0)
No	74652	(96,3)
Ignored	1302	(1,7)
Missing	1160	
Means of Aggression – Sharp object		
Yes	22166	(28,5)
No	54527	(70,1)
Ignored	1120	(1,4)
Missing	845	
Means of Aggression – Hot substance/object		
Yes	546	(0,7)
No	75703	(97,6)
Ignored	1290	(1,7)
Missing	1119	
Means of Aggression – Poisoning/Intoxication		
Yes	43678	(56,0)
No	33461	(42,9)
Ignored	1165	(1,2)
Missing	603	
Means of Aggression – Firearm		
Yes	197	(0,3)
No	76017	(98,1)
Ignored	1294	(1,7)
Missing	1150	
Recurrence		
Yes	37386	(47,7)
No	25944	(33,1)
Ignored	15120	(19,3)
Missing	208	

Fonte: Dados SINAN . Nota: M = Mean; SD = Standard Deviation.

The analysis focused on reports of self-harm among adolescents across all regions of the country, with emphasis on the seven Brazilian states noted above. The variables analyzed

included: sex (female, male); age (10-19 years); race/color (White, Black, Brown, Yellow/Asian, Indigenous); method of self-injury (hanging, blunt object, sharp instrument, hot substance/object, poisoning/intoxication, and firearm); area of occurrence (urban, peri-urban, rural); place of occurrence (residence, public thoroughfare, public areas); and recurrence (SINAN form item 53: "occurred other times"). In addition, we examined the number of notifications across three COVID-19 - related periods: (a) before social distancing (January 1, 2018 to March 19, 2020); (b) during mandated social distancing (March 20, 2020 to January 17, 2021); and (c) after social distancing (January 18, 2021 to December 31, 2022).

Binary logistic regression analyses were conducted to test two predictive models. The first model used recurrence as the outcome, with the following predictors: demographic variables (age, sex, race/color, schooling, and disability/mental disorder), area of occurrence, place of occurrence, isolation period (pre-, during-, and post-COVID-19), and exposure to other forms of violence (physical, psychological, neglect, sexual, and torture). The second model used method of self-harm as the outcome (hanging, blunt object, sharp instrument, hot substance/thermal injury, poisoning/intoxication, and firearm). For each method, the predictors tested were: demographic variables (age, sex, race/color, schooling, and disability/mental disorder), area of occurrence, place of occurrence, isolation period (pre-, during, and post-COVID-19), exposure to other forms of violence (physical, psychological, neglect, sexual, and torture), and recurrence. For reasons of parsimony and to improve the clarity of presentation, only the most frequent self-harm methods (poisoning/intoxication and sharp instrument) are presented in tables in the Results section. The tables presenting the results for the less frequent self-harm methods are available from the authors upon request. Odds ratios (ORs) were estimated for the predictors, and model explanatory power was assessed using Tjur's R^2. To enhance parsimony, cases with sex recorded as "unknown" were excluded from inferential analyses. For the logistic regressions, similar categories were combined and variables were coded as follows: (1) age as a continuous variable; (2) sex: male = 1, female = 0; (3) race/color: White = 0, ethnoracial minority = 1 (Black, Brown, Indigenous, or Yellow/Asian); (4) schooling: elementary or less = 0 (illiterate or elementary school), secondary = 1 (high school or incomplete higher education); (5) disability/mental disorder: none = 0, presence of any condition = 1 (physical disability, mental disorder, or psychological condition); (6) area of occurrence: urban = 0, peri-urban or rural = 1; (7) place of occurrence: residence = 0, public roads/spaces = 1; (8) isolation period: pre = 0, during = 1, post = 2; (9)

exposure to physical, psychological, neglect, sexual violence, and torture: absent = 0, present = 1; and (10) recurrence: absent = 0, present = 1. Statistical analyses were performed using RStudio (2020), an integrated development environment for R.

