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# Evolution and patterns of suicide mortality among older adults in Brazil, from 1996 to 2022: a population study

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## ABSTRACT

**Introduction:** Suicide among older adults has shown a worrisome upward trend in Brazil, underscoring the need to understand its evolution over recent decades. **Objective:** To analyze the evolution of suicide deaths and their characteristics among older Brazilians between 1996 and 2022. **Methods:** This cross-sectional, retrospective epidemiological study used data from the Mortality Information System (SIM/DATASUS) and population estimates from IBGE. All suicide deaths (ICD-10: X60–X84) among individuals aged 60 years or older were included. We calculated mortality rates per 100,000 inhabitants and analyzed them by sex, age group, race/skin color, educational level, marital status, federative unit, and method used. Temporal trends were evaluated using Prais–Winsten regression, and comparisons between federative units and the national rate were performed for 2022. **Results:** There was a 24.6% increase in the overall suicide rate among older adults, rising from 7.11 to 8.86 per 100,000 inhabitants. The growth was higher among men (31.4%) compared to women (10.5%). Deaths were concentrated among adults aged 60–64 years, those of White race/skin color, and individuals with low educational attainment. Hanging was the leading method (70.8%). Northern and Northeastern states showed marked increases, while Rio Grande do Sul consistently had the highest rates in the country. In 2022, Rio Grande do Sul, Santa Catarina, Piauí, and Minas Gerais presented significantly higher suicide rates than the national estimate. **Conclusion:** Suicide among older adults in Brazil has increased over recent decades, with marked regional and sociodemographic disparities.

**Keywords:** suicide; aged; Epidemiology; mortality.

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## INTRODUCTION

The number of older adults worldwide is expected to reach approximately 1.4 billion by 2030, according to projections by the World Health Organization[1]. The phenomenon of population aging is also evident in Brazil, a country that has experienced a significant increase in its older adult population over the past two decades, making it one of the countries with the largest older adult populations in the world[2]. This rapid transformation poses specific challenges for public health, especially regarding the leading causes

of morbidity and mortality in this age group. Among these causes, suicide stands out as one of the leading external causes of death among older adults years of age[3], requiring greater attention in Brazilian public health strategies.

The word "suicide" means "self-inflicted death;" however, when analyzing the context and factors involved in this act, one realizes the breadth of suicidal behavior[4]. Suicide results from a complex interaction between individual and collective determinants, which encompass biological, psychological, social, cultural, and economic aspects[5]. A family history of suicide and access to highly lethal means, such as firearms and poisons, significantly increases the likelihood of suicide. In addition, factors such as bereavement, divorce, diagnosis of illness, violence, unemployment, economic problems, or involuntary migration can trigger a suicidal act[6]. Suicide is merely the beginning that conceals the high prevalence of suicide attempts, suicidal ideation, and mental disorders associated with life adversities and epigenetic changes in systems involved in the stress response, such as the hypothalamic-pituitary-adrenal axis[7].

Among older adults, the prevalence of suicide has increased considerably[3]. This alarming upward trend reflects not only the complexity of the risk factors associated with aging but also the influence of social determinants of health[8,9]. Conejero et al.[10] in a study conducted with older adults in the United States, noted that factors such as psychiatric and neurological disorders, social issues, grief and loss, as well as cognitive and physical impairments, were found to be significant contributors to the rise in suicide among older adults.

In the Brazilian context, older adults represent a population group at high risk for suicide, in part due to a lack of basic resources for a dignified life and low levels of social and family support - factors that highlight the need to monitor trends in this cause of death and its characteristics[11]. However, this issue still receives little attention from researchers, the media, and public health policymakers, with attention to this outcome most focused on younger populations.

Understanding suicide among the older adult population requires an integrated analysis of health determinants, social inequalities, and health inequities. These determinants operate at different levels: proximal (age 70–74, male gender, white race, psychiatric disorders, and physical illnesses), intermediate (substance abuse, marital, social, and family conflicts, violence, and previous suicide attempts), and distal (socioeconomic inequalities and limited access to mental health care). Identifying these factors is essential for developing effective prevention strategies[12].

If this increased life expectancy is accompanied by a decline in physical and cognitive abilities, limited family and social support, and socioeconomic and health care access inequities, the negative impact on older adults' health and their risk of suicide is likely to become even more pronounced in the coming decades[13]. In this regard, monitoring suicide deaths among older adults, as well as understanding the related factors, can contribute to the development of more effective preventive strategies.

