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Epidemiological profile of suicide in Brazil from 2007 to 2017

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Abstract

Suicide is a public health problem that ranks among the twenty leading causes of death worldwide. This study aims to describe the epidemiological profile of suicide cases in Brazil from 2007 to 2017, to recognize local particularities and support protection and prevention actions. Data were obtained from the DataSUS Mortality Information System, which recorded a total of 113,483 cases of suicide in the period, with an increase in the mortality rate, especially among the older adults aged over 80 years, men and single. The most common methods were hanging, firearms and pesticides. The highest mortality rates in the period analyzed were found in the Southern region, followed by the Midwest. The highest percentage growth was observed in the North and Northeast regions. Considering this information, public policies that adopt preventive measures must be intensified to reduce suicide rates in Brazil.

Keywords: Suicide. Epidemiology. Mortality.

Resumo

Perfil epidemiológico do suicídio no Brasil de 2007 a 2017

O suicídio é um problema de saúde pública que está entre as vinte principais causas de óbito no mundo. Este estudo busca descrever o perfil epidemiológico dos casos de suicídio no Brasil no período de 2007 a 2017, visando reconhecer as particularidades locais e subsidiar ações de proteção e prevenção. Os dados foram obtidos no Sistema de Informação sobre Mortalidade do DataSUS, que registrou um total de 113.483 casos de suicídio no período, com aumento da taxa de mortalidade sobretudo entre idosos acima de 80 anos, homens e solteiros. Os métodos mais comuns foram enforcamento, arma de fogo e pesticidas. A região Sul apresentou as maiores taxas de mortalidade no período analisado, seguida pela região Centro-Oeste. Norte e Nordeste tiveram o maior crescimento percentual. Considerando essas informações, é necessário intensificar políticas públicas que adotem medidas preventivas para reduzir as taxas de suicídio no Brasil.

Palavras-chave: Suicídio. Epidemiologia. Mortalidade.

Resumen

Perfil epidemiológico del suicidio en Brasil de 2007 a 2017

El suicidio es un problema de salud pública y está entre las veinte principales causas de muerte en el mundo. Este estudio propone describir el perfil epidemiológico de los casos de suicidio en Brasil entre 2007 y 2017, con el fin de reconocer las particularidades locales y promover acciones de protección y prevención de esta práctica. Los datos se obtuvieron del Sistema de Información de Mortalidad del DataSUS, que registró un total de 113.483 casos de suicidio en el período, con un aumento de la tasa de mortalidad especialmente entre los ancianos mayores de 80 años, hombres y solteros. Los métodos más comunes fueron ahorcamiento, armas de fuego y pesticidas. El Sur del país concentró las tasas más elevadas en el período, seguido del Centro-Oeste. El Norte y el Nordeste tuvieron el mayor crecimiento porcentual. Es necesario intensificar las políticas públicas con medidas preventivas para reducir estas tasas en Brasil.

Palabras clave: Suicidio. Epidemiología. Mortalidad.

Research

The authors declare no conflict of interest.

Suicide is an important public health problem [1] and it is estimated that more than 800 thousand people commit suicide per year worldwide, and about 75% of the cases occur in underdeveloped countries [2]. Global rates indicate this condition is among the 20 leading causes of death, ahead of malaria, breast cancer, war, and homicide, also being the second leading cause of death among young people in the world [2,3].

There are important implications related to gender, age, culture, and ethnicity, as well as significant differences in motivations, methods, and risk factors within each group [4]. Epidemiological evidence demonstrates that suicidal behavior is the outcome of a complex interaction of these elements, so the study requires difficult theoretical models for effective prevention strategies [5].

In 2012, Brazil was the eighth country with the highest absolute number of cases, after India, China, the United States, Russia, Japan, South Korea, and Pakistan. According to the map of violence, the number of cases of intentional self-harm increased from 2.7% in 1980 to 33.3% in 2012, even surpassing the country's population growth rate (11.1%) [6].

