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ORIGINAL ARTICLE

SUICIDE BY SELF-POISONING AMONG BRAZILIAN ADOLESCENTS AND YOUNG ADULTS: TIME-SERIES STUDY

Frantielen Castor dos Santos Nascimento*
Samira Reschetti Marcon**
Bruna Hinnah Borges Martins de Freitas***
Moisés Kogien****
Nathalie Vilma Pollo de Lima *****

ABSTRACT

Objective: to analyze the temporal trend of mortality from self-intoxication among adolescents and young adults in Brazil from 2000 to 2017. **Method**: time-series study of mortality from suicide from self-intoxication (X60 to X69) among adolescents and young adults, between 2000 to 2017. The coefficients of mortality per 100,000 population and proportional mortality were calculated. The Prais-Winster linear regression was chosen for trend analysis. **Results**: there was linearity in the trend of overall suicide mortality in this population. A decreasing trend was evidenced among female individuals, aged 15 to 19 years old and 20 to 24 years old, from the Northeast and Midwest regions and who adopted suicide methods by pesticides and chemical products or unspecified harmful substances. A growing trend of mortality due to the use of all drug classes analyzed, organic solvents, and other inhalants were also highlighted. **Conclusion**: This study identified a considerable increase in the use of medications and inhalants as a method of suicide among adolescents and young adults.

Keywords: Suicide; Time-series studies; Poisoning; Young adult; Adolescent.

INTRODUCTION

Suicide among adolescents and young adults is characterized as a serious contemporary public health problem, gaining relevance due to its magnitude and increasing rates over the last decades in various regions of the world[1]. Although it is a rare phenomenon before 15 years old, its prevalence increases considerably after the beginning of adolescence, to the point of being considered the second leading cause of mortality among people aged 15 to 29 years old[2].

In Brazil, the suicide mortality rates in the young population stand out due to its accelerated and accentuated growth in the last two decades, with evidence pointing to an increase of more than 20% in the number of self-harm in the age group from 10 to 24 years old[3-5].

The methods used for suicide vary according to sociodemographic and cultural factors, and the ease of access to them[6]. Some studies analyzing the sociodemographic profile of suicide mortality in Brazil demonstrate that the means most used in the general population are hanging and self-intoxication[7,8]. Among young people, intentional self-intoxications are also an important and potentially preventable cause of morbidity and mortality and commonly appear as the main method of suicide for this population[9-11]. Recently, a British study highlighted self-intoxication in the age group from 10 to 24 years old as one of the main methods of self-injury or self-harm[9]. In Ecuador, a time-series study identified self-intoxication as the second leading cause of mortality in individuals aged between 10 and 19 years old[10]. In Brazil, evidence points to exogenous self-intoxication as the most used method in this same age group for suicide attempts[12] and the second leading cause of mortality in the group between 15 to 24-year-old [11], demonstrating the epidemiological relevance of this method as a cause of self-harm in this population.

Although there are national studies that investigated the temporal behavior of suicide mortality among Brazilian adolescents and

*Nursing student. Graduation. Center for Studies in Mental Health, Federal University of Mato Grosso. Cuiabá, MT, Brazil. Email: frantielen.castor@gmail.com ORCID iD: 0000-0002-8102-5693.
**Nurse. PhD, Center for Studies in Mental Health, Federal University of Mato Grosso. Cuiabá, MT, Brazil. Email: samira.marcon@gmail.com ORCID iD: 0000-0002-5191-3331.
***Nurse. PhD student, Study Group on Child and Adolescent Health, Federal University of Mato Grosso. Cuiabá, MT, Brazil. Email: bruhinnah@gmail.com ORCID iD: 0000-0002-2121-1785.
****Nurse. PhD student, Center for Studies in Mental Health, Federal University of Mato Grosso. Cuiabá, MT, Brazil. Email: mkogien@yahoo.com.br ORCID iD: 0000-0003-4591-6648.
*****Nurse. Resident, Center for Studies in Mental Health, Federal University of Mato Grosso. Cuiabá, MT, Brazil. Email: nathalie26.lima@gmail.com ORCID iD: 0000-0001-5558-972X.

young adults, to date, no investigation was found that focused on the analysis of temporal trends in suicide mortality specifically due to self-intoxication in this population. Thus, this study aims to analyze the temporal trend of mortality from self-intoxication among adolescents and young adults in Brazil from 2000 to 2017 to fill a gap in the literature on the temporal distribution of these events.