Given this context, the objective of this study was to analyze trends in suicide deaths and their characteristics among older adults in Brazil.

## METHODS

### Study Design

A quantitative, cross-sectional, retrospective epidemiological study that analyzed suicide mortality among older adults (aged 60 and older) in Brazil from 1996 to 2022.

### Data Collection

The data were obtained from the Mortality Information System (SIM) from the Brazilian Ministry of Health, available on the website of the Department of Information Technology of the Unified Health System (DATASUS). The data collection included records of deaths by suicide classified under codes X60 through X84 of the International Statistical Classification of Diseases and Related Health Problems (ICD-10). Population data were extracted from estimates by the Brazilian Institute of Geography and Statistics (IBGE) for the same period.

### Selection Criteria

All suicide deaths among individuals aged 60 years or older were included, stratified by sex (male and female), age group (60–64 years; 65–69 years; 70–74 years; 75–79 years; 80 years and older), race/color, educational level, and marital status. In addition, the data were organized according to Brazil's 27 federal states. The analysis also considered the method used for suicide, categorizing them—according to the ICD-10 categories—by similarity or low incidence (10), into self-poisoning (X60–X69), hanging (X70), drowning (X71), firearm (X72 to X74), smoke and flames (X76), fall from a height (X80), unspecified means (X84), and other means (X75, X77 to X79, X82 to X83).

### Data Analysis and Processing

Suicide mortality rates were calculated by dividing the annual number of suicide deaths by the total older adult population residing in each state, expressed per 100,000 inhabitants.

Temporal trends in mortality rates were analyzed using generalized linear regression with the Prais–Winsten method, an approach recommended for time series exhibiting first-order serial autocorrelation in the residuals. For each model (overall, male, and female), the dependent variable was the natural logarithm of the mortality rate, and the independent variable was the year of death. The slope (β) estimated by the model represents the annual

change in the logarithm of the rate, allowing for the calculation of the Annual Percent Change (APC). The 95% confidence intervals (95% CI) for the APC were derived from the exponential transformation of the lower and upper limits of the 95% CI for the β coefficient. Statistical significance was defined as $p<0.05$.

In addition, specifically for the end of the period, descriptive analyses were conducted of the suicide mortality rate by sex, age group, race/skin color, educational level, marital status, and method of suicide, to characterize the profile of this cause of death in the country. In the same vein, in 2022, a comparison of mortality rates between the states and the national rate was conducted using the estimated older adult population for Brazil as the national denominator, ensuring comparability among the estimates. The 95% confidence intervals (95% CI) were estimated using the Poisson distribution for rare events. The statistical difference between each state and the country was assessed through an overlap analysis of the confidence intervals. In addition, the relative risk (RR) for each state was estimated in comparison to the national rate, accompanied by 95% CI. RR values with 95% CI not encompassing 1 were interpreted as statistically significant.

Data processing and analysis were performed using Stata V14.2 software (Stata Corporation, College Station, Texas, USA, 2017).

## RESULTS

Suicide among older adults has increased in recent decades. Between 1996 and 2022, a total of 42,616 deaths were recorded, and the national suicide rate rose from 7.11 in 1996 to 8.86 per 100,000 inhabitants, representing a 24.6% increase. Rising suicide rates were also observed by sex. Among men, the suicide rate rose from 12.29 to 16.15, and among women, from 2.77 to 3.06 deaths per 100,000 inhabitants—figures that correspond to percentage increases of 31.4% and 10.5%, respectively (Figure 1).

A significant upward trend in mortality rates was observed from 1996 to 2022. The total APC was 0.75% per year (95% CI 0.05–1.46). Among men, the trend was also upward, with an APC of 0.83% per year (95% CI 0.20–1.47). Among women, the APC was 0.85% per year (95% CI 0.08–1.63; p=0.031). All results indicate a progressive increase in mortality rates over the past few decades (Table 1).