In Brazil, the quantity and quality of death registration have already been subject of studies, which suggest a high underreporting rate of suicide compared to other external causes [7,8]. Older adults have the highest suicide rate and individuals between 15 and 24 years old had the greatest increase [9,10]. Hanging and the use of firearms were the most common suicide methods in men, whereas in women it was poisoning [11,12]. Most epidemiological studies address specific regions in Brazil, and it is not possible to project conclusions to the entire territory, mainly because of the country's continental dimensions and relevant regional differences.

Bioethics of life, guided by the principle of justice, emphasizes the importance of ensuring equity in treatment and distribution of health resources, especially for vulnerable groups. In the context of suicide, bioethical justice requires that all people, regardless of their socioeconomic or regional conditions, have access to appropriate preventive and therapeutic care. Thus, the development of effective programs aimed at preventing suicidal behavior requires expansion of the knowledge about regional specificities and epidemiology regarding this public health problem [13,14].

This study aims to describe the epidemiological profile of suicide in Brazil from 2007 to 2017, aiming to recognize local particularities and subsidize protection and prevention actions.

Method

This is a quantitative and retrospective study, which uses secondary data related to suicides from 2007 to 2017. Data were obtained via Department of Informatics of the Unified Health System (DataSUS), a public and unrestricted information bank, in a way this work does not require approval by the research ethics committee.

Deaths registered in the Mortality Information System (SIM) were analyzed [15], including the causes regarding codes from X60 to X84 according to the International Classification of Diseases 10th Revision (ICD-10) [3], in Brazil. These codes comprise: intentional self-intoxication by drugs and biological substances (X60-X64); intentional alcohol self-intoxication (X65); intentional self-poisoning by pesticides and chemicals (X68-X69); intentional self-harm by firearm discharge (X72-X74); intentional self-harm by knife and blunt objects (X78-X79); intentional self-harm by hanging and strangulation (X70); intentional self-harm by jumping from a high place (X80); intentional self-harm of unspecified medium (X84); and other categories (X66, X67, X71, X75-X77, X81-X83).

Data stratification was chosen according to sex, skin color/ethnicity, age group, marital status, education, and region, corresponding to place of occurrence. To calculate the mortality coefficients in the strata, population information was obtained from the website of the Brazilian Institute of Geography and Statistics (IBGE).

Results

In total, 113,483 cases of suicide were registered from 2007 to 2017. The mortality rate (MR) increased from 4.82 to 6.01 deaths per 100 thousand inhabitants, corresponding to a 24.9% increase, and the specific MR for the period was 5.24 per 100 thousand (Table 1).

Table 1. Distribution of reported mortality cases from intentional self-harm by year, absolute number, frequency, resident population, and standardized mortality ratio from 2007 to 2017. Brazil, 2020

Year	N	%	RP	SMR
2007	8,868	7.81	184,014,516	4.82
2008	9,328	8.22	189,612,814	4.92
2009	9,374	8.26	191,506,729	4.89
2010	9,448	8.33	190,732,694	4.95
2011	9,852	8.68	192,379,287	5.12
2012	10,321	9.09	193,976,530	5.32
2013	10,533	9.28	201,062,789	5.24
2014	10,653	9.39	202,799,518	5.25
2015	11,178	9.85	204,482,459	5.47
2016	11,433	10.07	206,114,067	5.55
2017	12,495	11.01	207,660,929	6.01
Total	**113,483**	**100**	**2,164,342,332**	**5.24**

RP: resident population; SMR: standardized mortality ratio

Source: Sistema de Informação sobre Mortalidade/DataSUS [15]

Distribution by sex indicates MR among women remained stable during the period, with a 2.16 per 100 thousand mean. Among men, the rate increased from 2010 onwards, with an 8.25 per 100 thousand mean, 3.82 times higher than the rate for women. There was a predominance of individuals aged 80 years or older, followed by the 70 to 79 age group, with 8.21 and 7.98 per 100 thousand inhabitants mean values, respectively. Regarding age, the highest percentage increase was among individuals aged 10 to 14 years, followed by those aged 15 to 19 years: 58.2% and 47.1%, respectively.

