Suicide attempt and death by suicide in Brazil: an epidemiological analysis

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ABSTRACT

Objective: Describe the epidemiological profile of suicide attempts and deaths in Brazil. **Method:** Retrospective, quantitative research, data obtained in September 2020 in the database of the Department of Informatics of the Brazilian Unified Health System. **Results:** Gradual increase in self-harm reports by 497.5% between 2011 and 2018. In 2018, from those who attemped suicide, 68.9% were women, 65.6% were aged between 20 and 59 years; and 49.4% were white. Between 2009 and 2018, there were 108,020 deaths; higher rates among males. In data from 2018, we noted similar age groups; there were important regional differences mostly among white (49.2%) and brown (42.8%); in 2017 and 2018, we noted the highest proportional percentage in people with 8 to 11 years of study: 33.1 and 35.6%, respectively. **Conclusion:** Increase in suicide attempt and suicide rates, according to Brazilian regions and states. Increase in the death of indigenous people; white people; men; in those single, divorced, and widowed; with more years of schooling; from all age groups; who died at home by hanging.

Keywords: Mental health, Suicide, Suicide attempt, Epidemiology, Brazil.

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INTRODUCTION

Suicidal ideation, suicide attempt and death by suicide compose the suicidal behavior, and comprise actions towards gradual voluntary self-extermination[1]. Suicide affects families, friends and communities. It can affect around five or six close people[2]. However, such impact can reach from 60 people[3] to 135 people[4]. According to the World Health Organization, about 804,000 people died by suicide worldwide in 2016, totalling one death every 40 seconds and 10 to 40 suicide attempts for each suicide death, depending on the location[1,5].

In Brazil, there were 183,484 deaths by suicide between 1996 and 2016, an increase of 69.6% in suicide cases[6]. According to data from DATASUS, Brazil recorded 12,733 deaths by suicide in 2018, a rate of 6.1 per 100,000 inhabitants, or about 35 deaths per day that year, maintaining its position as the eighth country with most suicides in the world in absolute numbers[1].

An estimated one person dies by suicide every 45 minutes in Brazil, although there is not enough reliable data due to the lack of adequate surveillance system for suicidal behavior, despite recent years improvements. That maintains under-reporting and non-notification very high, resulting in data masking, often at the request of family members out of shame and stigma, and lowering rates[7].

In addition to under-reporting and under-registration, car accidents, drowning, accidental poisoning and death by undetermined causes, also hinder data gathering on death by suicide[8].

With a population greater than 200 million inhabitants, the Brazilian national coefficient of suicide mortality is not enough to tackle regional variations, that depend on specific factors. Studies show that small and medium-sized cities have the highest suicide rates[9–10].

This study aims at analyzing epidemiological data on suicide attempts (2011–2018) and deaths by suicide (2009–2018) in Brazil.

METHOD

Type of study

This is a descriptive retrospective study[11] (2011–2018 on suicide attempt and 2009–2018 on suicide) of quantitative approach.

Population

All cases of suicide attempt were recorded in the Brazilian Notifiable Diseases Information System (SINAN – *Sistema de Informação de Agravos de Notificação*), from 2011 to 2018, and suicide deaths were recorded in the Mortality Information System (SIM – *Sistema de Informação de Mortalidade*), from 2009 to 2018, both available through the Informatics Department of the Brazilian Unified Health System (DATASUS – *Departamento de Informática do Sistema Único de Saúde do Brasil*).

Data collection

Data on suicide attempts and death by suicide were obtained in September 2020 by accessing DATASUS.

When selecting data on mortality rates, X60-X84 (intentional self-inflicted injuries)[12] were considered, according to the 10th International Classification of Diseases (ICD-10)[12]. Data on population estimates were obtained from the Brazilian Institute of Geography and Statistics (IBGE).

The variables selected for this study are those available in the database: age group, color/race, schooling, place of occurrence, marital status, gender, region and state, and the suicide methods.

Data processing and analysis

Data were put on Microsoft Excel spreadsheets for retrospective and historical analysis. In addition, descriptive statistical analysis was performed through the Statistical Package for Social Sciences (SPSS) program, 20.0 version, which allowed us to understand absolute frequency and relative frequency.