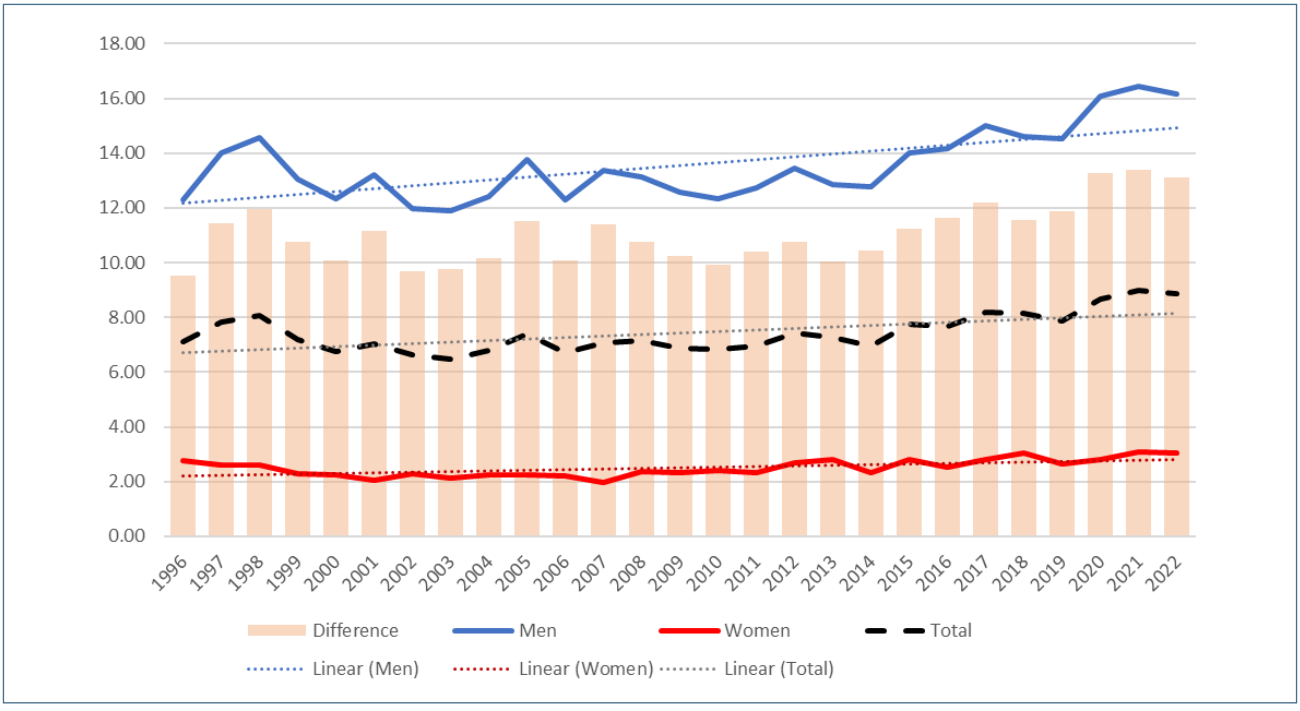



**Figure 1:** Suicide Rate Among Older Adults by Sex. Brazil, 1996–2022.

**Table 1:** Trends in Suicide Mortality Rates by Sex. Brazil, 1996–2022

| | β (year) | p-value | APC (% per year) | 95% CI APC |
|---|---|---|---|---|
| Total | 0.0075045 | 0.036 | 0.75 | 0.05-1.46 |
| Men | 0.0082948 | 0.012 | 0.83 | 0.20-1.47 |
| Women | 0.0084735 | 0.031 | 0.85 | 0.08-1.63 |

APC: Annual Percent Change

An analysis of suicides among older adults by sociodemographic characteristics reveals significant disparities. In 2022, most deaths occurred in the 60–64 age group (30.3%), with a higher proportion among women (33.6%) than among men (29.5%). A gradual decrease in the proportion of suicides was observed with increasing age, especially among women. Among men, 14.6% of suicides occurred among those aged 80 and older, while among women this percentage was less than 10% (Table 2).