Suicide occurrence in the analyzed period prevailed among men (78.83%), white (50.64%), single (50.33%) and with little formal education (from 4 to 7 years in 24.24% of the cases). Regarding the clinical-epidemiological characteristics, home was the most frequent place, with 59.21% (Table 2).

Table 3 shows the distribution of cases according to ICD-10 categories.

Table 2. Distribution of mortality cases from intentional self-harm by sex, skin color/ethinicity, marital status, education, place of occurrence and age group from 2007 to 2017. Brazil, 2020

Variables		N	%
Sex	Male	89,455	78.83
	Female	24,010	21.16
	Ignored	18	0.02
Skin color/ethnicity	White	57,463	50.64
	Black	6,013	5.30
	Asian	476	0.42
	Brown	44,335	39.07
	Indigenous	1,182	1.04
	Ignored	4,014	3.54

continues...

Table 2. Continuation

Variables		N	%
Marital status	Single	57,116	50,33
	Married	31,786	28,01
	Widow/widower	4,471	3.94
	Divorced	7,480	6.59
	Other	3,992	3.52
	Ignored	8,638	7.61
Education	None	5,469	4.82
	1 to 3 years	16,878	14.87
	4 to 7 years	27,503	24.24
	8 to 11 years	22,370	19.71
	12 years or more	9,011	7.94
	Ignored	32,252	28.42
Place of occurrence	Hospital	19,377	17.07
	Other health facility	1,582	1.39
	Home	67,198	59.21
	Public space	7,209	6.35
	Other	17,472	15.40
	Ignored	645	0.57
Total		**113,483**	**100**

RP: resident population; SMR: standardized mortality ratio

Source: Sistema de Informação sobre Mortalidade/DataSUS [15]

Table 3. Distribution of mortality cases due to intentional self-harm according to the ICD-10 categories from 2007 to 2017. Brazil, 2020

	ICD-10 Category	M	%	F	%	IG	Total	%
Self-poisoning by	X60 Antirheumatics, nonopioid analgesics and antipyretics	61	0.07	60	0.25		121	0.11
	X61 Antiepilectic, sedative-hypnotic, antiparkinsonism and psychotropic drugs not elsewhere classified	757	0.85	1,242	5.17		1,999	1.76
	X62 Narcotics and hallucinogens not elsewhere classified	438	0.49	130	0.54		568	0.50
	X63 Other drugs acting on the autonomic nervous system	63	0.07	77	0.32		140	0.12
	X64 Other unspecified drugs, medicaments and biological substances	1,022	1.14	1,060	4.41		2,082	1.83
	X65 Alcohol	361	0.40	77	0.32		438	0.39
	X66 Organic solvents and halogenated hydrocarbons and their vapours	86	0.10	46	0.19		132	0.12
	X67 Other gases and vapours	211	0.24	48	0.20		259	0.23
	X68 Pesticides	4,147	4.64	2,282	9.50	1	6,430	5.67
	X69 Other and unspecified chemicals and noxious substances	1,943	2.17	1,193	4.97		3,136	2.76

continues...

