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Epidemiology of suicides in Brazil: a systematic review

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Abstract

Objective: Find and review data about suicide prevalence and incidence in Brazil.

Materials and methods: This is a systematic review that used PRISMA protocol and has PROSPERO registration at the number CRD42021288299. Using PubMed, Scielo databases, Brazilian Ministry of Health, and World Health Organization (WHO) documents, 245 manuscripts (metaanalysis, systematic reviews, cohorts, cross-sectional, and government documents) published from 2010 to 2021 were initially selected, of which 46 remained in the review. The risk of bias was assessed by the Cochrane Bias Risk Assessment tool.

Results: The data showed that suicide rates in Brazil range between 4.6 and 6.6 per 100,000 inhabitants, from 2000 to 2020. It showed an increased risk of death from suicide in all regions of Brazil, highlighting the South and Midwest. Overall, suicide in Brazil is more prevalent among those aged 15 to 45 years (and there is an increase in adolescent mortality rates), unmarried, males, and those who present mental disorders, and this is associated with unemployment and economic deprivation. Indigenous people have elevated levels of suicide compared to non-indigenous people. Hanging and poisoning were the most common methods used and the suicide most often happen at home.

Limitations: Only English and Portuguese publications were included in the present work. All studies published in the different periods were included. Some biases were observed: some studies had restricted eligibility criteria and different measures, others failed to adequately control confound variables. We protected the quality of this research paper by excluding studies where bias could compromise interpretation.

Conclusion: The consolidated information from this present systematic review about suicidal behaviour in Brazil may contribute to the assessment of the current situation and future planning of public health interventions, especially better prevention efforts.

Keywords

Suicide, Epidemiology, Suicidal Behaviour, Prevalence, Incidence, Brazil, Systematic Review

INTRODUCTION

Suicidal behaviour is a set of behaviours ranging from ideation to attempts or complete acts of killing oneself, which causes high costs for the individual and society, both economically and emotionally (Baldaçara, Rocha, et al,. 2020). The WHO data confirms that suicidal behaviour is a serious public health problem and a major cause of mortality (Rodrigues et al,. 2019; Piccin et al,. 2020; Alarcão et al,. 2020). More than 700,000 people die by suicide worldwide every year, (WHO 2019) representing from 1.3% to 1.5% of all causes of mortality (Naghavi and Global Burden of Disease Self-Harm 2019; Baldaçara, Grudtner, et al,. 2020; Baldaçara, Rocha, et al,. 2020; da Silva et al,. 2020; WHO 2019).

Between 2010 and 2019, 112,230 deaths occurred in Brazil due to suicide, with a 43% increase in the annual number of deaths by suicide, from 9,454 in 2010 to 13,523 in 2019 (Ministério da Saúde 2021). Brazil has elevated levels of social and economic inequality, which influences the health of the population and mortality from several causes,

including suicide. (Ministério da Saúde 2021, WHO 2021). Despite there being several publications on suicide in Brazil and although some prevention strategies have started, the lack of consolidated information on the epidemiology of suicidal behaviour limit the efficacious of these interventions. The publications so far are incomplete, and the data is of little help in implementing preventive measures. Therefore, the purpose of this paper is to present and discuss the results of the epidemiology of suicide in Brazil that has been published during the past 10 years, in order to identify the research gaps and with a focus on clinical and planning practices (prevention and public health policies).

METHODS

Type of study

This is a systematic review that used PRISMA protocol and has PROSPERO registration at the number CRD42021288299.

Eligibility criteria

A systematic review was performed using the PubMed (Medline) and Scielo databases. The inclusion criteria was articles published from 2010 to 2021 that discussed the epidemiology of suicidal behaviour in Brazil. Language was limited to English and Portuguese. We included systematic reviews, cohort studies, and observational studies. The exclusion criteria were articles published in other languages, articles that did not specifically address the epidemiology of suicidal behaviour in Brazil, and articles that lacked relevant information.

Information sources

In the survey of databases from January 2010 to 2021, 245 articles were found (see flowchart; Fig. 1); 212 in PubMed, 28 in Scielo, and five additional studies, two from the WHO and three from the Brazilian Ministry of Health.

Search strategy

The search was conducted using the following Boolean expressions:
https://pubmed.ncbi.nlm.nih.
gov/?term=suicide+brazil&filter=pubt.
booksdocs&filter=pubt.clinicalconference&filter=pubt.
clinicalstudy&filter=pubt.clinicaltrial&filter=pubt.
comparativestudy&filter=pubt.dataset&filter=pubt.
evaluationstudy&filter=pubt.guideline&filter=pubt.
meta-analysis&filter=pubt.multicenterstudy&filter=pubt.

observationalstudy&filter=pubt.
practiceguideline&filter=pubt.
pragmaticclinicaltrial&filter=pubt.
randomizedcontrolledtrial&filter=pubt.
review&filter=pubt.
systematicreview&filter=years.2010-2021
https://search.scielo.org/?q=epidemiology+suicide+-suicidal+behavior++brazil&lang=pt&count=15&-from=0&output=site&sort=&format=summa-ry&fb=&page=1&q=%28epidemiology+suicide+bra-zil%29+OR+%28epidemiology+suicidal+behavior+bra-zil%29&lang=pt&page=1, for the Scielo database
Since the definitions of suicidal behaviour vary in the literature, we used the standardised meaning according to the Brazilian Psychiatric Association guidelines (Baldaçara, Rocha, et al,. 2020; Baldaçara, Grudtner, et al,. 2020; da Silva et al,. 2020). The search was conducted on 20 January 2021.