RESULTS

Recurrence of self-harm was more frequent among male adolescents (OR = 1.392; ≈39% higher than females), among those with any disability or mental disorder (OR = 2.713), and among victims who had experienced sexual violence (OR = 1.650) or torture (OR = 1.502). Lower odds of recurrence were observed in peri-urban/rural areas compared with urban settings (OR = 0.803) and among adolescents who had experienced neglect (OR = 0.748). Tjur's R^2 was 0.052, indicating that the model explained a small proportion of the variance in recurrence (**Table 2**).

Table 2. Coefficients of the multiple logistic regression model including all possible independent variables recurrence and methods of self-harm behavior.

Recurrence	b	SE	df	p-value	OR Exp (B)	95% CI for OR		R Tjur
						Upper	Lower	
Constant	-0.100	0.079	14	0.204	0.905	0.775	1.056	0.052
Age	-0.015	0.005	14	0.002	0.985	0.976	0.994	
Sex (1)	0.331	0.025	14	0.000	1.392	1.325	1.461	
Race/ethnicity identification (1)	0.126	0.020	14	0.000	1.134	1.090	1.181	
Disability (1)	0.998	0.023	14	0.000	2.713	2.595	2.836	
Schooling (1)	-0.019	0.013	14	0.150	0.981	0.956	1.007	
Zone (1)	-0.220	0.042	14	0.000	0.803	0.740	0.872	
Place (1)	0.135	0.036	14	0.000	1.145	1.067	1.228	
Isolation – during (1)	0.158	0.052	14	0.002	1.171	1.058	1.297	
Isolation – after (2)	0.144	0.029	14	0.000	1.154	1.091	1.221	
Physical violence (1)	0.145	0.023	14	0.000	1.156	1.105	1.210	
Psychological violence (1)	0.049	0.044	14	0.258	1.051	0.965	1.145	
Neglect (1)	-0.290	0.107	14	0.007	0.748	0.607	0.923	

Sexual violence (1)	0.500	0.207	14	0.016	1.650	1.109	2.504
Torture (1)	0.407	0.137	14	0.003	1.502	1.152	1.974

Fonte: Dados do SINAN. **Nota:** b = logistic regression coefficient; SE = standard error; df = degrees of freedom; p-value = significance level; OR Exp (B) = odds ratio; 95% CI for OR = 95% confidence interval for the odds ratio; R Tjur = effect size measure based on model fit.

Most Frequent Self-Harm Methods

1. Sharp object

Analyses of self-harm by sharp instrument indicated that age was a protective factor (OR = 0.844), such that each additional year of age was associated with an approximately 15.6% decrease in the odds of the outcome, with statistical significance. Belonging to an ethnoracial minority (OR = 1.098) and having a disability (OR = 1.110) significantly increased the odds. With respect to the isolation periods, both during (OR = 1.274) and after (OR = 1.190) were associated with higher odds, statistically significant in both cases. Among violence types, physical violence (OR = 1.836), sexual violence (OR = 1.746), and especially torture (OR = 3.134) substantially increased the odds. In contrast, psychological violence (OR = 0.724) and neglect (OR = 0.455) significantly reduced the odds. Finally, recurrence showed the largest effect (OR = 3.782), indicating nearly a fourfold increase in the likelihood of the outcome, with strong statistical significance. Tjur's R^2 was 0.118, indicating modest explanatory power for this model (Table 3).

Table 3. Coefficients of the multiple logistic regression model including all possible independent variables methods of self-harm behavior – Sharp object.