Table 3. Continuation

	ICD-10 Category	M	%	F	%	IG	Total	%
Self-harm by	X70 Hanging, strangulation and suffocation	60,960	68.15	11,992	49.95	14	72,966	64.30
	X71 Drowning and submersion	845	0.94	462	1.92		1,307	1.15
	X72 Handgun discharge	2,743	3.07	352	1.47		3,095	2.73
	X73 Rifle, shotgun and larger firearm discharge	522	0.58	30	0.12		552	0.49
	X74 Other and unspecified firearm discharge	6,625	7.41	764	3.18		7,389	6.51
	X75 Explosive materials	52	0.06	7	0.03		59	0.05
	X76 Smoke, fire and flames	938	1.05	1,092	4.55	2	2,032	1.79
	X77 Steam, hot vapour and hot objects	27	0.03	17	0.07		44	0.04
	X78 Sharp or penetrating object	1,624	1.82	288	1.20		1,912	1.68
	X79 Blunt object	661	0.74	186	0.77		847	0.75
	X80 Jumping from a high place	2,767	3.09	1,562	6.51		4,329	3.81
	X81 Jumping or lying before moving object	184	0.21	53	0.22		237	0.21
	X82 Crashing of motor vehicle	371	0.41	110	0.46		481	0.42
	X83 Other specified mean	220	0.25	56	0.23		276	0.24
	X84 Unspecified means	1,827	2.04	824	3.43	1	2,652	2.34
	Total	**89,455**	**100**	**24,010**	**100**	**18**	**113,483**	**100**

ICD-10: International Classification of Diseases 10th Revision; F: female; IG: ignored; M: male

Southern Brazil had the highest MR in the analyzed period, with a 8.28 deaths per 100 thousand inhabitants mean, followed by the Midwest (6.14 deaths per 100 thousand). Northern and Northeastern Brazil had the lowest MR, with 4.24 and 4.33, respectively; however, the highest percentage increase was observed in the North, with 41.64%, followed by the Southeast, with 32.25%. In general, all regions showed percentage increases in MR between the beginning and the end of the period.

The states with the highest means were Rio Grande do Sul, Santa Catarina and Mato Grosso do Sul, and those with the lowest were Rio de Janeiro, Pará and Bahia. The highest percentage increase was observed in Rondônia, with 137.29%, followed by Maranhão and Paraíba, with 81.18% and 73.56%, respectively. However, Alagoas and Roraima had an 11% and 4.46% decrease, respectively.

Mortality rates were higher among men in all states, especially in the South, with 13.28 deaths per 100 thousand inhabitants, the region which also had the highest rate among women, 3.37. The highest percentage increase occurred among women in the North, with 67.10%. Mortality rates among men in this region also increased more in the analyzed period, with an increase of 35.91%.

Discussion

Intentional self-harm signals suffering and malaise in individuals dominated by the sense of powerlessness to solve intimate conflicts [4]. This is an important public health problem, as it is estimated that a case of suicide directly affects at least six people and can reach hundreds if it occurs in a school or workplace, impacting health services [2,3].

One of the most important aspects to consider in the study of suicide is underreporting, caused by factors such as erroneous completion of registrations and family requests to change the cause of death. The consensus is that the extent of this problem is underestimated, especially in underdeveloped countries [16]. Despite the imperfections due to underreporting of data,

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the results obtained confirm that suicide is an important public health problem in Brazil, with increasing mortality rates in the analyzed period. Nevertheless, the national average is considered low compared to the world's, which, according to the World Health Organization (WHO) [4,16], was 10.6 deaths per 100 thousand inhabitants in 2016. A comparative study of suicide rates in developing countries identified lower rates in countries with high levels of social inequality, suggesting that inequality is generally associated with traditional societies, with strong religious influences, which is a protective factor against suicide [17].

This study demonstrates that there is considerable variability in the distribution of mortality rates in the different Brazilian regions. South had the highest MR, and Rio Grande do Sul the highest rate (10.27), higher than the world average, which can be explained by the higher proportion of older adults, a group in which the risk of suicide is considered higher [18].

In a study on suicide rates between 1980 and 2006, the state also had the highest rates, especially among fishermen and farmers, suggesting that depressive disorders may be triggered by high exposure to pesticides [19]. In fact, numerous studies point to a connection between pesticide poisoning, especially with organophosphates and manganese, and the development of neuropsychiatric disorders in these populations [20-22].