METHODS

This is an ecological, time-series study, which used the coefficients of mortality from self-intoxication among adolescents and young adults (10 to 29 years old) from 2000 to 2017, a time frame in which all necessary information was available in the data collection period.

Data on mortality from self-intoxication were obtained from the Mortality Information System (MIS) available through the Information System of the Unified Health System (DATASUS) portal between 2000 and 2017. All deaths of interest were considered. (X60-X69), in the age group of interest (10 to 29 years old), in the period of interest (2000-2017). Thus, there was no application of eligibility criteria.

The information on mortality follows the 10threview of the International Classification of Diseases (ICD 10) whose records had the following code as the underlying cause: X60-X69 (self-intoxication)[15]. In turn, population estimates by gender, age group, and regions were obtained through the Brazilian Institute of Geography and Statistics (IBGE), in the selection "Projection of the population of Brazil and Federation Units by gender and age for the period 2000- 2030", also available on the DATASUS website.

The variables of interest, available on SIM/DATASUS, were:

a) place of residence in the territorial extension (Brazil, Brazilian macro-regions and states);

b) gender (female and male);

c) age group (10-14 years old, 15-19 years old, 20-24 years old, and 20-29 years old);

d) place of occurrence of death (hospital, other health facilities, home, public highway, others and ignored);

e) methods used (X60: non-opioid analgesics, antipyretics or antirheumatics, X61: anticonvulsants, hypnotics, antiparkinsonians or psychotropics, X62: narcotics or psycholeptics/hallucinogens, X63: other pharmacological substances acting on the autonomic nervous system, X64: medications, unspecified drugs or biological substances, X65: alcohol, X66: organic solvents, halogenated hydrocarbons, and their vapors, X67: other gases and vapors, X68: pesticides and X69: unspecified harmful chemicals or substances).

The structuring of the database was performed using the Microsoft Office Excel® spreadsheet editor with independent double typing, based on data collection in DATASUS. Data from both banks were compared using the Data Compare tool to identify possible inconsistencies in the typing and calculation of indicators, which were later corrected by consulting the database.

To calculate the specific gross mortality coefficient due to self-intoxication, we considered the number of deaths of residents due to self-intoxication as the numerator and the total resident population as the denominator, multiplied by 100,000 inhabitants. The age-adjusted mortality coefficient was also calculated using the direct method, considering the WHO standard world population[13], based on world population projections for the period 2000-2025. The raw coefficients were calculated according to gender, age group, regions, and states and presented per 100,000 inhabitants. For the place of occurrence and the methods used, we calculated the proportional mortality.

Time trend analysis was performed using the Prais-Winster model for generalized linear regression[14]. Using this method, we could assess whether the mortality coefficients showed increasing, decreasing, or stationary trends over the period considered, and calculating the annual percentage variation (APV). This rate demonstrates the percentage difference between mortality from suicide in two subsequent years and indicates the rate of growth or retraction of mortality in the study population[14].

APV was calculated from the formula shown in Figure 1, where b1 corresponds to the slope coefficient of the straight line formed in the regression model. The 95% confidence interval (95%CI) of APV values was also calculated using the formulas in Figure 1, in which b1min.

and b1max. correspond, respectively, to the minimum and maximum values of the 95%CI of the slope coefficient of the straight line (b1)[14].

Figure 1. Formulas used to calculate the Annual Percentage Change (VPA) and Confidence Interval (CI)

$$APV=[-1+10^{b1}]*100\%$$
$$95\%CI=[-1+10^{b1min.}]*100\%;\ 95\%CI=[-1+10^{b1max.}]*100\%$$

Source: adapted from Antunes and Cardoso, 2015[14].