Selection process and data collection process

During the screening phase, 101 articles were eliminated for not meeting the inclusion criteria, and in the eligibility phase, another 98 articles were excluded due to the following risks of bias: incomplete data, selective reporting, conflict of interest, missing data, included and excluded criteria not reported. Finally, 46 articles were included, and analysed. All authors aided in the writing and reviewing of this paper.
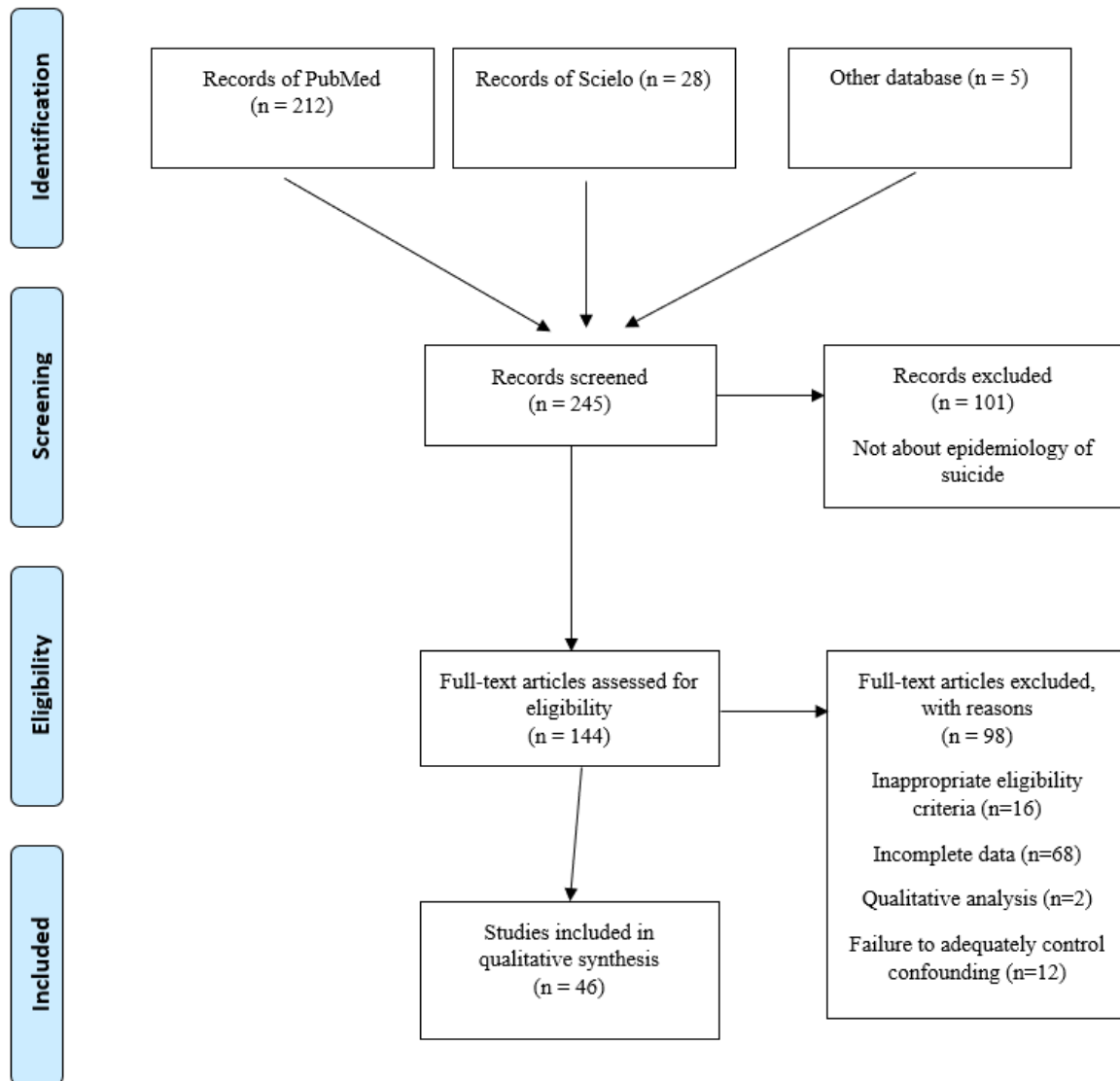
Data items and effect measures

The main outcome measure evaluated was the number of suicide cases, measured by prevalence and incidence rates. Other secondary outcome measures were risk factors. Risk factors were assessed using prevalence, incidence, relative risk, odds ratio, and other measures of association.

Synthesis methods

After meeting the inclusion criteria, the articles were analysed in their entirety, the information was grouped in Table 1 for prevalence, incidence, and Table 2 for risk factors related to suicide. Other information was presented in the text.

Risk of bias

The study adhered to predefined objectives and eligibility criteria that were unambiguous to decrease selection bias. For each study found, all references were searched for additional papers to reduce the chance of missing eligible papers. The study only contains published papers and so there is a risk of publication bias. The Cochrane Bias Risk Assessment tool was used to assess bias in each paper.

Figure 1: Flowchart of the selected studies following PRISMA guidelines.

RESULTS

Suicide rate in Brazil

The global age-standardised suicide rate was 9.0 per 100,000 population for 2019. Rates varied between countries from fewer than two deaths by suicide per 100,000 to over 80 per 100,000 (WHO 2019). The suicide rate in Brazil varied from 4.82 to 6.9 per 100,000 habitants along with different studies from different years (Martini et al,. 2019; Colombo-Souza et al,. 2020; Dantas et al,. 2018; Ministério da Saúde 2019, 2021; WHO 2019, 2021).

Brazil has elevated levels of social and economic inequality, which influences the health of the population and mortality from many causes, including suicide. (Machado et al,. 2019) The actual suicide rate in Brazil reported by the WHO is 6.4/100,000 (WHO 2021) and 6.6/100,000 reported by the Brazilian Health Ministry, (Ministério da Saúde 2021) which represents a large number of people as Brazil is a populous country. Rates have increased over the last 30 years and vary across major regions, states and cities. Examples will be cited below.

In 2015, Rodrigues et al,. alerted that with suicide rates increasing between 1997 and 2015, the WHO targets to reduce suicide rates might not be achieved (Rodrigues et al,. 2019). Between 2010 and 2019, 112,230 deaths occurred in Brazil due to suicide, with a 43% increase in the annual number of deaths by suicide, from 9,454 in 2010 to 13,523

in 2019 (Ministério da Saúde 2021).

From 1990 to 2015 one study observed that there were already changes in the epidemiological pattern of suicide, with high mortality rates in South Brazil as well as variations in different regions of the country. There was a reduction in suicide deaths among older adults (individuals aged 60 years and over) in Southern Brazil, however, there was an increase in suicide deaths in the Northeast, an increase in deaths by suicide among adults and Black people in the Midwest, and an increase in suicide deaths among young and Indigenous people in the Northwest of the Amazonas (Palma et al,. 2020).

The Brazilian municipalities presenting the highest rates were Taipas do Tocantins, state of Tocantins (79.68 deaths per 100,000 population), Itaporã, state of Mato Grosso do Sul (75.15 deaths per 100,000 population), Mampituba, state of Rio Grande do Sul (52.98 deaths per 100,000 population), Paranhos, state of Mato Grosso do Sul (52.41 deaths per 100,000 population), and Monjolos, state of Minas Gerais (52.08 deaths per 100,000 population) (Dantas et al,. 2018). A study in the city of São Paulo, the most populous city in the country located in the Southeast region, found that suicide rates increased from 4.6/100,000 inhabitants in 2000 to 4.9/100,000 in 2017 (Colombo-Souza et al,. 2020). In the states of Sergipe, Northeast region, suicide rates in the state increased 102.3% (from 2.69/100,000 population in 2000 to 5.44 in 2015) (Santos et al,. 2018). In the state of Roraima, North region, from 2014 to 2017 the average mortality coefficient was 8,6/100.000 inhabitants. (Macedo and Cardoso 2020) Finally, in the State of Mato Grosso do Sul, Midwest region, the suicide rate population was 8.1/100,000 from 2009 to 2011 (Orellana et al,. 2016).

In adolescents, the highest suicide rates were observed in the Porto Alegre (South region) and Belo Horizonte (Southeast region). Moreover, the greatest increase in suicide rates occurred between 2006 and 2015 in the Belo Horizonte (193%) region, and the greatest decrease in the Recife (55%) region (Jaen-Varas et al,. 2019).

The latest data in 2021, from the Brazilian Ministry of Health, reported adjusted mortality rates in the period from 2010 to 2019 and showed an increased risk of death from suicide in all regions of Brazil, highlighting the South and Midwest as the regions with the highest suicide rates (Ministério da Saúde 2021). Suicide rates by region were South 10.41, Midwest 8.30, North 6.28, Southeast 5.70, Northeast 5.67. From 2010 to 2019 there was a greater increase in the Midwest (from 6.18 to 8.30) and the South (from 7.99 to 10.41).