To calculate morbidity and mortality rates, populations of 100,000 inhabitants were considered.

Ethical aspects

This research uses public databases, whose information are aggregated, although without the possibility of individual identification. It is part of a broader study that met Brazilian legislation and was approved by the Research Ethics Committee under opinion no. 2,314,347 in 2017.

RESULTS

Suicide attempt in Brazil (2011-2018)

Brazil has shown a gradual increase in reports of self-harm in absolute numbers. Between 2011 and 2018, there was an increase of 497.5% in reported cases. Table 1 presents the evolution of self-inflicted violence reported cases in Brazil.

When analyzing the absolute numbers of reported cases of self-inflicted violence according to sex, women are the majority, with 68.1% of cases in 2017 and 68.9% of cases in 2018. While in the state of Amazonas most reports of self-harm are from men, with 53.4% in 2018.

As for age, there are more occurrences of suicide attempt in people aged between 20 and 59 years with 65.6% in Brazil in 2018. In all Brazilian regions, suicide attempts are higher in this phase, varying around 57.5% in the North and 66.9% in the Southeast Region. This is the age with the highest occurrence, its proportional percentage being above 50% in all Brazilian states. The second highest percentage is among adolescents aged between 10 and 19 years with 29.8% in Brazil, and variation of 28.1% to 38.3% throughout Brazil.

For skin color, 49.4% of self-harm reports were from white people, followed by brown people with 34.2%. However, we shall consider the regional differences of the Brazilian population; in Santa Catarina, the proportional percentage of white people is 87.6%, while in Amazonas it is 3.8%. For brown people, the proportional percentage ranges from 82.7% in Roraima to 6.3% in Santa Catarina.

Suicide in Brazil (2009–2018)

According to DATASUS, from 2009 to 2018, Brazil recorded an ascending number of 108,020 deaths by suicide due to voluntary self-inflicted injuries. A total of 38.3% were from the Southeast region in absolute numbers, the largest Brazilian population.

Table 2 presents data on deaths by suicide from 2009 to 2018 in Brazilian regions and states.

Figure 1 represents the evolution of the Suicide Mortality Rate in Brazil, calculated through data from the Department of Informatics of the Brazilian Unified Health System (DATASUS), on the number of deaths by suicide in Brazil from 2009 to 2018, and from the Brazilian Institute of Geography and Statistics (IBGE), on the population residing in the country in the same period. Rates calculated per 100,000 inhabitants.

When analyzing deaths by suicide between the sexes, the five highest proportional percentages of deaths of men were in Bahia (85.3%), Rio Grande do Norte (84.2%), Ceará (82.3%), Paraná (81.5%), and Pará (80.0%) in 2018. Amazonas was the only one with most suicide attempts by men, probably because of the concentration of indigenous population and the occurrence of suicide deaths among these peoples, mostly men.

For women, the five highest proportional percentages of deaths stem from Roraima (32.4%), Amapá (32.3%), Acre (28.8%), Rondônia (27.2%) and Piauí (26.6%).

Age analysis showed people aged between 30 and 39 years (20.7%) were the ones with the highest percentage of deaths in 2018, followed by people aged between 20 and 29 years (19.7%) and those between 40 and 49 years (18.1%). Suicide among people with 60 years and more corresponded to 17.9% of the occurrences in the same year. Between 1996 to 2018, rates increased by 162.2% in the 60–69 population, 141.4% in the 70–79, and 189.3% in those with 80 and more.

Regarding skin color, most deaths by suicide are in people with white (49.2%) and brown (42.8%) skin, despite some regional differences throughout Brazil. In Brazilian regions, the percentages of death by suicide in people of white and brown skin are, respectively, 12.2% and 75.0% in the North, 15.2% and 75.7% in the Northeast, 58.7% and 33.2% in the Southeast, 87.0% and 8.9% in the South and 36.0% and 53.9% in the Midwest region.

We highlight the 176% increase in suicides among indigenous peoples from 2000 to 2018.