The interpretation of the temporal trend was based on the analysis of APV, its confidence intervals, and the p-value (provided by Prais-Winster regression). Thus, negative APV with negative 95%CI/p ≤ 0.05 indicates a decreasing trend; Positive APV with positive 95%CI/p ≤ 0.05 indicates an increasing trend; 95%CI that passes the value 0/p ≥ 0.05 indicates a stationary trend. This analysis was performed using the STATA 13 software.

This study is part of a matrix survey, which was submitted and approved by the Research Ethics Committee (CEP) in compliance with the ethical precepts of Resolution 510 of April 2016 of the National Health Council (CNS), being approved under opinion 2,840,432. The data used in this research are in the public domain.

RESULTS

From 2000 to 2017, 7,183 deaths from self-intoxication in adolescents and young adults were registered in the Mortality Information System (MIS). The highest mean coefficients, by gender and age group variables, occurred among male individuals (0.61/100,000 inhab.) and in the age group from 25 to 29 years old (0.86/100,000 inhab.). The analysis of the temporal trend of the general and age-adjusted mortality coefficients showed a stationary behavior of deaths due to self-intoxication in the studied population. However, regarding gender and age group, there was evidence of a decreasing trend of deaths among women with APV of -2.05% (95%CI = -3.87; -0.20) and in the age groups from 15 to 19 years old (APV = -2.02; 95%CI = -3.81; -0.20) and 20 to 24 years old (APV = -2.23; 95%CI = -3.60; -0.85). The others maintained a linear trend (Table 1).

Table 1. Number, coefficient, and trend of crude and age-adjusted mortality (per 100,000 population) due to self-intoxication in adolescents and young adults, according to gender and age group. Brazil, 2000-2017.

Mortality	Deaths (n)	Mean Coefficient	APV[a]	$CI_{95\%}$[b]		Interpretation
Gross	7183	0.58	-1.18	-2.87	0.55	Stationary
Adjusted	7183	0.58	-1.39	-2.98	0.23	Stationary
Gender						
Female	3358	0.55	-2.05	-3.87	-0.20	Descending
Male	3825	0.61	-0.54	-2.19	1.14	Stationary
Age group						
10-14 years old	328	0.11	0.61	-2.81	4.15	Stationary
15-19 years old	1839	0.59	-2.02	-3.81	-0.20	Descending
20-24 years old	2447	0.78	-2.23	-3.60	-0.85	Descending
25-29 years old	2569	0.86	-0.91	-2.44	0.65	Stationary

Note: [a]Annual Percentage Variation; [b] Confidence Interval of 95%.

From the geographic variables considered in the study (Brazilian regions and states), we identified that the Midwest region had the highest average coefficient of death from self-intoxication among adolescents and young adults (0.83/100,000 inhab.). The three states with the highest average mortality coefficients were in the Northeast region: Sergipe (1.41/100,000

inhab.), Ceará (1.24/100,000 inhab.) and Pernambuco (1.05/100,000 inhab.), followed by Rondônia, in the North region (1.03/100,000 inhab.), and Goiás, in the Midwest (1.03/100,000 inhab.) (Table 2).

Table 2. Number, mean coefficient (per 100,000 inhabitants), and trend of mortality rates due to self-intoxication in adolescents and young adults, according to Brazilian regions and states. Brazil, 2000-2017.