**Table 2:** Distribution of Demographic and Socioeconomic Characteristics of Suicides Among Older Adults by Sex. Brazil, 2022.

| | Men (%) | Women (%) | Total (%) |
|---|---|---|---|
| Age group | | | |
| Ages 60 – 64 | 29.46 | 33.64 | 30.26 |
| Ages 65 - 69 | 24.5 | 28.7 | 25.31 |
| Ages 70 - 74 | 17.67 | 18.1 | 17.75 |
| Ages 75 - 79 | 13.75 | 10.6 | 13.15 |
| Ages 80 and older | 14.62 | 8.96 | 13.53 |
| Race/Skin Color | | | |
| White | 61.58 | 66.3 | 62.49 |
| Black | 4.06 | 1.66 | 3.59 |
| Brown | 33.85 | 31.49 | 33.39 |
| Asian | 0.52 | 0.55 | 0.53 |
| Education Level | | | |
| None | 14.21 | 9.93 | 13.38 |
| 1 to 3 years | 22.41 | 14.89 | 20.94 |
| 4 to 7 years | 31.86 | 33.57 | 32.2 |
| 8 to 11 years | 21.89 | 29.79 | 23.43 |
| 12 years and older | 9.63 | 11.82 | 10.06 |
| Marital Status | | | |
| Single | 19.6 | 20.29 | 19.73 |
| Married | 54.16 | 35.45 | 50.47 |
| Widowed | 12.95 | 29.3 | 16.17 |
| Separated | 13.3 | 14.96 | 13.63 |

By race/skin color, most older adults who died by suicide in 2022 were white (62.5%), with a higher prevalence among women (66.3%) than among men (61.6%). Older adults of mixed race accounted for 33.4% of cases, with similar proportions between the sexes. Deaths among Black individuals accounted for 3.6% of the total, being less frequent among women (1.7%) than among men (4.1%) (Table 2).

Regarding educational attainment, more than half of the suicides among older adults occurred among individuals with up to 7 years of schooling, particularly those with 4 to 7 years of schooling, who accounted for 31.9% of cases among men and 33.6% among women. Among men, suicides were concentrated in the groups with the lowest levels of education, with 14.2% of older adults having no years of schooling and 22.4% having 1 to 3 years. Among women, however, a higher proportion was observed in the higher levels of education, with 29.8% having between 8 and 11 years of schooling and 11.8% having 12 years or more (Table 2).

Regarding marital status, most men who died by suicide were married (54.2%), while among women this proportion was 35.4%. Among women, widowhood was more prevalent (29.3%) compared to men (12.9%). The proportions of unmarried older adults were similar between the sexes, at 19.6% among men and 20.3% among women (Table 2).

In 2022, suicide among older adults in Brazil accounted for 7.1% of deaths from external causes in this population, with hanging being the primary method (70.8%). This method was more prevalent among men (74.8%) than among women (54.3%). Among older women, after hanging, the main methods of suicide were self-poisoning (17.7%) and falling from a height (8.4%). Among men, excluding suicides by hanging, the most common methods were intentional firearm discharge (10.1%) and self-poisoning (5.5%) (Table 3).

Suicide rates among older adults increased in most Brazilian states between 1996 and 2022, with significant regional variations that reflect the heterogeneity of the phenomenon across the country (Figure 2).

**Table 3:** Distribution of Methods of Suicide Among Older Adults by Sex. Brazil, 2022.

| ICD-10 Categories | Men (%) | Women (%) | Total (%) |
|---|---|---|---|
| Poisoning (X60 to X69) | 5.48 | 17.73 | 7.84 |
| Hanging (X70) | 74.76 | 54.3 | 70.83 |
| Drowning (X71) | 0.44 | 3.29 | 0.98 |
| Firearm (X72 to X74) | 10.06 | 1.46 | 8.4 |
| Smoke and Flames (X76) | 0.91 | 5.48 | 1.79 |
| Injury caused by a sharp or blunt object (X78 to X79) | 2.7 | 3.47 | 2.85 |
| Fall from a height (X80) | 2.52 | 8.41 | 3.66 |
| Unspecified causes (X84) | 2.56 | 4.39 | 2.92 |
| Other causes (X77, X81, X82, X83) | 0.52 | 1.28 | 0.67 |

In the North region, there were significant increases in Tocantins, where the rate nearly tripled during the period, and in Amapá, where it more than doubled, reaching 14.54 deaths per 100,000 inhabitants in 2022. In contrast, Roraima was the only state in the region to record a decrease, falling from 10.97 to 5.95 per 100,000 inhabitants (Figure 2).