Demographic data according to gender, age, and education

Brazil follows the worldwide pattern in terms of gender: males are more likely to become a victim of suicide (Bando et al,. 2012; Carmo et al,. 2018; Colombo-Souza et al,. 2020; Franck et al,. 2020; Goncalves, Ponce, and Leyton 2018; Lazzarini et al,. 2018; Macedo and Cardoso 2020; Martini et al,. 2019; Ministério da Saúde 2019, 2021; Palhares-Alves et al,. 2015; Rodrigues et al,. 2019; Santos et al,. 2018; Sena-Ferreira et al,. 2014; WHO 2019, 2021), except in indigenous children (Souza 2019).

There was an increase in suicide for people aged 25 to 44 years old between 2000 and 2017 (Colombo-Souza et al,. 2020; Bando et al,. 2012). (Ministério da Saúde 2021) and adolescents (Jaen-Varas et al,. 2019) (Ministério da Saúde 2021). The mean age ranged from 39.90 ± 0.75 years (Goncalves, Ponce, and Leyton 2018) to 47.6 ± 18.3 years (Franck et al,. 2020). A high proportion of suicides were present in groups from 15 to 44 years old (Colombo-Souza et al,. 2020) (Franck et al,. 2020; Macedo and Cardoso 2020; Martini et al,. 2019; Rodrigues et al,. 2019; Santos et al,. 2018; Sena-Ferreira et al,. 2014; Ministério da Saúde 2021). Suicide rates related to age, on the other hand, vary according to regional differences.

In 2012, people aged over 60 years had the highest suicide rate in Brazil, over 80 years old (8.2/100,000) (Martini et al,. 2019; Rodrigues et al,. 2019). In Bahia, of 858 deaths by suicide among older adults, 53.8% were 60-69 years old (Carmo et al,. 2018).

In relation to scholarships, in 2019, the suicide rate was 25.9% in elementary schools and 30.3% among high school students. However, this data was lacking in 35.8% of all cases (Ministério da Saúde 2021). In another study, higher suicide rates were observed in individuals with a higher education, white ethnicity (67.2%) (Colombo-Souza et al,. 2020). However, in another, low-level education had a positive association (RR: 1.015, 95% CI: 1.010–1.021) with suicide rates (Machado, Rasella, and Dos Santos 2015).

Financial and social problems are risk factors for suicide (Franck et al,. 2020). Unemployment and low income measured by the Gini index are associated with higher suicide rates, especially in teenagers (Jaen-Varas et al,. 2019). Socioeconomic deprivation at community and municipal levels is an important risk factor for suicide in the young population (Alarcão et al,. 2020; Machado, Rasella, and Dos Santos 2015). Socioeconomic deprivation, especially in rural settings with poor infrastructure and development also correlate with increased suicide rates (Alarcão et al,. 2020).

Related to marital status, suicide is more frequent for singles (Santos et al,. 2018; Bando et al,. 2012; Macedo and Cardoso 2020; Sena-Ferreira et al,. 2014; Ministério da Saúde 2019; Palhares-Alves et al,. 2015; Ministério da Saúde 2020) widowers or those who are divorced (83%) (Ministério da Saúde 2019; Palhares-Alves et al,. 2015; Ministério da Saúde 2020). Being a prisoner may also be another risk factor (Franck et al,. 2020).

Tables 1: Main findings of prevalence and incidence of suicide in Brazil and regions differences

Author´s names / study design	Years	Sample characteristics	Variable	Main findings	Limitations
Colombo-Souza et al,. 2020. Longitudinal retrospective study.	Between 2000 and 2017.	Data from the Ministry of Health´s mortality notification system in the city of São Paulo.	Suicide mortality.	Suicide rates were high throughout this period, increasing from 4.6/100,000 inhabitants in the 2000s to 4.9/100,000 in 2017 (mean: 4.7/100,000). The increase in mortality was due to increased male suicide, which went from 6.0/100,000 to the current 8.0/100,000. Other higher coefficients corresponded to social risk factors, such as being a young adult (25-44 years old), being more educated (eight years of schooling) and having white ethnicity (67.2%). Suicide was also twice as likely to occur at home (47.8%).	The real degrees of underestimation and underreporting of data were not ascertained. Thus, the true prevalence of suicide may have been greater, considering the extreme difficulty in accurately assessing the scale of suicidal acts and recording them.
Dantas et al,. 2018. Ecological study.	Between 2010 and 2014.	Ecological study of multiple groups, using Brazilian municipalities as a unit of analysis.	Suicide mortality.	The average suicide mortality rate in Brazil was 5.23/100,000 population. The Brazilian municipalities presenting the highest rates were Taipas do Tocantins, state of Tocantins (79.68 deaths per 100,000 population), Itapora˜, state of Mato Grosso do Sul (75.15 deaths per 100,000 population), Mampituba, state of Rio Grande do Sul (52.98 deaths per 100,000 population), Paranhos, state of Mato Grosso do Sul (52.41 deaths per 100,000 population), and Monjolos, state of Minas Gerais (52.08 deaths per 100,000 population).	Use of secondary mortality data, which is subject to underreporting. Study design: although an ecological association may correctly reflect a causal association between exposure and a health-related condition/disease, the possibility of ecological bias is always perceived as a limitation on the use of ecological correlations.
Jaen-Varas et al,. 2019. Retrospective ecological design.	From Jan 2006 to Dec 2015.	Adolescents.	Suicide rates.	The highest suicide rates were observed in the Porto Alegre (South region) and Belo Horizonte (Southeast region). Moreover, the greatest increase in suicide rates occurred between 2006 and 2015 in the Belo Horizonte (193%) region, and the greatest decrease in the Recife (55%) region.	Indirect data from the Brazilian government.
Santos et al,. 2018. Ecological time-series.	Between 2000 and 2015.	1,560 suicide cases in the state of Sergipe.	Suicide deaths.	Suicide rates in the state increased 102.3% (from 2.69/100,000 population in 2000 to 5.44 in 2015).	Indirect data from the Brazilian government.
Macedo et al,. 2020. Cross-sectional.	From 2014 to 2017.	Profile of deaths by suicide in the state of Roraima (North region).	Suicide deaths.	176 deaths were reported in the state of Roraima during the period studied. The average mortality coefficient was 8,6/100.000 inhabitants.	Indirect data from Brazilian government. Restrict to a state.
Machado et al,. 2019. Descriptive analysis.	2010 – 2017.	Socioeconomic and demographic variables were obtained from the Brazilian Institute of Geography and Statistics.	Suicide rates.	The difference in the mortality trends were supported by the coefficients of binomial regression for the two periods, before (2010-2014) and after (2014-2017) the Brazilian economic crisis and related austerity, measures have started. Suicide increased in all regions in the second period, except in the Southeast, where there was a slight decrease.	Indirect data from Brazilian government.
Martini et al,. 2019. Cross-sectional.	From 2000 to 2016.	Suicide rates in the Brazilian population between 2000 and 2016.	Number of suicides, rates suicides.	156,292 suicides were registered in the period, with a standardised rate of 4.82/100,000. The risk for males was 3.81 times higher than for females, without meaningful regional variations. This ratio was 8.2 in the 80+ group. An increase from 2000 to 2016 was demonstrated in all subgroups over 17, especially men aged 20–39 and women aged 40–59.	Used only official data registered in Information System on Mortality (SIM) database.