States	Deaths (n)	Mean Coefficient	APV[a]	$CI_{95\%}$[b]		Interpretation
North	567	0.51	-4.49	-6.50	-2.44	Descending
Acre	26	0.71	-3.34	-7.15	0.62	Stationary
Amapá	20	0.64	-2.93	-7.24	1.57	Stationary
Amazonas	79	0.30	5.86	-2.00	14.35	Stationary
Pará	241	0.46	-7.96	-10.78	-5.05	Descending
Rondônia	116	1.03	-4.27	-8.41	0.06	Stationary
Roraima	15	0.90	-0.16	-6.94	7.10	Stationary
Tocantins	70	0.72	-3.51	-8.11	1.31	Stationary
Northeast	2777	0.73	0.22	-2.94	3.48	Stationary
Alagoas	186	085	-3.69	-7.01	-0.25	Descending
Bahia	396	0.40	0.03	-3.41	3.60	Stationary
Ceará	715	1.24	-2.38	-6.22	1.61	Stationary
Maranhão	259	0.56	3.14	-2.06	8.62	Stationary
Paraíba	125	0.50	12.50	5.77	19.66	Growing
Pernambuco	620	1.05	-2.58	-7.79	2.92	Stationary
Piauí	204	0.96	4.02	-3.00	11.55	Stationary
Rio Grande do Norte	69	0.34	-0.65	-2.77	1.51	Stationary
Sergipe	203	1.41	4.98	0.63	9.53	Growing
Midwest	755	0.83	-5.30	-6.96	-3.61	Descending
Distrito Federal	103	0.60	0.52	-7.21	8.89	Stationary
Goiás	399	1.03	-4.80	-6.27	-3.30	Descending
Mato Grosso	158	0.85	-6.74	-12.18	-0.97	Descending
Mato Grosso do Sul	95	0.61	-6.40	-10.09	-2.56	Descending
Southeast	2101	0.43	-1.16	-2.67	0.37	Stationary
Espírito Santo	153	0.66	-2.56	-5.12	0.08	Stationary
Minas Gerais	734	0.59	-2.09	-4.64	0.54	Stationary
Rio de Janeiro	269	0.29	-3.50	-6.97	0.10	Stationary
São Paulo	945	0.37	0.96	-1.55	3.54	Stationary
South	983	0.58	-1.30	-2.91	0.34	Stationary
Paraná	519	0.79	-5.21	-7.91	-2.44	Descending
Rio Grande do Sul	287	0.45	2.25	0.13	4.41	Growing
Santa Catarina	177	0.45	5.65	3.77	7.57	Growing

Note: [a]Annual Percentage Variation; [b]Confidence Interval of 95%.

The temporal trend analysis showed a decreasing behavior of deaths from self-intoxication among adolescents and young adults in the North (APV = -4.49; 95%CI = -6.50; -2.44) and Midwest (APV = -5 .30; 95%CI = -6.96; -3.61), while it remained stationary for the other regions. Among the Brazilian states, there are those that showed an increasing trend, namely: Paraíba (APV = 12.50; 95%CI = 5.77; 19.66), Sergipe (APV = 4.98; 95%CI = 0. 63; 9.53), Rio Grande do Sul (APV = 2.25; 95%CI = 0.13; 4.41) and Santa Catarina (APV = 5.65; 95%CI = 3.77; 7.57).

Pesticides (45.14%) were the most used substance for suicide by self-intoxication among adolescents and young adults. Despite the high proportion as the substance of choice for self-intoxication, pesticides tended to decrease over the years analyzed (APV= -2.51%; 95%CI = -4.02; -0.97). We found growth trends in deaths

from ingestion of all major groups of medications considered: analgesics, antipyretics or non-opioid antirheumatics (APV = 5.74; 95%CI = 0.35; 11.43); anticonvulsants, hypnotics, antiparkison drugs or psychotropics (APV = 5.80; 95%CI = 4.20; 7.43); narcotics or psychodysleptics/hallucinogens (APV = 14.80; 95%CI = 10.27; 19.52); other pharmacological substances acting on the autonomic nervous system (APV = 8.10; 95%CI = 1.84; 14.74); and autonomous medicines, drugs or biological substances (APV = 3.85; 95%CI = 2.74; 4.97) (Table 3).

Table 3. Number, percentage of deaths, and trend of proportional mortality due to self-intoxication in adolescents and young adults, according to the substance used for suicide according to ICD 10. Brazil, 2000-2017.