In the Northeast, rates rose in all states, particularly in Piauí, Maranhão, Paraíba, and Ceará, which recorded the largest percentage increases. Piauí saw its rate rise from 2.97 to 14.38 deaths per 100,000 inhabitants, becoming the state with the highest rate in the region in 2022. Only Pernambuco recorded a slight decrease during this period (Figure 2).

In the Midwest, the trend was mixed: Goiás and the Federal District showed a significant increase, while Mato Grosso and Mato Grosso do Sul recorded declines, with the latter accounting for a 31% decrease in its rate (Figure 2).

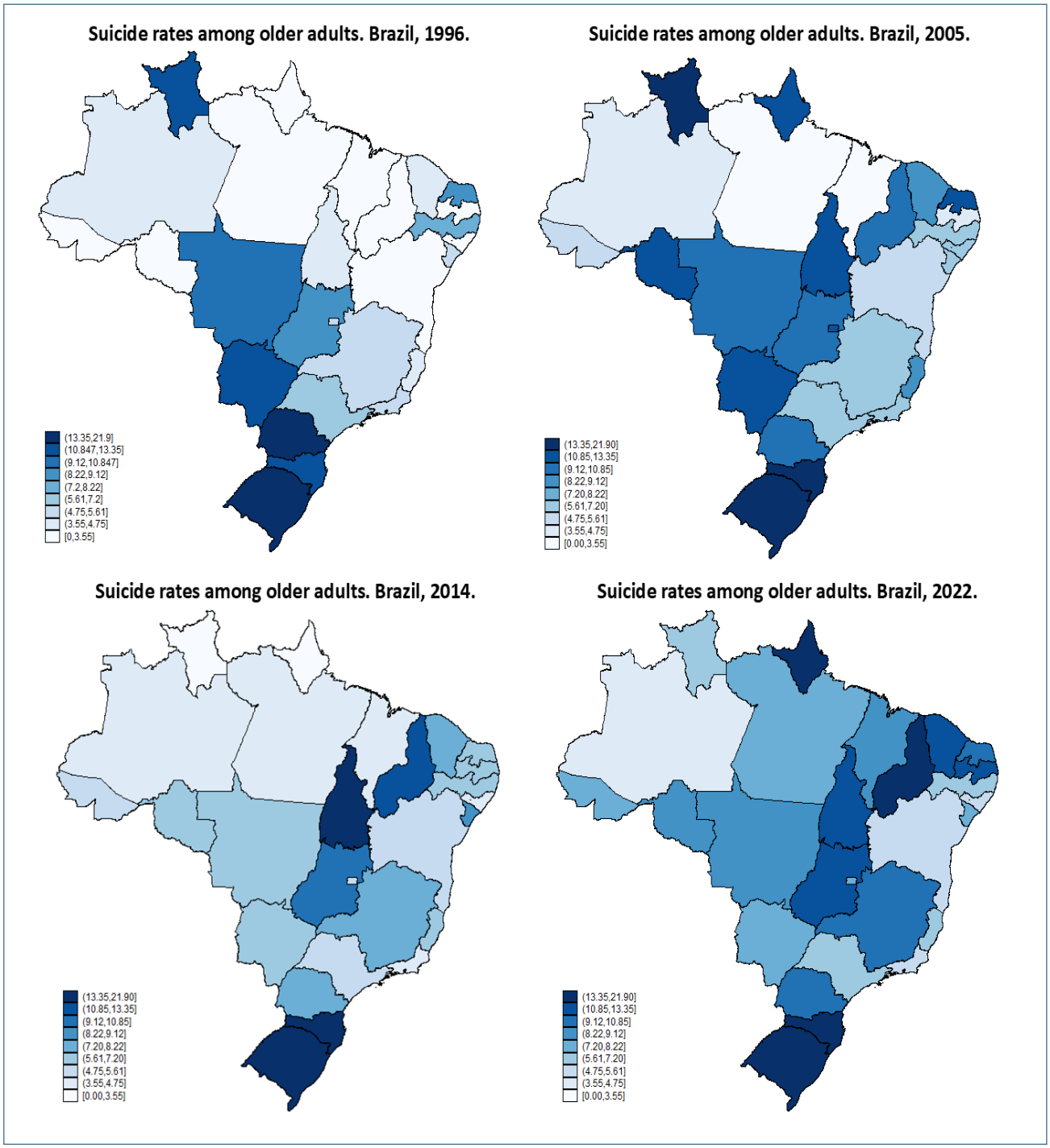



**Figure 2:** Distribution of Suicide Rates by State. Brazil, 1996–2022.

The Southeast region showed varying trends among the states. São Paulo saw a 21% decline in rates, while Minas Gerais recorded the largest percentage increase in the region, with growth exceeding 95% and reaching 9.48 deaths per 100,000 inhabitants in 2022. Rio de Janeiro and Espírito Santo also saw an increase in suicide rates among older adults, although to a lesser extent (Figure 2).