Tables 1: Main findings of prevalence and incidence of suicide in Brazil and regions differences

Author´s names / study design	Years	Sample characteristics	Variable	Main findings	Limitations
Ministério da Saúde 2019. Cross-sectional.	From 2011 to 2017.	Suicide between 15 to 29 years old.	Number of suicides, rates suicides.	Between 2011 and 2017 there was an increase in the number of deaths from suicide among young people aged 15 to 29, being 8.7% among men and 7.3% among women. In different states suicide rates from 15 to 29 years of age range 3.9 to 11.9 in 2011, and from 3.5 to 14.8 in 2017. The greatest percentage increases in suicide mortality rates occurred in Acre (81%) and Goiás (61%).	Government document that is dependent on the correct registration of death notifications in different regions across the country.
Ministério da Saúde 2021. Cross-sectional.	Between 2010 and 2019.	Suicide deaths recorded in the Mortality Information System (SIM), excluding children under 5 years.	Suicide deaths.	Between 2010 and 2019, 112,230 deaths occurred in Brazil due to suicide, with a 43% increase in the annual number of deaths, from 9,454 in 2010 to 13,523 in 2019. Analysis of the adjusted mortality rates for the period showed an increased risk of death from suicide in all regions of Brazil. In this same period, it is estimated that the Brazilian population has grown from 190,732,694 to 210,147,125, resulting in a growth of 10.17%. The rate in 2019 was 6.6 per 100,000 inhabitants. The increased risk of death from suicide in all regions of Brazil, highlight the South and Midwest regions. South 10.41, Midwest 8.30, North 6.28, Southeast 5.70, Northeast 5.67. From 2010 to 2019 there was a greater increase in the Midwest (from 6.18 to 8.30) and South (from 7.99 to 10.41).	Government document that is dependent on the correct registration of death notifications in different regions across the country.
Orellana et al,. 2016. Ecological study.	2009-2011 period.	Suicide rates in indigenous versus non-indigenous in the state of Mato Grosso do Sul.	Suicide deaths.	In the non-indigenous population was 8.1/100,000 (95%CI 7.4-8.8).	Data from a specific area.
Palma, Santos, and Ignotti 2020. Ecological study.	From 1990 to 2015.	Spatial pattern in mortality rates.	Mortality rates and odds ratio.	The high rates, previously concentrated in the South of Brazil, had expanded to other regions of the country. Extremely high rates emerged in southern Mato Grosso do Sul state. Clusters with a higher likelihood in all the periods were observed in the South.	Indirect data from IBGE – Brazilian Institute of Geography and Statistics.
Rodrigues et al,. 2019. Ecological study with an analysis of the time trend.	from 1997 to 2015.	The number of suicides was obtained from the Mortality Information System (Sistema de Informações sobre Mortalidade [SIM]) database.	Suicide deaths.	Overall, 90.6% of units of analysis had a stable or increasing trend in suicide rates from 1997 to 2015. If these trends remain, most of Brazil will fail to achieve the WHO-recommended reduction in suicide rates by 2020. There is great variability in the epidemiology of suicidal behaviour in the country.	The use of data on suicide from a secondary database; specifically, the Brazilian Ministry of Health SIM. Although the coverage and quality of these data are regarded as satisfactory, underreporting and misclassification are known to occur, and tend to lead to an underestimation of suicide rates, particularly in developing regions.
WHO 2019. Cross-sectional.	2019.	Suicide worldwide.	Suicide deaths.	In Brazil, the crude suicide rates, all ages (per 100 000), 2019 was 6.9 and the age-standardised suicide rates, all ages (per 100 000), 2019 was 6.4.	Indirect data reported by the Brazil government to WHO.
WHO 2021. Cross-sectional.	2019.	Suicide rates.	Suicide rates.	6.41 (5.79-12.1).	Indirect data reported by the Brazil government to WHO.

There are different results when it comes to race. Suicide is more frequent in white ethnicity (67.2%) (Colombo-Souza et al,. 2020). The suicide rate is 6.0 in Whites, 5.7 in Blacks, 2.0 in Asians (Souza 2019). But in some studies it's more frequent in multiracial (64.2%) or indigenous people (25.6%) (Macedo and Cardoso 2020) (Sena-Ferreira et al,. 2014; Santos et al,. 2018) multiracial people with (1,039

cases; 66.6%) (Santos et al,. 2018).

Professional groups

Military police officers were assessed in a cohort study involving a total of 31,110 participants in the South of Brazil. The mean age of military police officers was

41.4 ± 9.1 years and 90.7% were males. There were 43 suicides (6.6% of all deaths) reported in this cohort with a cumulative incidence of 138/100,000 (Gomes, de Araujo, and Gomes 2018).

Another study assessed the suicide of doctors in the state of São Paulo. The sample included 50 cases of suicide, 1.7% of all causes of death. It was observed that patients died by suicide 20 years earlier than by other causes. There was an association between being single or divorced. The average mortality in the study period was 4.2 deaths per 100,000 in this group (Palhares-Alves et al,. 2015).

Mental disorders

In a few studies that related mental health problems to suicide, these issues are mentioned as a risk factor, without informing the specific diagnosis (Franck et al,. 2020; Sena-Ferreira et al,. 2014). Depression is the most frequently cited diagnosis (Franck et al,. 2020) followed by substance use disorders (Franck et al,. 2020; Goncalves, Ponce, and Leyton 2018).

Indigenous populations

High rates of suicide mortality among indigenous people have been observed in several regions such as Alto Solimões (Palma, Santos, and Ignotti 2020), Roraima, (Souza and Onety 2017), Mato Grosso do Sul (Orellana et al,. 2016; Lazzarini et al,. 2018), with higher rates than non-indigenous people (Souza and Onety 2017). The suicide risk among the indigenous population of the state of Mato Grosso do Sul was 8.1 times higher than in the non-indigenous population. In the state of Amazonas among indigenous people, the suicide rate was 18.4/100.000, 4.4 times higher than that of non-indigenous people (de Souza and Orellana 2013).

In 2019, Souza (Souza 2019) reported the characteristics, distribution, and mortality rates from suicide among indigenous children in Brazil, compared to non-indigenous ones. A descriptive study was conducted, comprising the years 2010 to 2014, using data from national information systems. Approximately three-quarters of suicides among indigenous children occurred in 17 municipalities (Souza 2019). The suicide mortality rate among indigenous children was 11.0/100,000 (8.4-14.3), 18.5 (10.9-31.6) times greater than that observed among non-indigenous children, 0.6/100 thousand (0.5-0.6), with no differences between boys and girls. This work showed, for the first time, on a national scale, specificities of the characteristics of indigenous suicide and its high rates, as well as identifying priority areas for interventions. In 2010, according to the Demographic Census 15, the indigenous population of Brazil was estimated at 817,963

people, 0.4% of the country's total population (Souza 2019). Among the indigenous, 11.6% of the population, 94,826 individuals were between 10 and 14 years old, while, among the non-indigenous, this age group was equivalent to 9% of the population. Most of the indigenous population aged 10 to 14 years lived in the northern (42.1%) and northeast macro-regions (23.9%), and the remainder, in the Midwest (17%), Southeast (7.8%), and South (7.8%). The non-indigenous population aged 10 to 14 years was mainly concentrated in the Southeast (38.7%) and Northeast (30.6%), followed by the macro-regions of the South (13.4%), North (10.1%), and Midwest (7.2%) (Souza 2019).