Substance used	Deaths		APV[a]	$CI_{95\%}$[b]		Interpretation
	N	%				
Analgesics, antipyretics or non-opioid antirheumatics	47	0.65	5.96	1.26	10.89	Growing
Anticonvulsants, hypnotics, antiparkisonians or psychotropics	687	9.56	5.39	3.79	7.02	Growing
Narcotics or psychodysleptics/hallucinogens	280	3.90	17.34	12.09	22.83	Growing
Other pharmacological substances acting on the autonomic nervous system	50	0.70	8.54	3.15	14.21	Growing
Medicines, drugs or unspecified biological substances	951	13.24	3.07	1.47	4.68	Growing
Alcohol	79	1.10	-1.24	-10.48	8.95	Stationary
Organic solvents, halogenated hydrocarbons,and their vapors	56	0.78	6.49	1.89	11.30	Growing
Other gases and vapors	115	1.60	10.13	0.88	20.22	Growing
Pesticides	3242	45.14	0.71	-3.59	-0.67	Descending
Unspecified harmful chemicals or substances	1676	23.33	-4.14	-5.22	-3.04	Descending

Nota: [a]Annual Percentage Variation; [b]Confidence Interval of 95%.

DISCUSSION

This study showed that the overall mortality from suicide by self-intoxication in Brazilian adolescents and young adults remained stable during the analyzed period, in contrast to the rising trends in general suicide mortality among Brazilian adolescents and young adults highlighted in other recent studies[5,15]. However, despite this general stationary trend, this study showed that there are differences in the temporal behavior of mortality from intentional self-intoxication when considering characteristics such as gender, age group, geographic region, and type of substance used. These variations are expected when analyzing a highly complex phenomenon such as suicide, whose multi-determined etiology can be influenced by a myriad of distinct factors potentially associated with the biological, social, psychological, or cultural spheres of human existence[16].

Regarding the analysis by gender and age group, although they show a stationary trend for mortality from self-intoxication among men and in the age groups from 10 to 14 years old and 25 to 29 years old, the decreasing trends of suicide by self-intoxication observed among women stand out, as well as in the 15-19 and 20-24 age groups. This evidence is noteworthy, since, in general, the literature in suicidology points to self-intoxication as one of the methods most used by women to cause the end of their own life, with growth trends in self-intoxication being commonly reported as a method for suicide and/or attempts mainly among young women[17].

It is also important to consider that time-series studies of overall suicide mortality among Brazilian adolescents and young adults did not show decreasing trends in these coefficients among females in similar periods[5,15], which allows us to reflect that although young Brazilian women are dying less from intentional

self-intoxication, other potentially more lethal and more easily accessible methods may be being used. The phenomenon of substitution of suicide methods, considering ease of access and lethality, has been suggested in the literature[18]. However, studies of the temporal behavior of suicide mortality with an emphasis on the methods used in this age group are needed to better clarify these considerations.

Geographically, there was a decrease in mortality from self-intoxication in the North and Midwest regions, while in the others the trend remained stationary. The findings diverge from the study that found an increasing trend in overall suicide mortality among young people aged 10 to 19 years old in the North and Northeast regions[15]. Although the Midwest region has shown a decreasing trend for self-inflicted deaths due to poisoning, it was the Brazilian region with the highest average mortality rate for the period analyzed, corroborating findings that pointed to the Midwest as the region with the highest death rates by suicides among adolescents, without considering specific causes[11,15].

Also, regarding the Northeast region, two of the states that showed an increase in suicide by intentional self-intoxication in the analyzed period are from this geographic area: Paraíba and Sergipe. These findings are in line with those in a study that analyzed general indicators of suicide among adolescents in the period 1997-2016 and also found an increase in mortality in these states[5]. The joint reflection of this evidence can demonstrate that intentional self-intoxication is actively and significantly helping to increase the overall mortality rates among adolescents and young adults, and is, therefore, a problem that needs to be tackled on time.

