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SELF-HARM VIOLENCE AMONG ADOLESCENTS IN BRAZIL: EVIDENCE OF A SERIOUS PUBLIC HEALTH PROBLEM

*Violência autoprovocada entre adolescentes no Brasil: evidências de um grave problema de saúde pública**Violencia autolesiva entre adolescentes en Brasil: evidencia de un grave problema de salud pública***Gabriel Pavinati**¹ **Lucas Vinícius de Lima**² **Anny Caroline Ribeiro Devechi**³ **Adriane Bochi Candido**⁴ **Mateus Miranda Fernandes de Faria**⁵ **Gabriela Tavares Magnabosco**⁶ 

ABSTRACT

Objective: to characterize the temporal trend of self-inflicted violence among adolescents in Brazil. **Method:** time series study, based on notifications of self-harm among people aged 10 to 19 years from 2009 to 2019. The coefficients of violence, per 100,000 inhabitants, were calculated by macro-region in Brazil. Polynomial regression was employed for trend analysis. **Results:** a growing trend was identified in the coefficients of self-inflicted violence among adolescents in Brazil, especially among females ($y=26.4+6.1x+3.0x^2+0.5x^3$) aged between 15 and 19 years ($y=26.4+14.4x+2.5x^2$). All regions showed an upward trend, regardless of gender and age group. The South region had the highest coefficients, with increments for both sexes and ages. **Conclusion:** there is a need for coping strategies against self-harm aimed at implementing prevention and post-prevention policies, based on the specificities of different regional contexts, with a view to mitigating these events.

DESCRIPTORS: Suicide; Adolescent health; Time series studies.

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RESUMO

Objetivo: caracterizar a tendência temporal da violência autoprovocada entre adolescentes no Brasil. **Método:** estudo de séries temporais, a partir das notificações de lesão autoprovocada entre pessoas de 10 a 19 anos no período de 2009 a 2019. Os coeficientes de violência, por 100.000 habitantes, foram calculados por macrorregião do Brasil. A regressão polinomial foi empregada para a análise da tendência. **Resultados:** identificou-se tendência crescente dos coeficientes de violência autoprovocada entre adolescentes no Brasil, especialmente entre pessoas do sexo feminino ($y=26,4+6,1x+3,0x^2+0,5x^3$) e com idade entre 15 e 19 anos ($y=26,4+14,4x+2,5x^2$). Todas as regiões demonstraram tendência de aumento, independentemente do sexo e faixa etária. A região Sul teve os maiores coeficientes, com incrementos em ambos os sexos e as idades. **Conclusão:** aponta-se a necessidade de estratégias de enfrentamento da autoviolência voltadas à implementação de políticas de prevenção e posvenção, pautadas nas especificidades dos diferentes contextos regionais, com vistas à mitigação desses eventos.

DESCRIPTORIOS: Suicídio; Saúde do adolescente; Estudos de séries temporais.

RESUMEN

Objetivos: caracterizar la tendencia temporal de la violencia autoinfligida entre adolescentes en Brasil. **Método:** estudio de series temporales, a partir de notificaciones de autolesiones entre personas de 10 a 19 años de 2009 a 2019. Los coeficientes de violencia, por 100.000 habitantes, fueron calculados por macrorregión en Brasil. Se empleó la regresión polinomial para el análisis de tendencias. **Resultados:** se identificó una tendencia creciente en los coeficientes de violencia autoinfligida entre adolescentes en Brasil, especialmente entre mujeres ($y=26,4+6,1x+3,0x^2+0,5x^3$) con edades entre 15 y 19 años ($y=26,4+14,4x+2,5x^2$). Todas las regiones mostraron una tendencia ascendente, independientemente del género y el grupo de edad. La región Sur presentó los coeficientes más altos, con incrementos para ambos sexos y edades. **Conclusión:** existe la necesidad de estrategias de enfrentamiento a las autoagresiones dirigidas a la implementación de políticas de prevención y posprevención, a partir de las especificidades de los diferentes contextos regionales, con miras a la mitigación de estos eventos.

DESCRIPTORIOS: Suicidio; Salud del adolescente; Estudios de series temporales.