Methods used and preferred location

Suicide is twice as likely to occur in the home (Colombo-Souza et al,. 2020; Macedo and Cardoso 2020). The most commonly used methods were hanging or poisoning, (Carmo et al,. 2018) followed by the use of firearms and jumping (Franck et al,. 2020; Faria, Fassa, and Meucci 2014; Jaen-Varas et al,. 2019; Macedo and Cardoso 2020). Poisoning by pesticides is higher in micro-regions with a higher proportion of farms run by 35 to 64-year-old female workers and on farms with better economic indicators (higher farming income, level of mechanisation and farm area) (Faria, Fassa, and Meucci 2014).

Another relevant factor is suicide related to drug intoxication, such as anxiolytics, antidepressants, stimulants and other psychotropic drugs, in addition to the association of these medications with alcohol (Franck et al,. 2020).

Suicide attempts and self-harm

Although not the purpose of this article, it is important to discuss data on suicide attempts and self-harm. These are risk factors for complete suicide, and it is a challenge to identify which patients may or may not progress to fatalities. For example, a history of previous attempts and other types of suicidal behaviour are warnings for suicide and those who left a farewell note are risk factors for a complete suicide. (Franck et al,. 2020; Sena-Ferreira et al,. 2014).

In a two-year retrospective cohort with 258 patients treated for suicide attempts, 3.9% died by suicide and 9.3% made repeated attempts. Patients with mental health problems and a previous history of treatment were at a higher risk for repeated suicide attempts (OR = 2.46).

It was concluded that patients who had made suicidal attempts and were admitted to emergency hospitals had more serious mental health problems and, despite the interventions, continued to present an elevated risk of fatalities (Ferreira et al,. 2016).

Tables 2: Main factors associated with suicide in Brazil.

Author´s names	Variable	Years	Sample characteristics	Variable	Main findings	Limitations
Alarcão et al,. 2020.	Economic aspects.	1998-2002 and 2008-2012.	Three age groups (15-19, 20-24, and 25-29 years) in southern Brazil.	Suicide mortality.	Suicide among youth aged 15-29 occurs in geographic clusters which are associated with socioeconomic deprivation. Rural settings with poor infrastructure and development also correlate with increased standardised mortality rate for suicide (SMR) clusters.	Analysis of secondary data, which is subject to limitations of the data source. For instance, underreporting of suicide is common, as is incomplete data collection.
Bando et al,. 2012. Ecological study.	Gender, age, method used, marital status.	From 1996 to 2009.	Suicide rates in the city of São Paulo (Southeast region) and trends of related variables.	Suicide rate.	In the period analysed, 6,002 suicides were accrued with a rate of 4.6 per 100,000 (7.5 in men and 2.0 in women); the male-to-female ratio was around 3.7. Trends for men presented a significant decline of 5.3% per year from 1996 to 2002, and a significant increase of 2.5% from 2002 onwards. Women did not present significant changes. For men, the elderly (> 65 years) had a significant reduction of 2.3% per year, while younger men (25-44 years) presented a significant increase of 8.6% from 2004 onwards. Women did not present significant trend changes according to age. Leading suicide methods were hanging and poisoning for men and women, respectively. Other analyses showed an increased suicide risk ratio for singles and foreigners.	Ecological study. Although public source used provides a complete, extensive record of mortality in the city of São Paulo, it still depends on medical diagnosis and information of relatives.
Carmo et al,. 2018. Ecological study	Gender, age, methods.	1996 – 2013.	Elderly in the state of Bahia.	Number of suicides and proportion.	In Bahia, of 858 deaths by suicide among older adults, there was a predominance of males (85.4%) and adults aged 60 to 69 years (53.8%). The types of suicide deaths observed were hanging/strangulation and self-poisoning with pesticides and chemicals.	Indirect data from an incomplete source.
Colombo-Souza et al,. 2020. Longitudinal retrospective study.	Gender, age, scholarship, place.	From 2000 to 2017.	Suicide mortality in the city of São Paulo.	Suicide rates.	Male 6.98, female 2.0. Hight proportion in 25-34-year-old group (24.7%), followed by 35-44 years old (21.2%), and 15 24 years old (17.3%). A higher proportion in 8 to 11 years of study group (35.7%), followed by 4 to 7 years of study (33.1%). Home (47.8%), hospital (32.8%), Public highway (7.2%), others (12.2%).	Restrict to the city of São Paulo.
Faria et al,. 2014. Ecological study.	Pesticide exposure.	From 1996 to 2010.	Analysis was all 558 Brazilian micro-regions.	Suicide rates.	The ecological analysis showed that the suicide rates were higher in micro-regions with a higher proportion of farms run by 35 to 64-year-old female workers and on farms with better economic indicators (higher farming income, level of mechanisation and farm area). There was a positive association between the Catholic religion and suicide rates. Micro-regions with a greater use of pesticides, and with a high proportion of pesticide poisoning had the highest suicide rates for all three groups analysed: both genders, men, and women (p ranging from 0.01 to p < 0.001).	Ecological study.

Tables 2: Main factors associated with suicide in Brazil.

Author´s names	Variable	Years	Sample characteristics	Variable	Main findings	Limitations
Franck et al,. 2019. Cross-sectional.	Gender, age, substance use, depression and other mental disorders, previous suicidal behaviour, socio-economic factors, physical disease, methods used.	2017.	Suicide victims in Rio Grande do Sul. 1.284 suicides.	Suicide rates, proportion.	Men (80%). The average age of the victims was 47.6 ± 18.3 years. In 2017 in RS, young people (15 to 29 years old) accounted for 18.8% (n = 241) of suicide victims, providing a rate of 9.1 cases/100,000 inhabitants. The elderly (60 years or older), at 26.9% (n = 345), with a rate of 23.6 cases/100,000 inhabitants of this age group the presence of ethanol was observed in 30% of the samples analysed, with an adult male profile associated with the presence of other psychotropic drugs, whose class most frequently detected was that of anxiolytics. The most frequent associated diagnostic was depression. Other factors: other mental disorders (not informed), Warned that would commit suicide (n=109), there was already the suicide attempt (n= 89), left a farewell note (n=74), committed homicide before suicide (n= 19), relationship problems, physical diseases, financial problems, committed homicide before suicide, and be a prisoner. Methods used: hanging, firearm, intoxication, high fall, stabbing.	Suicide is a behaviour with multifactorial determinants, the result of a complex psychological, genetic, cultural, and socio-environmental interaction. Therefore, a multidisciplinary approach is needed, combining government efforts, and rescuing the potential of existing networks in the family, school, and community, according to the circumstances of each location. Restrict to a state.
Gomes et al,. 2018. Cross-sectional.	Profession.	From 2006 to 2016.	Incidence of suicide in military police officers.	Suicide rates.	Mean age at the end of the follow up time was 41.4 ± 9.1 years, with 90.7% males. A total of 650 participants died (2.1%), with 43 suicides (6.6% of all deaths) – cumulative incidence of 138/100,000. Bivariate analysis revealed a significant association (p < 0.05) between suicide and age (HR = 0.70, 95%CI = 0.66-0.74), females (HR = 1.67, 95%CI = 1.08-2.60) and enlisted military rank (HR = 14.9, 95%CI = 2.05-108.5). Multivariate models showed an independent association between suicide and age (HR = 0.71, 95%CI = 0.67-0.74) and enlisted military rank (HR = 9.96, 95%CI = 1.30-76.3).	Data restricted to military police officers in the South of Brazil.
Gonçavels et al,. 2018. Cross-sectional.	Gender, age, alcohol use.	2011–2015.	Suicide victims in the city of Sao Paulo.	Suicide rates, proportion.	Victims were male (74.6%). The mean age of the victims was 39.90 ± 0.75 years. The prevalence of positive blood alcohol concentration was higher amongst men (34.7%) than women (17.1%)	Focus of the study was to find victims that used alcohol.
Jean-Varas et al,. 2019. Retrospective ecological design.	Age, economic aspects, methods used.	From 2006 to 2015.	Adolescent suicide rates.	Suicide rates.	There was a 13% increase in the nationwide adolescent suicide rate from 2006 (2.34 per 100,000 population) to 2015 (2.64 per 100,000 population). The overall rate for the six cities included in this study increased by 24%. Higher levels of inequality and unemployment were associated with higher rates of suicide. The most used method of suicide by both sexes was hanging (2015 = 70.3%), and the most significant increase was observed in girls (2015 = 65.82%). The proportional use of arms (2006 = 14.2%; 2015 = 9.1%) and poisoning (2006 = 13.3%; 2015 = 9.2%) decreased over the period.	Ecological study.