Two other states that showed an increasing trend in mortality from self-intoxication in the period analyzed are in the southern region of Brazil: Rio Grande do Sul and Santa Catarina. Historically, the states in this region of Brazil have shown the highest suicide rates among the country's Federative Units[19], with intentional self-intoxication being a serious public health problem already observed in this region, with an indication of easy access and wide use of pesticides used in the crops of the region[20], one of the hypotheses for the worsening of the situation.

Despite these notes, explaining the rates, trends, and characteristics of mortality from suicide among adolescents and young people in a country with continental dimensions such as Brazil is not a simple task. This regional variability is expected[16] mainly due to its geography, economic and cultural aspects, ethnic diversity between states, income inequality, level of education, unemployment, investments in public health, degree of urbanization, and mental health conditions of the populations[11,16].

As for the substances used for intentional self-intoxication, there was a growing trend towards the use of all classes of medication analyzed. The availability and ease of access to potentially toxic substances, including medications, is one of the findings in the scientific literature for the widespread of intentional self-intoxication as one of the main means used for suicidal behavior[7].

Among the drug groups that showed a tendency to increase as a cause of mortality in this study, the use of narcotic or psychodysleptic/hallucinogenic drugs stands out, which showed the highest annual percentage change in the period evaluated. This type of drug indicates restricted use and its acquisition is only possible through the mandatory presentation of a medical prescription, so it should not be easily accessible for individuals in such a young age group. Possibly, these narcotics or psychodysleptic medications are available at home due to the use of a family member. A study carried out in the United States found an increased risk for attempted suicide in children whose parents had a medical prescription for the purchase of opioid analgesics, when compared with children of parents who did not have a prescription for such medications. This aspect denotes that the availability of this type of substance in the environment of younger individuals is a risk factor for self-harm[21].

We also observed in the substances used as means of suicide that the use of gases and inhalants has increased significantly in this population. This may be related to the ease of access to some types of gases, especially cooking gas, which is universal in practically all Brazilian homes. Review research identified that, in countries such as England, Switzerland, Australia, Japan, and the United States, suicide rates decreased after changing the domestic gas,

which was coal-based, to another type of non-toxic natural gas[22].

This finding has significant relevance in suicides among young people, considering that self-intoxication by household gas is considered highly lethal, painless, does not cause bodily disfigurement in individuals, and does not require elaborate planning for its use[22]. In this sense, it is necessary to rethink national programs in Brazil that allow the replacement of conventional domestic gas by other types of non-toxic gas, following the example of several developed countries that have already carried out this replacement for decades. Such measures are essential so that the suicide rates for this cause may have a deceleration in their upward trend.

The temporal behavior of mortality due to pesticide self-intoxication among adolescents and young adults in this study was inverse than in the world literature. Studies show increasing trends in mortality in various regions of the world, especially in those where access to this type of substance is not properly regulated and controlled[10,23,24]. Even though it has decreased, self-intoxication by pesticides still represents the biggest cause of death in this population, requiring greater efforts to mitigate it.

In Brazil, the use of these substances does not have strict regulations and has been continuously made more flexible by the government[25], contrary to relevant points that were raised from the discussion of the National Policy for the Prevention of Self-Mutilation and Suicide in Brazil. This condition in the Brazilian scenario may be an important risk factor for its increase, as found in the study that showed an increase in suicides caused by pesticide self-intoxication in younger male populations (15 to 34 years old)[24].

The downward trend in deaths from the use of unspecified chemicals or harmful substances demonstrated in this study needs to be carefully reviewed, considering that it is a method with a high percentage of choice for suicide, and its lack of definition, as an indicator, it substantially contributes to less precision in the deaths that occurred[24-25], which may show unpreparedness and/or negligence about the importance of classifying these substances.

Finally, adolescents and young adults constitute a distinct population in terms of risk for suicide caused by intentional self-intoxications. Suicidal behaviors in this group involve complex and multi-determined motivations, permeating social, biological, and psychological factors[7]. Thus, the need to develop further research with this population is emphasized, considering age specificities and the risk of suicide by self-intoxication.