Sharp object	b	SE	df	p-value	OR	95% CI for OR		R Tjur
					Exp (B)	Upper	Lower	
Constant	0.749	0.087	15	0.000	2.116	1.783	2.510	0.118
Age	-0.170	0.005	15	0.000	0.844	0.835	0.853	
Sex (1)	-0.035	0.028	15	0.213	0.965	0.913	1.021	
Race/ethnicity identification (1)	0.093	0.022	15	0.000	1.098	1.050	1.147	
Disability (1)	0.104	0.024	15	0.000	1.110	1.059	1.163	
Schooling (1)	0.008	0.015	15	0.606	1.008	0.979	1.038	
Zone (1)	-0.026	0.047	15	0.582	0.974	0.888	1.069	
Place (1)	-0.051	0.039	15	0.190	0.950	0.880	1.025	
Isolation–during (1)	0.242	0.056	15	0.000	1.274	1.141	1.422	
Isolation – after (2)	0.174	0.031	15	0.000	1.190	1.120	1.264	
Physical violence (1)	0.608	0.025	15	0.000	1.836	1.748	1.929	
Psychological violence (1)	-0.323	0.049	15	0.000	0.724	0.658	0.796	

Neglect (1)	-0.787	0.137	15	0.000	0.455	0.346	0.593
Sexual violence (1)	0.557	0.201	15	0.006	1.746	1.177	2.593
Torture (1)	1.142	0.138	15	0.000	3.134	2.396	4.120
Recurrence (1)	**1.330**	**0.025**	**15**	**0.000**	**3.782**	**3.605**	**3.970**

Fonte: Dados do SINAN

2. Poisoning/Intoxication

Self-harm by poisoning/intoxication was more likely among males (OR = 1.502) and occurred more frequently at home (OR = 0.399). The presence of physical violence (OR = 0.549), psychological violence (OR = 1.268), neglect (OR = 0.574), sexual violence (OR = 0.404), or torture (OR = 0.397) reduced the odds of poisoning. Tjur's R^2 was 0.099, indicating low explanatory power of the model (Table 4).

Table 4. Coefficients of the multiple logistic regression model including all possible independent variables methods of self-harm behavior – Poisoning/Intoxication.

Poisoning/ Intoxication	b	SE	df	p-value	OR Exp (B)	95% CI for OR		R Tjur
						Upper	Lower	
Constance	-1.423	0.081	15	0.000	0.241	0.206	0.283	0.099
Age	0.132	0.005	15	0.000	1.142	1.131	1.153	
Sex (1)	0.407	0.026	15	0.000	1.502	1.428	1.579	
Race/ethnicity	- 0.051	0.021	15	0.014	0.950	0.912	0.990	
Identification (1)								
Disability (1)	-0.020	0.022	15	0.369	0.980	0.938	1.024	
Schooling (1)	-0.003	0.014	15	0.843	0.997	0.971	1.024	
Zone (1)	-0.473	0.044	15	0.000	0.623	0.572	0.679	
Place (1)	-0.918	0.038	15	0.000	0.399	0.371	0.430	
Isolation – during (1)	-0.166	0.052	15	0.001	0.847	0.765	0.939	
Isolation – after (2)	0.012	0.029	15	0.677	1.012	0.956	1.071	
Physical violence (1)	-0.600	0.024	15	0.000	0.549	0.524	0.575	
Psychological violence (1)	0.238	0.045	15	0.000	1.268	1.162	1.385	
Neglect (1)	-0.555	0.116	15	0.000	0.574	0.456	0.719	
Sexual violence (1)	-0.907	0.228	15	0.000	0.404	0.254	0.623	
Torture (1)	-0.923	0.151	15	0.000	0.397	0.294	0.531	
Recurrence (1)	**-0.868**	**0.021**	**15**	**0.000**	**0.420**	**0.403**	**0.437**	

Fonte: Dados do SINAN

DISCUSSION

Logistic regression analyses revealed that self-harm recurred in 47.7% of the sample. Prior studies reported similar figures (41% [FATTAH N e LIMA MS, 2020; 46.4% LEITE