INTRODUCTION

The substantial number of children and adolescents who provoke self-injury has been observed worldwide. A meta-analysis review showed a high prevalence of non-suicidal self-injury (22.1%) and suicide attempts (6.0%) in this public around the globe, and in South American countries, the highest percentage of suicide attempts among youth (19.0%) was visualized.¹

This scenario was also found in Brazil. Research with national data found that the coefficient of self-harm violence increased from 2.1 cases per 100,000 people in 2009 to 25.7 cases in 2016.² This rise in cases denotes a challenging problem to be faced in the context of public health, since this situation impacts services, society, and the families of these young people.

Adolescence represents the time of life that spans the period between 10 and 19 years, a time when several physical, social, and emotional changes occur.³ For health professionals, this phase of the life cycle is seen as complex and the phenomenon of self-injury is shrouded in an imaginary of stereotypes and judgments, which weakens the care provided to this public.⁴

The World Health Organization (WHO) establishes three main groups that characterize people who commit violent acts, as follows: violence against oneself, also known as self-inflicted violence; interpersonal violence, comprising the domestic and community dimensions; and collective violence, which refers to political groups, terrorist organizations, militias, among others.⁵

Self-inflicted violence, for reporting and surveillance purposes in Brazil, comprises suicidal behavior (suicidal ideation, suicide attempt,

and suicide) or self-aggressions (without suicidal ideation, such as cutting, scratching, and burning).⁶ It is known that this self-injurious behavior is presented as an attempt for immediate relief of suffering and may be linked to mental disorders.⁷

The occurrence of self-aggressions may also indicate the existence of latent suffering, which denotes a prediction for possible episodes of attempts against life.⁸ Furthermore, suicide attempts are considered an important risk factor for suicide itself.⁹ Therefore, the great relevance and complexity of this grievance in the public health field is understood, especially among adolescents.

The occurrence of self-injury and suicide implies high social and family costs, and years of life lost, which categorizes this phenomenon as a serious public health problem.^{1,10} In this sense, it is necessary to (re)think about the various dimensions and particularities involving the occurrence of this grievance, in order to adequately address it in the Brazilian scenario.¹¹

In Brazil, reports of hospitalizations for self-harm in adolescents have been gradually increasing,⁸ with particularities in each region.¹² It is noteworthy that violence, alcohol and drug abuse, bullying, absence or lack of affection, family problems, depression, anxiety, and other mental disorders may represent some of the risk factors for self-harm.²

In this sense, epidemiological studies are valuable for the direction of more effective policies and practices regarding the prevention and promotion of health and well-being, because they analyze situations and contexts in which people are inserted. Thus, this study aimed to characterize the temporal trend of self-harm violence among adolescents in Brazil in the period from 2009 to 2019.

METHOD

Ecological time series study, population-based, conducted from the notifications of self-harm in people between 10 and 19 years old for the period from 2009 to 2019. This study had as unit of analysis the regions (North, Northeast, South, Southeast and Midwest) of Brazil. We followed the recommendations of the Reporting of Studies Conducted using Observational Routinely-Collected Health Data.¹³

The data came from the Sistema de Informação de Agravos de Notificação (Sinan) and from the Instituto Brasileiro de Geografia e Estatística (IBGE), accessed by the Departamento de Informática do Sistema Único de Saúde (Datasus), in September 2022. Sinan aggregates information from investigations and confirmations of diseases and illnesses of compulsory notification carried out by health services throughout the country.

This system is routinely fed by the notification forms of interpersonal/self-inflicted violence and, for the purpose of delimiting the cases of self-inflicted violence included in this study, we considered all records among people aged 10 to 19 years, from 2010 to 2019, whose variable "self-inflicted injury" was marked as "yes".

The time frame that precedes the covid-19 pandemic was chosen because it is an unprecedented intervention, especially in mental health. Moreover, the reorganization of the health systems to face this health crisis may have overloaded the care services, surveillance, and information systems, with possible underdetection and underreporting of diseases.¹⁴

The calculation of the annual coefficients of self-prompted violence for the macro-regions of the country was done by the ratio between the number of notifications of self-prompted violence, according to sex (male/female) and age bracket (10 to 14 years/15 to 19 years), over the resident population, in the same period, region, sex, or age bracket, and the result was multiplied by 100,000 inhabitants (inhab.).