The percentage increase in the North region is remarkable, which was the highest among the analyzed regions, and particularly the case of the state of Rondônia, which showed a 137.29% increase. The finding may be related to the increase in the registration of suicides in indigenous societies, which has been associated with not adapting to external developmental demands, alcohol abuse, and integration into the national society with which they come into contact. Underreporting is particularly problematic in this group, so data may be substantially higher. Prevention strategies are equally complex, considering the cultural peculiarities of each community, marginalization by public policies, and the scarcity of studies on their mental health [23,24].

The states with the lowest averages of mortality rates were Rio de Janeiro, Pará and Bahia, and the one with the lowest percentage increase was Pernambuco. Studies discuss the possibility of an inverse proportionality connection between suicide and homicide rates, considering those of all the states mentioned are among the highest in the country: 38.38 in Rio de Janeiro, 54.68 in Pará, 48.79 in Bahia, and 33.31 in Pernambuco. These studies infer that social problems such as inequality and unemployment would result in higher rates of interpersonal, rather than self-inflicted violence [25].

The highest mortality rates were observed in men, which is a finding consistent with the literature. There is a consensus that although attempted suicide is higher among women, men complete it more frequently. This finding may be related to the methods: in this study, in line with the literature, women opted for less violent and lethal ways, such as the use of pesticides and the ingestion of medications, instead of hanging and firearms, which are more frequent in men [26].

The result may also be related to gender roles: in women, the use of substances is more socially acceptable than by men. Men also have a higher prevalence of alcoholism, more fragile religious beliefs, and a lower tendency to seek help for mental disorders treatment, which contributes to higher rates [27].

It is remarkable that the abusive use of psychoactive drugs has become a public health problem. However, the WHO is already aware of pesticide poisoning and an increase in the number of deaths associated with them in underdeveloped countries in Asia, Central America and the Global South (including Brazil), needing a greater regulation, especially in rural areas. In countries such as China, Malaysia, Sri Lanka, Trinidad and Tobago, it is estimated that this poisoning is the cause of 60% to 90% of suicides [28].

Data regarding age group reinforce the prevalence among the older adult population repeatedly pointed out in the literature. This finding is traditionally associated with the sense of distress, isolation, and relationship difficulties experienced by this age group, triggered and aggravated by losses, physical and psychological limitations, and retirement. The loss of identity and sense of usefulness are often unnoticed and strongly associated with depression and suicide [29,30].

Note that the highest percentage increase was found in the age group from 15 to 19 years. This is a trend observed in several countries, usually associated with bullying, influence of digital media, lack of family and social acceptance regarding sexuality and gender identity, dissatisfaction with body image, impulsivity, poor family structure, and history of depression. It is also important to highlight socioeconomic indicators, especially regarding unemployment, as determinants for suicide risk [31].

Regarding the level of education, its connection is inversely proportional to suicidal conception. This is due, among other factors, to financial instability, which often accompanies individuals with a low level of education and is linked to occupational status. Also, the sense of personal and family unsafety, usually generated by the lack of access to knowledge and preventive measures, is a risk factor for self-inflicted injuries [31,32].

Final considerations

Suicide is a serious public health problem in Brazil and mainly affects white, older adult men with few years of formal education, most concentrated in Southern Brazil. There was a predominance of hanging in both sexes, with firearm discharge in men and the use of pesticides in women in second. North and Northeast Brazil had the highest percentage growth.

In this sense, bioethics of life, based on the principle of justice, requires the implementation of public policies that reduce these inequalities and ensure the protection of human rights, aiming at the prevention of suicide and the promotion of mental health. Measures can be implemented, such as: reducing access to lethal toxic substances; more efficient diagnosis of mental disorders and treatment of affected people; and promotion of training for health professionals in the identification of people at risk of suicide.

The limitations of this study include the underreporting of surveillance data and the scarcity of previous studies. Although, the data can serve as a subsidy for the formulation of new strategies aimed at reducing suicide in the country.

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