FMC, et al., 2022]), underscoring a clinically relevant phenomenon that reflects the persistence of psychological distress and the fragility of institutional prevention and care responses. This high proportion indicates that nearly half of the notified adolescents had previously self-injured, revealing a pattern of repetition and chronic vulnerability. The most salient predictor was the presence of disability or mental disorder (OR = 2.713), suggesting that adolescents with these conditions are nearly three times more likely to reengage in self-harm, consistent with literature highlighting the strong comorbidity between psychiatric disorders and self-destructive behaviors (BRASIL, 2024; LEITE FMC, et al., 2022; NOCK MK, 2010; SUNG C, et al., 2025; WEAVER ND, et al., 2025). Sexual violence was also a relevant predictor, increasing the likelihood of recurrence by 65%. The literature indicates that early sexual victimization is associated not only with the onset but also with the repetition of self-harm, due to persistent feelings of guilt, shame, and helplessness that foster self-destructive coping strategies (ALVES FJO, et al., 2024; JEGLIC EL, et al., 2025; WHO, 2025b). Similarly, the experience of torture showed a significant association, underscoring the cumulative burden of severe trauma and its relationship with the chronicity of psychological distress (LIMA RFF, HABIGZANG LF e MORAIS NA, 2025; WHO, 2025b). These findings confirm the overlap between multiple forms of victimization and the risk of revictimization through self-harm, a phenomenon already discussed in studies on polyvictimization in the Brazilian context (LEITE FMC, et al., 2022; LIMA RFF, HABIGZANG LF e MORAIS NA, 2025; SUNG C, et al., 2025).

Demographic factors also exerted a meaningful influence. Male adolescents (OR = 1.392) and those residing in urban areas had a higher probability of recurrence compared with female adolescents and those living in rural zones. These results differ from prior findings (FATTAH N e LIMA MS, 2020; LEITE FMC, et al., 2022). Leite FMC, et al. (2022) identified greater recurrence among girls exposed to psychological violence and neglect (30%), which may reflect temporal and geographic differences, given that their study was conducted in a single Brazilian state and prior to the COVID-19 pandemic. The magnitude of recurrence observed in the present study-coupled with multiple individual, contextual, and relational vulnerabilities-suggests structural failures in the early detection and ongoing follow-up of adolescents experiencing psychological distress. Taken together, these findings indicate that the repetition of self-harm reflects both discontinuities in mental health care and the persistence of social and territorial inequalities, underscoring the urgency of intersectoral public policies that connect schools, families, and health and social assistance services to ensure effective monitoring and

support for adolescents living in conditions of social vulnerability (ORNELL F, et al., 2022; WEAVER ND, et al., 2025; WHO, 2025b)

Self-harm by sharp objects-present in more than 28% of the sample-was significantly associated with prior exposure to multiple forms of violence, including physical and psychological violence, neglect, sexual violence, and torture. These predictors were also identified by Sung C, et al. (2025), reinforcing the link between victimization and the choice of self-injury method. According to Civiero JCZ e Torres JRP (2024), adolescents tend to use sharp objects as an emotion-regulation strategy because such methods are generally less lethal yet provide immediate relief from psychological pain. This association can also be understood through the lens of polyvictimization, in which different forms of violence converge to intensify subjective suffering and foster the adoption of self-harming practices.

In the specific case of torture, the repeated use of cutting instruments by aggressors-to inflict pain, exert control, humiliate, or instill psychological terror-may be internalized by victims as a form of self-punishment or as an attempt to retain control over suffering that finds no space for elaboration (VELOSO-BESIO C, et al., 2023). In this context, self-harm ceases to be merely an individual response to distress and comes to represent the reproduction of experienced patterns of violence, often chronically and in silence. Therefore, self-harm by sharp objects should be interpreted not only through clinical or psychological dimensions but also as a reflection of the interpersonal and structural violence to which adolescents are subjected (LEITE FMC, et al., 2022; WEAVER ND, et al., 2025; WHO, 2025b). This perspective broadens the scope of intervention, underscoring the importance of interdisciplinary and intersectoral approaches that take into account the imprint of trauma and its ramifications for the selection of self-harm methods.