In the South, the pattern of high rates persisted, especially in Rio Grande do Sul, which remained the state with the highest suicide rate in the country throughout the entire period, reaching 20.70 deaths per 100,000 inhabitants in 2022. Santa Catarina also recorded an increase, while Paraná was the only state in the region to see a decrease, with a drop of approximately 25% (Figure 2).

In addition to the trends in suicide rates over the analyzed period, a comparison was made between the states and the national rate in the final year of the series, 2022. In this analysis, Rio Grande do Sul and Santa Catarina had rates significantly higher than the national rate, indicating a higher risk of suicide among older adults in those states. On the other hand, São Paulo, Rio de Janeiro, Espírito Santo, and Pernambuco recorded rates significantly lower than the national average. The remaining states had confidence intervals that overlapped with Brazil's, making it impossible to establish a statistically significant difference from the national average (Table 4).

## DISCUSSION

The results of this study show a significant increase in suicide rates among older adults in Brazil over the past few decades, indicating a consistent trend of an unfavorable trend in suicide mortality rates. Marked regional variations were observed, and the risk of suicide was higher among males.

Several factors may explain this gradual increase, including an aging population, a higher prevalence of mental and chronic disabling disorders, social isolation, widowhood, functional dependence, and limitations in access to or continuity of mental health care. In Brazil, these determinants are compounded by

**Table 4:** Distribution of suicide deaths, population, suicide mortality rate, and 95% confidence interval by state. Brazil, 2022.

| UF | Rate (per 100,000) | 95% CI | RR vs. Brazil | 95% CI for RR | Significance |
|---|---|---|---|---|---|
| Brasil | 8.86 | 8.53 – 9.20 | 1 | — | — |
| RO | 8.52 | 4.96 – 13.64 | 0.96 | 0.59 – 1.55 | Not significantly different |
| AC | 7.72 | 2.83 – 16.80 | 0.87 | 0.39 – 1.98 | Not significantly different |
| AM | 3.87 | 2.12 – 6.50 | 0.44 | 0.25 – 0.75 | Significantly lower |
| RR | 5.76 | 1.19 – 16.84 | 0.65 | 0.21 – 2.04 | Not significantly different |
| PA | 8.12 | 6.35 – 10.22 | 0.92 | 0.72 – 1.16 | Not significantly different |
| AP | 14.39 | 6.58 – 27.32 | 1.63 | 0.78 – 3.38 | Not significantly different |
| TO | 12.23 | 7.75 – 18.35 | 1.38 | 0.90 – 2.12 | Not significantly different |
| MA | 8.29 | 6.44 – 10.51 | 0.94 | 0.75 – 1.18 | Not significantly different |
| PI | 14.51 | 11.33 – 18.30 | 1.64 | 1.28 – 2.10 | Significantly higher |
| CE | 10.76 | 9.05 – 12.71 | 1.21 | 1.02 – 1.44 | Significantly higher |
| RN | 10.88 | 8.17 – 14.19 | 1.23 | 0.94 – 1.62 | Not significantly different |
| PB | 11.91 | 9.33 – 14.97 | 1.34 | 1.07 – 1.68 | Significantly higher |
| PE | 6.29 | 5.02 – 7.79 | 0.71 | 0.57 – 0.89 | Significantly lower |
| AL | 5.39 | 3.38 – 8.16 | 0.61 | 0.41 – 0.92 | Significantly lower |
| SE | 7.9 | 5.01 – 11.85 | 0.89 | 0.57 – 1.38 | Not significantly different |
| BA | 5.55 | 4.60 – 6.64 | 0.63 | 0.52 – 0.76 | Significantly lower |
| MG | 9.5 | 8.53 – 10.56 | 1.07 | 0.93 – 1.23 | Not significantly different |
| ES | 6.04 | 4.28 – 8.29 | 0.68 | 0.50 – 0.93 | Significantly lower |
| RJ | 5.12 | 4.35 – 5.98 | 0.58 | 0.49 – 0.69 | Significantly lower |
| SP | 5.86 | 5.33 – 6.44 | 0.66 | 0.60 – 0.74 | Significantly lower |
| PR | 10.4 | 8.99 – 11.97 | 1.17 | 1.01 – 1.36 | Significantly higher |
| SC | 18.25 | 15.89 – 20.85 | 2.06 | 1.79 – 2.38 | Significantly higher |
| RS | 20.8 | 18.93 – 22.80 | 2.35 | 2.07 – 2.66 | Significantly higher |
| MS | 7.99 | 5.43 – 11.34 | 0.9 | 0.62 – 1.30 | Not significantly different |
| MT | 8.66 | 6.10 – 11.94 | 0.98 | 0.72 – 1.34 | Not significantly different |
| GO | 11.54 | 9.49 – 13.89 | 1.3 | 1.07 – 1.59 | Significantly higher |
| DF | 7.69 | 5.11 – 11.12 | 0.87 | 0.59 – 1.30 | Not significantly different |