In the calculation, the denominator of the ratios was the IBGE population census for the year 2010 and, for the intercensal years, the study of population estimates by region, sex and age group, prepared by the Ministry of Health, was used. With the annual coefficients calculated, we carried out a trend analysis, using the polynomial regression model, according to Latorre and Cardoso.¹⁵

In this modeling, the coefficients of violence were considered as the dependent variable (y) and the years of the period as the independent variable (x). In order to avoid autocorrelation among polynomials, the variable "year" was transformed into the variable "year-centered". Since no random changes were observed, the use of moving average smoothing was dispensed with.¹⁵

Scatter diagrams were architected to identify the trajectory of the data. Then, first-order ($y = \beta_0 + \beta_1 x$) and, if necessary, second-order ($y = \beta_0 + \beta_1 x + \beta_2 x^2$) and third-order ($y = \beta_0 + \beta_1 x + \beta_2 x^2 + \beta_3 x^3$) models were tested, where β_0 represents the average coefficient (intercept) and β_1 , β_2 and β_3 configure the annual variation/acceleration of the increasing (+) or decreasing (-) trend.¹⁵

The definition of the model considered the significance of the F and t tests, the coefficient of determination (r^2) closest to 1.00,

and the analysis of the residuals (assumption of true homoscedasticity). When the criteria for more than one model were met, the polynomial of simplest order was chosen.¹⁵ The SPSS® software, version 21.0, was used for the analysis and statistical significance was set at 5% ($p < 0.05$).

In compliance with the guidelines for ethics in research involving human beings in Brazil, recommended by Resolutions 466 of 2012 and 510 of 2016 of the National Health Council, the assessment by the Research Ethics Committee was waived because it was a study that used publicly available, aggregated data from a secondary source and without identification of participants.

RESULTS

There was an increase in the number of cases of self-harm among young people aged 10 to 19 years in the period analyzed, from 1,029 in 2009 to 41,369 in 2019. In Brazil, a coefficient of 133.1 cases per 100,000 inhab. was identified in the last year of the historical series, with higher values for females (213.3/100,000 inhab.) and for the age group of 15 to 19 years (183.7/100,000 inhab.) (Table 1).

With regard to the geographical distribution of the self-inflicted injury coefficients, in the last year of the series, coefficients were above the national figure for the Southern (205.5/100,000 inhab.), Southeastern (147.8/100,000 inhab.), and Central-western (164.6/100,000 inhab.) regions, while the Northern (62.9/100,000 inhab.) and Northeastern (71.3/100,000 inhab.) regions remained below the values verified for the country (Table 1).

The highest occurrence of self-prompted violence was observed among females, with an average coefficient of 26.4/100,000 inhabitants for the country, while for males the rate was 11.1/100,000 inhabitants. In the period, the highest average coefficients were observed among female (48.5/100,000 inhabitants) and male (20.1/100,000 inhabitants) adolescents in the South, while the lowest were noted in the Northeast (Table 2).

An increasing trend in the coefficients of self-harm among adolescents of both sexes was evident in all regions of the country. The highest increases in the series were noted in the Southern region, both among young males ($+10.4x + 1.6x^2$; $r^2 = 0.96$) and females ($+36.1x + 6.6x^2$; $r^2 = 0.95$), with moments of deceleration of the annual increase at the end of the period (Table 2).

The highest occurrence of self-induced violence was found among young people from 15 to 19 years of age, with an average coefficient of 26.1/100,000 inhab. for the country, while among the younger population the rate was 10.5/100,000 inhab. In the regions, the highest average coefficients were found among adolescents from 10 to 14 years of age (20.6/100,000 inhab.) and 15 to 19 years of age (49.9/100,000 inhab.) in the South, while the lowest were also found in the Northeastern region (Table 3).