The ecological design adopted in this study is not intended to provide causal explanations between mortality from self-intoxication and the other variables analyzed. However, it provides an overview of how these coefficients have behaved over time.

CONCLUSION

This study verified the growing trend in the use of medications and inhalants as the substance of choice for self-intoxication suicides among adolescents and young adults in Brazil from 2000 to 2017, showing the need for more effective public health policies that restrict access to these substances for the population. Also, decreasing trends were found in this type of suicide among young women and in the age group between 15 and 24 years old, findings that deserve attention, as they may indicate a tendency to substitute methods for suicide among young Brazilians. The specificities evidenced in each region and Brazilian state need to be considered when thinking about mental health policies.

SUICÍDIO POR AUTOINTOXICAÇÃO ENTRE ADOLESCENTES E ADULTOS JOVENS BRASILEIROS: ESTUDO DE SÉRIES TEMPORAIS

RESUMO

Objetivo: analisar a tendência temporal da mortalidade por autointoxicação entre adolescentes e adultos jovens brasileiros no período de 2000 a 2017. **Método:** estudo de séries temporaisda mortalidade por suicídio por autointoxicações (X60 a X69) entre adolescentes e jovens adultos, entre os anos de 2000 a 2017. Calcularam-se os coeficientes de mortalidade por 100.000 habitantes e mortalidade proporcional. Optou-se pela regressão linear de *Prais-Winster* para análise de tendência. **Resultados:** percebeu-se uma linearidade na tendência da mortalidade geral por suicídio nessa população. Evidenciou-se uma tendência decrescente entre os indivíduos do sexo feminino, das

faixas etárias de 15 a 19 anos e 20 a 24 anos, das regiões Nordeste e Centro-Oeste e que adotaram métodos de suicídio por pesticidas e produtos químicos ou substâncias nocivas não especificadas. Destacou-se também uma tendência crescente da mortalidade pelo uso de todas as classes medicamentosas analisadas, solventes orgânicos e outros inalantes. **Conclusão:**este estudo identificou um aumento considerável na utilização de medicamentos einalantes como método para o suicídio entre adolescentes e adultos jovens.

Palavras-chave: Suicídio; Estudos de Séries Temporais; Envenenamento; Adulto Jovem; Adolescentes.

SUICIDIO POR AUTOINTOXICACIÓN ENTRE ADOLESCENTES Y ADULTOS JÓVENES BRASILEÑOS: ESTUDIO DE LAS SERIES TEMPORALES

RESUMEN

Objetivo: analizar la tendencia temporal de la mortalidad por autointoxicación entre adolescentes y adultos jóvenes brasileños en el período de 2000 a 2017. **Método:** estudio de las series temporales de la mortalidad por suicidio por autointoxicaciones (X60 a X69) entre adolescentes y jóvenes adultos, entre los años de 2000 a 2017. Se calcularonlas tasas de mortalidad por 100.000 habitantes y mortalidad proporcional. Se optó por la regresión lineal de *Prais-Winster* para análisis de tendencia. **Resultados:** se percibió una linealidad en la tendencia de la mortalidad general por suicidio enesta población. Se evidenció una tendencia decreciente entre los individuos del sexo femenino, de las franjas de edad de 15 a 19 años y 20 a 24 años, de las regiones Nordeste y Centro-Oeste y que adoptaron métodos de suicidio por plaguicidas y productos químicos o sustancias nocivas no especificadas. Se destacó también una tendencia creciente de la mortalidad por el uso de todas las clases de medicamentos analizadas, solventes orgánicos y otros inhalantes. **Conclusión:** este estudio identificó un aumento considerableen la utilización de medicamentos einhalantescomo método para el suicidio entre adolescentes y adultos jóvenes.

Palabras clave: Suicidio; Estudios de las series temporales; Envenenamiento; Adulto joven; Adolescente.

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Correspondig author: Frantielen Castor dos Santos Nascimento; Rua Sebastiana Paes de Barros, 661- Boa Esperança, Cuiabá- MT. CEP: 78068-375. E-mail: frantielen.castor@gmail.com

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