Tables 2: Main factors associated with suicide in Brazil.

Author´s names	Variable	Years	Sample characteristics	Variable	Main findings	Limitations
Lazzarini et al,. 2018. Retrospective cohort.	Race and ethnicity, gender, age, method used.	From 2003 to 2013.	Retrospective cohort study involving 14,666 indigenous individuals in reservations in Dourados, state of Mato Grosso does Sul, Brazil.	Suicide rate.	A total of 119 suicide cases were identified in the Aldeias between 2003 and 2013. The overall suicide rate was 73.4 per 100,000 person-years. Adolescent males aged. The overall suicide rate was 73.4 per 100,000 person-years. Adolescent males aged 15–19 and girls aged 10–14 had the highest rates for each sex at 289.3 (95%CI 187.5–391.2) and 85.3 (95%CI 34.9–135.7), respectively 15–19 and girls aged 10–14 had the highest rates for each sex at 289.3 (95%CI 187.5–391.2) and 85.3 (95%CI 34.9–135.7), respectively. Most cases (93%; 111/119) were reported as hanging and the remaining 7% of cases (8/119) were reported as intentional agrochemical ingestion. The male suicide rate (107.5 per 100,000) exceeded twice the female rate (41.7 per100,000).	High suicide rates presented in this study as underestimations of the true burden of suicide in this population.
Machado et al,. 2015. Ecological study.	Scholarship, economic aspects.	from 2000 to 2011.	5,507 Brazilian municipalities.	Suicide rates.	Low-level education had a positive association (RR: 1.015, 95% CI: 1.010–1.021) with suicide rates. The Gini index was positively associated with suicide rates; the rate ratio (RR) was 1.055 (95% CI: 1.011–1.101). Of the other social determinants, income had a significant negative association with suicide rates (RR: 0.968, 95% CI: 0.948–0.988),	Indirect data.
Macedo et al,. 2020. Cross-sectional.	Gender, age, city, race and ethnicity, marital status, method used, place.	From 2014 to 2017.	Profile of deaths by suicide in the state of Roraima (North region).	Suicide deaths.	Deaths were more frequent among men (73.9%), aged 20 to 29 years (31.2%), resident in the state capital (52.8%), brown (64.2%) or indigenous (25.6%), and single (69.9%). The main suicide method was hanging, strangulation and suffocation (87.5%), with the domicile being the most usual place (72.1%).	Indirect data from the Brazilian government. Restrict to a state.
Martini et al,. 2019. Cross-sectional.	Gender, age.	From 2000 to 2016.	Suicide rates in Brazilian population between 2000 and 2016.	Suicide rates.	Male and female age-standardised rates were 6.12 and 1.6 in 2000 and increased to 8.65 and 2.24 in 2016, respectively. The ratio was 3.81 times higher in men compared to women in the period. This ratio was 8.2 at the 80+ group. An increase from 2000 to 2016 was demonstrated in all subgroups over the 17, especially men aged 20–39 and women aged 40–59.	The data on suicide mortality were obtained from the database of the SIM/DATASUS, limiting the evaluation of important variables that may be associated with the outcome, such as diagnosis of psychiatric disorders, medical treatment, lifetime suicide attempts and family psychiatric history. Additionally, there is the possibility of underreporting of cases, presently not examined in the Brazilian registry.
Ministério da Saúde 2019. Cross-sectional.	Gender, scholarship, marital status.	From 2011 to 2017.	Suicide between 15 to 29 years old.	Number and proportion of suicides.	17,221 (79.0%) in males and 4,567 (21.0%) in females. 8-11 years of study (30.5%), 4-7 years of study (27.6%). 12 or more (8.2%). Single/widower/divorced (83%).	Government document that is dependent on the correct registration of death notifications in different regions across the country.

Tables 2: Main factors associated with suicide in Brazil.

Author´s names	Variable	Years	Sample characteristics	Variable	Main findings	Limitations
Ministério da Saúde 2020. Cross-sectional.	Race and ethnicity, scholarship, method used.	From 2000 to 2020.	Indigenous versus non-indigenous.	Suicide rates.	Indigenous mortality by suicide 17.5 per 100.000 habitants. Whites 6.0, Blacks 5.7, and Asians 2.0 per 100.000 habitants. Indigenous people who died by suicide had less education than non-indigenous people. the main means hanging was used, representing 89.4% of indigenous deaths and 68.9% of non-indigenous deaths. Non-indigenous had higher proportions of suicides by poisoning and firearms, compared to indigenous people.	Government document that is dependent on the correct registration of death notifications in different regions across the country.
Ministério da Saúde 2021. Cross-sectional.	Gender, age, region differences.	Between 2010 and 2019.	Suicide deaths recorded in the Mortality Information System (SIM), excluding children under 5 years of age.	Risk of suicide.	Men had a 3.8 times greater risk of death by suicide than women. Among men, the suicide mortality rate in 2019 was 10.7 per 100 thousand, while among women this figure was 2.9. To analyse the evolution of suicide mortality according to sex, there was an increase in rates for both genders, with the maintenance of the rate ratio between the sexes in the period. Comparing the years 2010 and 2019, there was a 29% increase in suicide rates among women and 26% of the rates among men. There was an increase in the incidence of suicides in all age groups. Higher tax of suicide in 40-59-old (8.43), second 20-39-years-old (8.19), and third 60 years or more (7.88). However, there is an increase in 15-19 years olds (from 0.31 in 2010 to 0.67 in 2019).	Government document that is dependent on the correct registration of death notifications in different regions across the country.
Ministério da Saúde 2020. Cross-sectional.	Race and ethnicity, scholarship, method used.	From 2000 to 2020.	Indigenous versus non-indigenous.	Suicide rates.	Indigenous mortality by suicide 17.5 per 100.000 habitants. Whites 6.0, Blacks 5.7, and Asians 2.0 per 100.000 habitants. Indigenous people who died by suicide had less education than non-indigenous people. the main means hanging was used, representing 89.4% of indigenous deaths and 68.9% of non-indigenous deaths. Non-indigenous had higher proportions of suicides by poisoning and firearms, compared to indigenous people.	Government document that is dependent on the correct registration of death notifications in different regions across the country.
Ministério da Saúde 2021. Cross-sectional.	Gender, age, region differences.	Between 2010 and 2019.	Suicide deaths recorded in the Mortality Information System (SIM), excluding children under 5 years of age.	Risk of suicide.	Men had a 3.8 times greater risk of death by suicide than women. Among men, the suicide mortality rate in 2019 was 10.7 per 100 thousand, while among women this figure was 2.9. To analyse the evolution of suicide mortality according to sex, there was an increase in rates for both genders, with the maintenance of the rate ratio between the sexes in the period. Comparing the years 2010 and 2019, there was a 29% increase in suicide rates among women and 26% of the rates among men. There was an increase in the incidence of suicides in all age groups. Higher tax of suicide in 40-59-old (8.43), second 20-39-years-old (8.19), and third 60 years or more (7.88). However, there is an increase in 15-19 years olds (from 0.31 in 2010 to 0.67 in 2019).	Government document that is dependent on the correct registration of death notifications in different regions across the country.
Orellana et al,. 2016. Ecological study.	Race and ethnicity.	2009-2011 period.	Suicide rates in indigenous versus non-indigenous.	Suicide deaths.	In the indigenous population, the rate was 65.2/100,000 (95%CI 53.2-79.5). The relative risk of suicide for the indigenous population compared to the non-indigenous population was 8.1 (95%CI 7.2-9.0).	Data from specific of an area.