For both age groups analyzed there was also an increasing tendency of the coefficients of self-inflicted violence in all regions of Brazil. The highest increases in the series were noted in the South, both among the 10 to 14 year-olds ($+15.9x + 2.9x^2$; $r^2 = 0.95$) and 15 to 19 year-olds ($+29.3x + 5.1x^2$; $r^2 = 0.95$) (Table 3).

Table I - Coefficients of self-harm among adolescents, per 100,000 inhabitants, by macro-region of Brazil, according to sex and age group

Location	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
North	2,8	3,5	6,9	7,3	10,5	10,5	12,6	16,9	30,6	34,7	62,9
Gender											
Male	1,4	2,0	3,0	4,0	5,8	6,5	8,1	9,9	16,1	16,4	28,8
Female	4,1	5,1	10,8	10,7	15,3	14,6	17,3	24,1	45,7	53,7	98,4
Age (years old)											
10 to 14	2,7	2,3	5,2	4,9	5,6	7,1	7,1	10,6	18,6	16,4	33,1
15 to 19	2,9	4,8	8,6	9,7	15,4	13,8	17,9	22,9	42,3	52,4	92,1
Northeast	2,4	2,9	5,5	7,1	10,0	9,7	12,1	13,8	24,1	38,5	71,3
Gender											
Male	1,2	1,5	3,1	3,9	5,7	5,2	7,1	7,6	12,9	18,1	30,1
Female	3,7	4,4	7,9	10,4	14,3	14,3	17,4	20,3	35,7	59,7	113,9
Age (years old)											
10 to 14	1,3	1,5	2,9	3,4	5,9	5,1	6,3	7,7	12,4	20,1	37,8
15 to 19	3,7	4,4	8,1	10,7	13,9	13,9	17,5	19,5	34,8	55,8	102,8
Southeast	3,1	5,1	13,6	19,3	22,3	27,4	34,1	41,5	71,0	100,4	147,8
Gender											
Male	1,8	3,1	8,0	10,5	12,2	14,2	17,0	20,9	33,0	45,0	58,0
Female	4,5	7,3	19,3	28,3	32,8	41,1	51,8	62,9	110,5	158,0	241,3
Age (years old)											
10 to 14	2,0	3,2	7,7	9,9	11,9	14,9	19,2	23,5	41,6	58,4	85,0
15 to 19	4,2	7,0	19,4	28,4	32,1	38,8	47,5	57,5	97,4	138,5	205,5
South	1,6	7,0	15,6	25,3	31,9	37,1	49,9	63,7	133,5	185,0	275,6
Gender											
Masculino	0,8	4,5	8,6	15,0	18,3	22,0	28,4	34,2	60,2	86,9	124,1
Female	2,4	9,6	22,7	36,0	46,1	52,8	72,3	94,3	209,9	287,2	433,8
Age (years old)											
10 to 14	1,3	4,0	8,9	14,0	19,0	23,7	31,6	37,3	96,9	125,1	190,0
15 to 19	1,8	10,0	22,0	36,0	43,6	49,0	66,0	86,6	165,6	238,4	353,5
Midwest	7,2	7,6	13,2	21,3	22,5	22,6	29,7	33,3	52,7	85,1	164,6
Gender											
Male	4,4	5,0	7,8	14,6	16,0	15,2	19,0	18,4	26,1	39,3	71,5
Female	10,2	10,3	18,9	28,1	29,3	30,1	40,8	48,8	80,4	132,7	261,3
Age (years old)											
10 to 14	3,4	3,9	7,8	12,9	13,1	11,7	17,9	18,0	32,0	48,4	94,4

15 to 19	11,1	11,3	18,6	29,4	31,5	32,7	40,7	47,7	72,3	119,9	231,3
Brazil	3,0	4,7	10,7	15,3	18,7	21,2	26,9	32,8	59,1	84,2	133,1
Gender											
Male	1,6	2,8	6,1	8,8	10,7	11,8	14,7	17,3	28,1	38,7	55,9
Female	4,3	6,7	15,4	22,1	26,9	30,9	39,6	48,9	91,4	131,5	213,3
Age (years old)											
10 to 14	1,9	2,8	6,1	8,1	10,4	12,0	15,5	18,6	36,4	49,7	78,9
15 to 19	4,1	6,7	15,2	22,3	26,5	29,7	37,4	45,6	79,9	116,2	183,7

Source: Notifiable Diseases Information System.