Among Brazilian states, the extreme percentages of deaths of white people range from 90.9% in Rio Grande do Sul to 2.9% in Alagoas. Likewise, brown people represent 89.6% of deaths in Sergipe and 4.1% in Rio Grande do Sul.

As for schooling, excluding ignored information, in 2017 and 2018 the highest proportional percentage was of people with 8 to 11 years of schooling, 33.1% and 35.6%, respectively. In 2013, 2014 and 2015, the highest percentage was of people with 4 to 7 years of study, 33.5, 32.9 and 33.6%, respectively. From 1996 to 2018, rates increased by 824% for people with 8 and 11 years of schooling and 520.3% for those with 12 and more.

Table 1. Absolute numbers of self-inflicted violence reported cases in Brazil, Brazilian Regions and States from 2011 to 2018. Assis, SP, Brazil, 2020.

Region/Federation Unit	2011	2012	2013	2014	2015	2016	2017	2018
Northern Region	636	722	1081	1112	1577	1935	2819	3114
.. Rondônia	36	21	43	37	108	180	375	431
.. Acre	33	74	65	85	243	314	614	515
.. Amazonas	104	88	152	207	416	319	281	341
.. Roraima	56	128	166	142	115	149	269	324
.. Pará	90	69	104	158	177	212	298	254
.. Amapá	57	71	104	45	38	61	81	108
.. Tocantins	260	271	447	438	480	700	901	1141
Northeast Region	1995	2564	3646	3638	4976	5555	8623	12105
.. Maranhão	61	166	173	185	375	198	283	454
.. Piauí	198	318	371	360	606	1045	1053	1247
.. Ceará	72	109	234	285	661	886	1400	1957
.. Rio Grande do Norte	107	126	251	233	334	441	728	1065
.. Paraíba	191	241	186	196	438	285	648	793
.. Pernambuco	421	443	998	1076	1124	1242	2169	3199
.. Alagoas	764	853	972	846	851	804	1227	1663
.. Sergipe	5	13	47	42	43	41	99	238
.. Bahia	176	295	414	415	544	613	1016	1489
Southeast Region	7455	10836	12422	15384	20182	23301	33624	43096
.. Minas Gerais	2377	4315	5782	7454	9153	8674	11273	13348
.. Espírito Santo	68	225	371	867	1238	1580	2001	3240
.. Rio de Janeiro	466	732	859	1121	1656	2125	3570	4246
.. Sao Paulo	4544	5564	5410	5942	8135	10922	16780	22262
Southern Region	3557	5342	6403	7524	10142	11562	18766	24264
.. Paraná	581	1367	1741	2356	3892	4754	7777	9950
.. Santa Catarina	1075	1480	2220	2476	2948	3131	4470	5816
.. Rio Grande do Sul	1901	2495	2442	2692	3302	3677	6519	8498
Midwest Region	1297	1700	1918	2050	2812	3136	4369	6693
.. Mato Grosso do Sul	905	886	1018	1074	1244	1300	1734	1928
.. Mato Grosso	86	209	178	225	235	273	477	641
.. Goiás	218	472	561	580	977	1051	1395	2234
.. Federal District	88	133	161	171	356	512	763	1890
Brazil	14940	21164	25470	29708	39689	45489	68201	89272

Source: Elaborated by the authors with data from DATASUS, 2020.

For marital status, most occurrences are among single people in all Brazilian regions and states, despite the difference between 87.1% in Amapá and 31.2% in Paraíba.

Most individuals attempted suicide and committed suicide at home by hanging, a method in rise, followed by exogenous intoxication and firearms, respectively, both in decrease.

In general, all regions had an increase in suicide rates from 1996 to 2018: the North with 81.1%, Northeast with 126.5%, Southeast with 26.6%, South with 17.8% and Midwest with 28.5%. As for the states with the highest increases in suicide rates: Piauí (464.6%), Paraíba (402.6%), Maranhão (355.6%), all in the Northeast region, Tocantins (264.1%) in the Midwest, and Acre (227.9%) in the North. In addition, historically,

Table 2. Deaths by suicide in Brazil, Brazilian regions and states from 2009 to 2018. Assis, SP, Brazil, 2020.