Tables 2: Main factors associated with suicide in Brazil.

Author´s names	Variable	Years	Sample characteristics	Variable	Main findings	Limitations
Palhares-Alves et al,. 2015. Cross-sectional.	Gender, marital status.	between 2000 and 2009.	Suicide in physicians compared to non-suicide.	Proportion.	Male (76%). Single/widower/divorced (52%).	Restrict to physicians. A potential limitation of this study is the possible loss of cases because of under-registration, under-notification, and inadequate completion of the ´´occupation´´ or ´´underlying cause of death´´ fields.
Rodrigues et al,. 2019. Ecological study with an analysis of the time trend.	Gender, age.	from 1997 to 2015.	The number of suicides was obtained from the Mortality Information System (Sistema de Informacões sobre Mortalidade [SIM]) database.	Suicide deaths.	Men accounted for 79.3% of total deaths; 32.4% of deaths occurred among people aged 40-59, 30.7% among people aged 15-29, 21.6% among people aged 30-39, and 15.3% among people aged 60 years and over.	The use of data on suicide from a secondary database; specifically, the Brazilian Ministry of Health SIM. Although the coverage and quality of these data are regarded as satisfactory, underreporting and misclassification are known to occur, and tend to lead to underestimation of suicide rates, particularly in developing regions.
Sena-Ferreira et al,. 2014. Cross-sectional.	Gender, age, race and ethnicity, scholarship, mental disorder, substance use, suicide. behaviour, stressors.	From 2006 to 2009.	Suicide victims.	Percentage.	Male, single, brown, aged between 20 and 40 years old and with elementary education. The main risk factors identified were mental disorders, alcohol and other drug abuse, troubled family relationships and a history of previous attempts.	Small sample.
Souza 2019. Comparative study.	Race and ethnicity, age, gender, method used, place.	From 2010 to 2014.	Suicide mortality rates among indigenous children from 10 to 14 years old in Brazil compared to non-indigenous.	Suicide rates.	The suicide mortality rate among indigenous children was 17.5 per 100,000 habitants, compared to 6,0 in Whites, 5,7 in Blacks, 2.0 in Asians. Suicide was higher in female indigenous (58.2%). The suicide is more frequent at home (65.5%). Methods used: hanging (96.4%). Percentage by region was: North (49.1%), Midwest (45.5%), Northeast (3.6%), Southeast (1.8%), and no cases in the South region.	Possible underreporting problems and misclassification of causes of death, something admittedly problematic when talking about child suicides.
Souza and Orellana 2013. Retrospective cohort.	Race and ethnicity.	From 2006 to 2010.	Suicide rates in indigenous in the state of Amazonas.	Suicide rates.	688 suicide cases were reported in the state of Amazonas, of which 19.0% were indigenous people. The standardised mortality rate for suicide (SMRs) in indigenous people, of 18.4/100.000, was 4.4 times higher than that of non-indigenous people. The SMRs in indigenous people increased 1.6 times in 2010 compared to the year 2006. In the municipalities of Tabatinga and São Gabriel da Cachoeira the SMRs was much high, 75.8 and 41.9/100.000, respectively.	Indirect data. Race classified by self-declaration.
WHO 2019. Cross-sectional.	Gender, age.	2019.	Suicide worldwide.	Suicide rates.	In Brazil, crude suicide rates, all ages (Per 100 000), 2019, in males 10.9, and females 3.0.	Indirect data reported by the Brazil government to WHO.
WHO 2021. Cross-sectional.	Gender, age.	2019.	Suicide rates.	Suicide rates.	Male 10.32 (9.34-17.75), and female (2.76 (2.47-6.68). Suicide rates by age group: 85+ years old 15.36, 75-84 years old 12.17, 65-74 years old 10.42, 55-64 years old 9.43, 45-54 years old 9.24, 35-44 years old 8.48, 25-34 years old 7.24, and 15-24 years old 7.61.	Indirect data reported by the Brazil government to WHO.

We can observe in the results for suicide that there is a lack of data to identify which diagnoses besides depression are present in patients who progressed to complete suicide. But, we can by indirect data, through a study that observed the risk of suicide by a certain scale, the most frequent diagnoses in patients with suicidal behaviour are: current major depressive disorder (OR=4.3), recurrent major depressive episode (OR=2.0), major depressive episode with melancholic features (OR=3.8), dysthymic disorder (OR=3.3), manic episode (OR=2.6), hypomanic episode (OR=2.6), social phobia (3.2), obsessive-compulsive disorder (OR=5.3), post-traumatic stress disorder (OR=4.0), psychotic syndrome (OR=3.6), mood disorder with psychotic features (OR=5.8), and generalised anxiety disorder (OR=2.5) (Alves Vde et al,. 2016).

A suicide attempt was reported in 9% of the sample of 4,225 individuals aged 14 years or older from the Brazilian household population, respectively, 5.4% among

substance users (Abdalla et al,. 2019), and 12.5% in family caregivers of people with dementia (Dos Santos Treichel et al,. 2019). In the study of Pelotas mentioned above, the lifetime suicide attempt was 4.9% (Quevedo et al,. 2020).

A greater number of suicide attempts is related to a greater real intention to die. Patients who showed a desire to die reported more emptiness, loneliness, and disconnection, however, their methods were the same as those who did not intend to die. In addition, a family history of suicidal behaviour is related to a higher risk of suicide by the patient (de Araujo et al,. 2015). Impulsivity measured by neuropsychological testing was a predictor of a suicidal attempt and maybe a potential target for interventions and suicide prevention (Ponsoni et al,. 2018).

Concerning the methods used in suicide attempts: poisoning by non-medical drugs (38.0%), poisoning by medical drugs (32.4%), cutting/piercing with objects (8.3%), firearms (5.0%), fire (2.6%), jumping (2.5%). Others were unspecified means (Martins Junior et al,. 2016). During care provided to persons who attempted suicide and their families, marital conflicts (75%), family conflicts (10%), and financial difficulties (7%) were identified (Rohling, Ciesca, and Liebl 2018).