Table 2 - Polynomial regression models for the trend of the coefficients of self-harm among adolescents, by macro region of Brazil, according to sex.

Location	Average Coefficient	Annual Evolution	r ² †	p-value‡	T§
North					
Male	y=6,1	+2,2x/+0,3x ²	0,94	<0,001	Crescente
Female	y=13,4	+7,2x/+1,3x ²	0,92	<0,001	Crescente
Northeast					
Male	y=4,8	+2,2x/+0,3x ²	0,92	<0,001	Crescente
Female	y=10,0	+7,9x/+1,7x ²	0,88	<0,001	Crescente
Southeast					
Male	y=13,9	+4,9x/+0,6x ²	0,97	<0,001	Crescente
Female	y=35,9	+19,5x/+3,2x ²	0,95	<0,001	Crescente
South					
Male	y=20,1	+10,4x/+1,6x ²	0,96	<0,001	Crescente
Female	y=48,5	+36,1x/+6,6x ²	0,95	<0,001	Crescente
Midwest					
Male	y=13,3	+0,4x/+0,8x ² +0,2x ³	0,96	<0,001	Crescente
Female	y=22,7	+1,4x/+4,0x ² +0,9x ³	0,97	<0,001	Crescente
Brazil					
Male	y=11,1	+4,5x/+0,6x ²	0,95	<0,001	Crescente
Female	y=26,4	+6,1x/+3,0x ² +0,5x ³	0,99	<0,001	Crescente

†Coefficient of determination. ‡Value by F-test. §Tendency.

Source: Information System of Notifiable Diseases.

Table 3 - Polynomial regression models for the trend of the coefficients of self-harm among adolescents, by macro regions of Brazil, by age group.

Location	Average Coefficient	Annual Evolution	r ² †	p-value‡	T§
North					
10 to 14 years old	y=6,3	+2,3x/+0,4x ²	0,90	<0,001	Crescente
15 to 19 years old	y=13,0	+2,4x+1,2x ² +0,2x ³	0,98	<0,001	Crescente
Northeast					
10 to 14 years old	y=3,9	+0,3x/+0,5x ² +0,1x ³	0,97	<0,001	Crescente
15 to 19 years old	y=10,6	+7,3x+1,5x ²	0,89	<0,001	Crescente
Southeast					
10 to 14 years old	y=13,6	+7,0x/+1,1x ²	0,96	<0,001	Crescente
15 to 19 years old	y=34,9	+16,7x/+2,6x ²	0,95	<0,001	Crescente
South					
10 to 14 years old	y=20,6	+15,9x/+2,9x ²	0,95	<0,001	Crescente
15 to 19 years old	y=49,9	+29,3x/+5,1x ²	0,95	<0,001	Crescente
Midwest					
10 to 14 years old	y=10,4	+0,5x/+1,3x ² +0,3x ³	0,97	<0,001	Crescente
15 to 19 years old	y=25,0	+15,8x/+3,3x ²	0,87	<0,001	Crescente
Brazil					
10 to 14 years old	y=10,5	+2,6x/+1,1x ² +0,2x ³	0,99	<0,001	Crescente
15 to 19 years old	y=26,1	+14,4x/+2,5x ³	0,94	<0,001	Crescente

†Coefficient of determination. ‡Value by F-test. §Tendency.

Source: Information System of Notifiable Diseases.

DISCUSSION

An increasing trend in the coefficients of self-harm among male and female adolescents in Brazil was demonstrated, with a higher occurrence among females. Furthermore, an increasing tendency was identified among young people between 10 and 19 years of age, especially among those in their late teens. The Southern region had the highest rates and increases in the analyzed period; and the Northeastern region had the lowest.