Region/Federation Unit	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Northern Region	593	624	692	694	759	708	881	826	896	991
.. Rondônia	85	82	78	73	86	84	109	103	113	125
.. Acre	31	41	41	43	44	49	39	56	64	59
.. Amazonas	152	162	188	185	225	233	263	194	207	234
.. Roraima	32	34	34	38	33	15	52	59	50	37
.. Pará	188	188	222	240	232	208	266	277	301	350
.. Amapá	26	30	37	21	45	34	53	36	46	62
.. Tocantins	79	87	92	94	94	85	99	101	115	124
Northeast Region	2101	2123	2297	2336	2494	2393	2540	2722	2981	2996
.. Maranhão	156	208	218	206	242	255	280	294	318	313
.. Piauí	207	201	234	233	227	244	271	321	317	331
.. Ceará	501	488	553	510	590	566	565	590	644	655
.. Rio Grande do Norte	144	137	177	171	157	169	156	181	180	196
.. Paraíba	166	158	163	189	199	158	221	181	250	237
.. Pernambuco	328	285	291	332	320	325	308	396	438	430
.. Alagoas	111	85	104	109	143	118	116	112	104	137
.. Sergipe	111	129	125	109	125	110	120	115	127	134
.. Bahia	377	432	432	477	491	448	503	532	603	563
Southeast Region	3570	3735	3900	4002	3959	4283	4323	4249	4635	4675
.. Minas Gerais	1123	1102	1258	1264	1159	1357	1303	1302	1515	1530
.. Espírito Santo	150	160	162	178	158	172	189	175	207	239
.. Rio de Janeiro	321	509	433	463	437	522	531	573	607	699
.. São Paulo	1976	1964	2047	2097	2205	2232	2300	2199	2306	2207
Southern Region	2279	2154	2156	2357	2365	2319	2494	2602	2862	2891
.. Paraná	648	588	593	629	655	620	716	760	774	915
.. Santa Catarina	519	530	520	548	568	587	637	674	739	735
.. Rio Grande do Sul	1112	1036	1043	1180	1142	1112	1141	1168	1349	1241
Midwest Region	831	812	807	932	956	950	940	1034	1121	1180
.. Mato Grosso do Sul	205	188	211	210	228	204	230	223	259	268
.. Mato Grosso	190	161	158	185	177	157	145	178	197	226
.. Goiás	307	315	338	402	427	454	435	481	497	499
.. Federal District	129	148	100	135	124	135	130	152	168	187
Brazil	9374	9448	9852	10321	10533	10653	11178	11433	12495	12733

Source: Elaborated by the authors with data from DATASUS, 2020.

the states of the Southern Region have higher rates when compared to those of other Brazilian states.

DISCUSSION

Despite suicide attempts is one of the main indicators of suicide risk, its underreporting results in misinformation[1,13–14]. At least 20 suicide attempts occur for each adult suicide death, i.e, one attempt per second[7]. From 2014 on, Brazilian data are better reported due to the current legislation, which increased reported cases from 2011 to 2018 (497.5%).

The Brazilian epidemiological report on suicide attempts and suicide by exogenous intoxication from 2007 to 2017 revealed 220,045 cases of exogenous