In a study, the method was ingestion of medication (83.7%), followed by ingestion of pesticides (9.5%), ingestion of cleaning products (5.5%), and jumping from high places (1.3%). The methods most often used by men were hanging (47.2%), ingestion of medication (41.1%), and use of weapons other than firearms (11.7%) (Rohling, Ciesca, and Liebl 2018).

Regarding self-harm, poisoning is the most frequent method used (60.2%), followed by sharp objects (16.2%), hanging (6.2%), and others (17.8%). It is more frequent in (71.3%) and more frequent in 15 to 19 year old (23.3%) and 20-39 year old (46.3%) groups, patients in elementary school (25.9%) and high school (30.3%). The frequency about race was White (47.3%), Black (42.4%), Asian (0.7%), indigenous (0.5%), no information (9.0%). The most frequent place was residency (83.9%) (Ministério da Saúde 2021).

DISCUSSION

The aim of this study was to review studies on suicide and related factors published over the past 10 years. Despite the publication dates, data that went back as far as 30 years was presented. What is observed is that Brazil has average suicide rates compared to the rest of the world, however, being a populous country, such rates represent a large number of people in absolute values.

Brazil has an actual suicide rate by WHO of 6.4/100,000 (WHO 2021) and by the Brazilian Health Ministry of 6.6/100,000, (Ministério da Saúde 2021). Comparing of

WHO may be lower to medium numbers. In Europe is 13.0, South-East Asia and Americas 10.0, Western Pacific 9.0, Africa 7.0, and Eastern Mediterranean 6.0. (WHO 2021). However, Brazil is a populous country and this rate represents a larger number of people.

Moreover, while much of the world has reduced suicide rates, Latin America is still increasing and Brazil follows the same trend (WHO 2021). And, despite the existence of prevention programmes, it is noted that they are still insufficient. Therefore, a review that consolidates data from several articles may help to improve public health programmes. Most studies used the federal government database through the Mortality Information System (SIM), a public database, but they differed in the analysed variables.

It was observed that, regarding the risk factors or association, suicide is more frequent in men, young adults, individuals who live alone, education at elementary and secondary levels, associated with economic problems, mental disorders, substance abuse and planning or attempts to prior suicide. However, it is important to emphasise that Brazil has a large territorial extension, with five regions, several states, and several cities, with a wide variety of epidemiological and cultural aspects. Therefore, suicide rates and their related factors can vary widely across the country, which requires personalised applications in prevention programmes in states and municipalities.

Most studies report the importance of treating mental health problems for the prevention of suicide, but few present specific diagnoses. Since each mental health problem has a different treatment and a different approach to suicidal behaviour, this gap must be filled in future research and government statistics. Such information is obtained indirectly by studies of suicide attempts or self-harm, however, as not every patient in these situations evolves to complete suicide, this data distorts the measures that could be used to focus on the most severe cases.

A group that stood out for high suicide rates when compared to the rest of the population were the indigenous people, in all regions of the country. This group is already experiencing several socioeconomic and health problems that have decimated its population and the higher suicide rate is a major risk factor for the preservation of these cultures.

The same difficultly was reported by another author in Bangladesh, who considers suicide as a neglected public health problem where quality data is a fundamental challenge. Criminal legal status, social stigma and a lack of a central database are some of the reasons for under-reporting (Arafat et al,. 2021; Arafat 2019).

Finally, there is lack of data about the epidemiology of suicide in the context of the COVID-19 pandemic

in Brazil, except for some manuscripts about suicidal thoughts or suicidal risk. This outbreak has the potential to increase mental health problems and suicides as a result of the socioeconomic impact of the COVID-19 pandemic, and of the necessary restrictive measures adopted worldwide to contain its spread (Ahmad et al,. 2021). Even if fear, worries and symptoms of anxiety, depression and stress can be considered a natural response to this global crisis, some individuals are overexposed to these potential negative effects, such as healthcare workers, COVID-19 and psychiatric patients, prisoners, members of the LGBTQ+ community, migrants (including migrant workers), ethnic minorities and asylum seekers and internally displaced populations. Nevertheless, social support, resilience, a supportive work environment and other protective factors may buffer the impact of this crisis on mental health (Ahmad et al,. 2021).

Strengths of the study

The study reviewed the full-length original articles on suicide in Brazil published in the last 10 years, with data from the last 30 years, and tried to consolidate them, which would help identify the research gaps for the national suicide prevention programme. Although most studies use the same data source, they sought to conduct different analyses, from diverse groups and regions.

LIMITATIONS

Only English and Portuguese publications were included in the present work. However, it is unlikely that publications reporting suicide behaviour in Brazil would be published in a language other than these two. Another potential limitation was the use of only two databases: Medline, Scielo, documents of WHO, and from the Brazilian Ministry of Health. Nevertheless, these are the most common virtual libraries used for publications involving suicide in Brazil. Findings from the reports should also be considered in the regional and cultural context. The selected studies did not always use the same methodology of investigation in their reports, so comparison of the data between studies should be interpreted with caution. All studies published in the different periods were included. It was also reported in the discussion that most of the studies used the same public data source and so monitor their limitations, such as dependents on the person who registered the suicide, self-reported information such as race, data that is not filled out in the record. Some biases were observed: some studies had restricted eligibility criteria, different measures, others failed to control confound variables. We protect the quality of this research paper by excluding studies were bias could compromise interpretation.

CONCLUSION

Suicide rates in Brazil range from 4.6 to 6.6 per 100,000 inhabitants and is increasing in the last years. The main risk factors and groups were males, aged between 15 to 44 years old, higher education, loneliness, unemployment, socioeconomic deprivation, mental disorders, suicidal plans, previous suicide attempts, Indigenous people have higher rates of suicide than non-indigenous people. The most frequent methods were hanging, self-poisoning by pesticides, illicit drugs, or medications, firearm, jumping. The most common location of fatality was at home, but it could occur in the hospital or street. Considering this data, we suggest more prevention methods be implemented, as well as future research focusing on the detection of subjects in danger and pathways to direct at-risk individuals to the appropriate treatment.

Authors' Contribution

LB: Conceptualisation, methodology, screening phase, formal analysis, writing original draft, writing the last version, and supervision.
AM: Screening phase, formal analysis, writing original draft and last version.
JQ: Conceptualisation, methodology, screening phase, writing original draft and last version.
HV: Formal analysis, writing original draft and last version.
AG: Formal analysis, writing original draft and last version.

Conflict of Interest

LB has served as a speaker for Libbs and a scientific consultant for Apsen. AM has served as a consultant for Abbott, Jansen, Aché, Cristália, Libbs, Pfizer, Torrent, Eurofarma, Medley, Sanofi-Aventis, and Allergan; as a board advisor for Crista´lia, Jansen, and Libbs; as a speaker for Abbott, Ache´, Cristalia, Jansen, Libbs, Pfizer, and Eurofarma; receives copyrights from Guanabara Koogan; and received assistance for events from Eurofarma and Cristália. JQ received clinical research support from LivaNova; has speaker bureau membership with Myriad Neuroscience, Janssen Pharmaceuticals, and Abbvie; is a stockholder at Instituto de Neurociencias Dr Joao Quevedo; and receives copyrights from Artmed Editora, Artmed Panamericana, and Elsevier/Academic Press. AGS reports no conflicts of interest.

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