Poisoning/intoxication was the most prevalent method of self-harm among the adolescents analyzed (56%), exhibiting a risk profile distinct from other means. The model showed that male sex and exposure to psychological violence were significantly associated with a higher likelihood of this behavior, in contrast to national and international evidence suggesting higher poisoning rates among girls (SUNG C, et al., 2025; WHO, 2025b; YAN Y, et al., 2023). This divergence points to cultural and contextual specificities in Brazil, related both to access to toxic substances in domestic settings and to patterns of expressing psychological distress among adolescents, which may vary by gender, territory, and social vulnerability (ALVES FJO, et al., 2024; BRASIL, 2024; LEITE FMC, et al., 2022). The positive

association with psychological violence reinforces the hypothesis that chronic interpersonal stressors-such as humiliation, threats, and persistent invalidation-can trigger less impulsive and more planned forms of self-harm, mediated by feelings of hopelessness, worthlessness, and loss of control (NOCK MK, 2010).

On one hand, poisoning may represent a silent strategy of self-destruction, often occurring in contexts of emotional isolation and internalized suffering where adolescents lack safe spaces to express their pain (ORNELL F, et al., 2022; WHO, 2025b). On the other hand, the protective effects observed for physical violence, sexual violence, and neglect suggest that these forms of victimization tend to be associated with more direct and lethal methods of self-harm, such as hanging or the use of blunt objects-a pattern consistent with the model of severity escalation and cumulative vulnerability identified in previous studies (LEITE FMC, et al., 2022). Moreover, the domestic environment concentrated most poisoning incidents, indicating that episodes take place in intimate and invisible spaces where suffering is rarely detected until it reaches critical levels (WEAVER ND, et al., 2025). Taken together, these findings underscore that poisoning, as a form of self-harm, cannot be understood solely through a clinical lens; it must be interpreted as an expression of relational and structural suffering among adolescents exposed to psychological violence and social isolation. Consequently, it is essential to strengthen intersectoral public policies aimed at preventing psychological violence and promoting mental health, prioritizing the development of protective bonds in family and school settings and expanding access to safe, culturally sensitive emotion-regulation strategies (ALVES FJO, et al., 2024; ORNELL F, et al., 2022; WHO, 2025b).

FINAL CONSIDERATIONS

This study contributes to global efforts to understand and prevent adolescent self-harm by mapping factors associated with both recurrence and the methods used an approach still underexplored in Brazil and Latin America, where suicide rates continue to rise despite global declines. To our knowledge, this is the first investigation to examine predictive models addressing both outcomes in a large sample of Brazilian adolescents across pre-, during-, and post-pandemic periods. The findings underscore the heterogeneity of self-harm, marked by multiple coexisting methods and a high recurrence rate (47.7%), revealing distinct risk profiles. Vulnerability was greater among female and White adolescents, those with disabilities or mental disorders, and those exposed to physical or sexual violence or torture, who showed

higher probabilities of recurrence and use of methods such as poisoning and sharp objects. The pandemic period intensified these patterns, with an increase in lethal methods, particularly hanging, especially in peri-urban and rural areas.

Despite its contributions, the study has limitations. The models showed low explanatory power, indicating the need to integrate environmental, psychosocial, and family variables capable of capturing subjective dimensions of self-harm. The use of secondary SINAN data may involve underreporting and inconsistencies, especially for less visible forms such as psychological violence. Although the sample covered all macro-regions, comparisons across states were not feasible. Notification quality depends on the training and perceptions of health professionals, potentially underrepresenting certain forms of violence and methods. Future research should integrate epidemiological and qualitative approaches to deepen the understanding of subjective meanings and social contexts of self-injury. Distinguishing notifications from public and private services may also help elucidate class-related disparities intersecting with gender, sexual orientation, and ethnoracial factors.

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