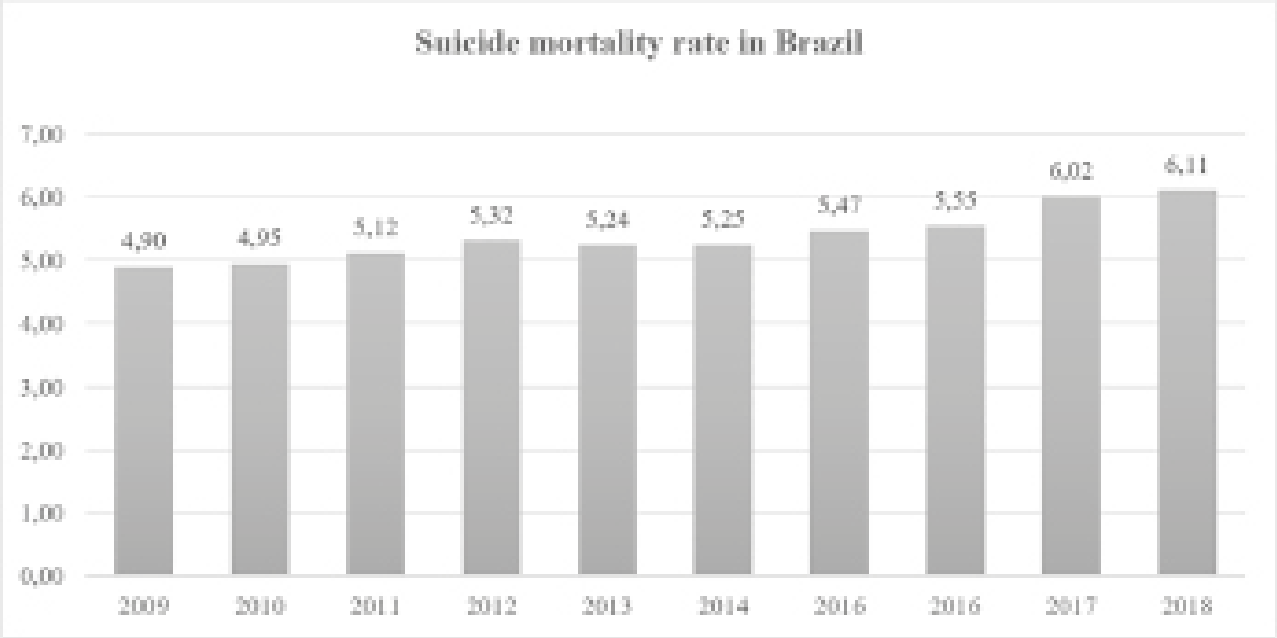

Figure 1. Evolution of the Suicide Mortality Rate in Brazil from 2009 to 2018. Assis, SP, Brazil, 2020.
Fonte: Elaborado pelos autores com dados do DATASUS, 2020.

intoxication characterized as suicide attempts, 69.9% of these being among females[15].

In Uberaba, Minas Gerais, a study that used data from the National Notification System (SINAN) concerning violence and exogenous intoxication in 2014, revealed 89 cases of suicide attempts by exogenous intoxication, 68 (76.4%) from females[16]. In the city of Palmas (TO), 67% of 656 suicide attempt reports from 2010 to 2014 were from females[17].

It is worth to highlight that the rise in suicides from 2013 to 2018 coincides with more efficient reporting, with the lack of significant differences between age groups and the constant increase among individuals who received more schooling. Data on death by suicide, according to Global Health Estimates of the World Health Organization for 2016, revealed a higher suicide mortality rate in men (13.7 per 100,000 inhabitants) than in women (7.5 per 100,000 inhabitants)[18].

An article on female suicide considers the psychological and psychiatric perspective to justify this behavior, pointing out to female sex inherent situations, such as the need for attention, hysterical traits, hormonal variations, volatility, impulsivity, excessive emotion, lack of rationality and pragmatism. However, the authors reflect on cultural and gender aspects from a historical scope[19].

According to them, suicide attempts are more common in women as this group has the highest prevalence of depression; the highest occurrence of eating disorders; problems with body image; unwanted pregnancy; postpartum psychosis; the highest occurrence of suicidal ideation after induced abortion and at low estrogen and serotonin levels; the highest vulnerability to the loss of children; domestic violence against them and their children and sexual abuse[20–21].

The Global Burden of Disease of 2015 revealed that suicide between 10 to 24 year-olds was among the five main causes of mortality in all regions, except for Africa[22–23]. Adolescents and young adults are highly vulnerable to suicidal behavior. Almost a third of all suicides is among young people[24] .