These findings corroborate a study that showed a tendency for an increase in the number of reports of self-harm among young Brazilians of both sexes, especially in the South and Southeast regions of Brazil.¹⁶ Similarly, a study carried out in the state of Rio Grande do Sul indicated an increase in the number of reports of this grievance, especially among women and in the 15-19 age group.⁷

Furthermore, research conducted in Santa Catarina, which considered the notifications of self-inflicted violence among adolescents and adults, identified a higher occurrence of suicide attempts (with suicidal ideation) among young people, when compared with self-injury (without suicidal ideation).¹⁷ Although less frequent, the latter showed an important number of notifications among this public.¹⁷

The increase in the number of records of self-harm may be related to the publication of Ordinance No. 1271 of 2014, by which violence was included in the list of diseases of mandatory notification,¹⁸ and the dissemination of the instructional manual for the notification of interpersonal/self-inflicted violence in 2016.⁶ These changes highlight the issue among professionals, and may contribute to the detection and notification.

However, we emphasize the need to recognize the multiplicity of aspects that influence the occurrence of this phenomenon, especially when considering the complexity of the adolescent public, which reinforces the importance of investigations to identify, in addition to the work process of health and surveillance services, the motivations of young people to consummate the act during "adolescence".

On the other hand, it is imperative to consider the possibility of underreporting of self-harm, which may underestimate the rates of its occurrence identified in this research. Studies that used the information system that includes data on this grievance pointed to the possible underreporting of about 74% of the cases,¹⁹ especially the less severe events.^{16,20}

It is known that self-harm during adolescence is an extremely complex and multifaceted phenomenon.² Its occurrence is intertwined with a scenario of stereotypes, prejudices and taboos, impregnated in contemporary society, which can further hinder the provision of humanized, sensitive and holistic care,²¹ so necessary for mental health care.

This context can hinder the development and implementation of strategies aimed at overcoming this important disease. Moreover, the pandemic of covid-19 is added, which has caused numerous negative and substantial repercussions in the daily lives of individuals, such as social distancing, fear, and grief,

causing deleterious effects on the mental health of children and adolescents.^{21,22}

It is essential to discuss the subject in order to produce welcoming and dialogic environments that enable the adequate care to the demands perceived by health professionals.²³ In this sense, the development of permanent and continuing education actions emerges as an important strategy to mitigate the occurrence of suffering and negative outcomes.^{23,24}

Mental health problems are directly associated with suicide attempts and self-mutilation, both among adolescents and adults.⁹ Moreover, self-mutilation (without suicidal ideation) is significantly associated with suicide, which increases the risk for its occurrence, since these episodes may have the potential to increase suicidal desire and ability among individuals.⁹

In addition to the risk of fatal outcome from self-harm, the occurrence of this phenomenon leads to numerous physical and psychological harm to adolescents and their families.^{23,25} Moreover, a systematic review indicated a scarcity of studies on the subject, with a lack of evidence, especially about the appropriate and effective strategies that can reduce self-injury among young people in Brazil.²³

In this sense, the vigilance raises an alert to public authorities about the relevance of the occurrence of self-injury among young people as a public health problem, whose event is related to strong cultural roots, which demands more emphasis on the development of intersectoral national policies for the primary guarantee of the right to expressiveness and human dignity.

In this study, it is worth noting that it was not possible to identify the presence or absence of suicidal intentionality in the cases that were included in the analysis. Meanwhile, we postulate the need for research on suicidal ideation in cases of self-harm, with the objective of subsidizing prevention and postvention policies for children and teenagers.

It is also pointed out, as limitations of this research, the use of secondary data, which, frequently, are subject to incomplete and/or erroneous filling out of notification forms. Thus, there is a demand for constant improvement of professionals in the use of data collection tools, in order to qualify the records entered into the information systems.

CONCLUSION

We identified an increasing tendency in the rates of self-harm in Brazil and its regions among adolescents of both sexes and from 10 to 19 years of age, especially among females and those aged 15 to 19 years. The Southern region presented the highest rates and increases of the offense in the analyzed population, while the Northeastern region had the lowest rates of occurrence of self-harm.

In this sense, the implementation of confrontation actions based on prevention policies is urgent, aiming at mitigating the occurrence of this grievance that affects the population. Furthermore, we emphasize the importance of postvention through humanized, comprehensive and integrated care to

those who are already victims of this phenomenon, ensuring the continuity of care and prevention of new occurrences.

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