It is an alarming public health matter with several risk factors associated with mental disorders, such as mood disorders, alcohol and drugs use, and eating disorders; psychological factors, such as low self-esteem, hopelessness and impulsivity; psychosocial adversity factors, such as exposure to violence, conflicting environment, traumatic events as abuse or victimization, lack of confidence and communication with parents, dysfunctional household and small number of friends, migration, and poverty. We highlight a history of aggression, law transgression and problems of conduct in general in adolescents with suicidal behavior[24-27].

A large part of the old age population presents suicidal behavior as the world's population is aging.

Aging is an inherent life process, which implies changes in physical, financial, psychological, emotional and structural aspects of old people's lives. At this point in life, they need support. In the lack of support, life expectancy makes them vulnerable to suicide[28].

How the aging process affects this population depends on each context. In Brazil, people see aging as a time when individuals fail to perform the activities they were used to[29].

This population also goes through significant emotional losses regarding socialization, occupation, contribution to the household income, their sense of belonging and utility, and negative changes in general that lead to a stigmatized self-perception. In addition, there is a need to consider other factors: physical and disabling problems, such as chronic diseases, functional decline; psychiatric problems, such as depression, abuse of licit and illicit substances, personality disorders, self-destructive behaviors, cognitive impairment; psychological problems such as persistent or traumatic suffering, feelings of loneliness, hopelessness and boredom, and fragility; social problems such as social isolation, family conflicts, low education level, the loss of relatives or friends, absence of religiosity, inflexibility to changes, particularly social ones; economic problems, such as the lack of financial autonomy and security and social assistance; among others[29–31].

To understand the relationship between suicidal behavior and skin color, one should consider the context of each location, as these determine which groups may be more vulnerable[24]. We highlight social determinants of suicidal behavior are associated with structural violence, which is associated with colonialism, a historical period in which social groups were exploited, discriminated, marginalized and excluded. People from these groups are considered vulnerable[32].

When analyzing Brazilian records on suicide attempts by exogenous intoxication from 2007 to 2017, they revealed most people had white skin (46.8% women and 43.7% men), followed by black people, and black and brown people (33.1% women and 36.5% men). The ignored information had a significant occurrence (19.4% for women and 19.0% for men)[15].

Another Brazilian study involving 86 emergency services of the Brazilian Unified Health System (SUS) located in 24 capitals and the Federal District showed inversed data with a record of 477 occurrences of self-inflicted violence. Around 62.4% of them were black or brown, and 34.3% were white[33].

Based on data from DATASUS, the Brazilian adolescent suicide mortality rate according to skin color showed adolescents of black, brown and indigenous skin color were the most affected by suicide[34].

In Brazil, from 2011 to 2015, single, divorced and widowed people represented 60.4% of deaths by suicide, while married people or those living in a stable union represented 31.5%. The percentage of single men and women was also higher in a study with people who committed suicide, with 57.9% and 40.0%, respectively. As for divorced people, 20.0% for women and 5.2% for men[35].

For suicide attempt and suicide in Brazil, one should consider regional differences, as the South has most part of the white population, lower miscegenation rate, sociocultural and religious values, more schooling, a small portion of indigenous peoples, and much due to European colonization. On the other hand, the Southeast and Northeast regions have greater miscegenation, cultural and religious diversity, and greater influence of Africans, Europeans, Asians and indigenous people, while the Midwest region has an expanding agricultural industry that banishes indigenous from their land and the North with Amazonian greatness and strong indigenous culture. It is necessary to pay attention to these factors when analyzing variables such as location, skin color, marital status, age group, schooling, individual and family income, among others for suicidal behavior.

It is worth considering the discrepancy in suicide rates among Brazilian regions. Some, regions/states have a more reliable historical record system over the years and others did not, with a relatively recent record.

This study contributes to health practices by analyzing suicidal behavior and the need to promote mental health and prevention of death by suicide considering the diagnosis of each reported case. It collaborates with the elaboration and implementation of public policies in the field.

The limitations of this study are regarding the underreporting and the lack of secondary data.

CONCLUSION

There is a significant and gradual increase in suicide attempt and death by suicide rates in Brazil, with specificities for each Brazilian region and state, especially among white and indigenous people, with more years of schooling and improved data collection and recording.

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