socioeconomic inequalities and a historical lack of specific policies aimed at preventing suicide among older adults.

Similar trends have been observed in other countries. Shah et al.[3] in an analysis of 51 United Nations member states, noted that suicide rates tend to increase with age, peaking between the ages of 65 and 80. In Brazil, the pattern is similar, with rising suicide rates starting at age 60, and a higher concentration among men[14]. Previous evidence had already pointed to high suicide mortality among older adults in the state of Rio Grande do Sul, especially among men, suggesting greater vulnerability of this group to suicidal behavior[15]. The findings of the present study corroborate the rising trend in suicide mortality among older adults observed by Silva et al.[16] and underscore the importance of considering regional environmental and cultural factors in understanding and addressing this phenomenon.

Suicide mortality was particularly concentrated among adults aged 60 to 80, especially in southern states such as Rio Grande do Sul—which has historically had the highest rates in the country[15], and in states in the North and Northeast, where there has been a significant increase. These findings underscore the complexity of the phenomenon and the need for regional and multifactorial approaches to suicide prevention among older adults.

Among the individual factors associated with suicide in older adults, affective disorders—particularly depression—stand out as factors that can significantly increase the risk of suicide[17]. Loneliness, grief, multimorbidity, loss of social role, and a weak support network are also among the main vulnerability factors for this population[18,19]. Older adults who live alone or are coping with grief, for example, often report feelings of worthlessness and a loss of a sense of belonging, especially when they lack adequate social support[20].

The COVID-19 pandemic has exacerbated this situation by imposing isolation measures that have intensified the emotional distress of the older adult population. Recent studies point to an increase in suicidal ideation and suicide deaths during the pandemic, linked to restrictions on daily activities, fear of infection, and difficulties adapting to social interactions mediated by digital technologies, which are often inaccessible or unfamiliar to this age group[21,22].

Psychosocial factors, alcohol use, and the presence of neuropsychiatric disorders, such as dementia, are major risk factors for suicide among the older population[23]. A national cohort study of older adults in the United States diagnosed with dementia found that the risk of suicide is significantly higher in the first 90 days after diagnosis, with this risk being particularly high among men, individuals with a recent diagnosis of depression, and those with mild cognitive impairment[24].

In addition to dementia, other chronic diseases, such as heart failure and chronic obstructive pulmonary disease, also have a significant impact on the risk of suicide in this population[17].

In this study, it was observed that the methods of suicide among older adults were predominantly highly lethal, particularly hanging, firearm use, and poisoning. The choice of method is related to the lethality and availability of these means, with hanging frequently being the most used method in this age group. Restricting access to lethal means is one of the most effective strategies for suicide prevention[25], as it can significantly reduce both the incidence and lethality of suicide attempts. In this context, regulatory interventions—such as controlling access to firearms, restricting the sale of pesticides, and modifying the home environment—have a proven impact on reducing suicide rates and should be considered among the prevention strategies in the Brazilian context.

In addition to clinical and psychosocial factors, the socioeconomic context has a significant influence on suicide mortality among older adults, with a higher risk associated with contexts marked by social inequality and low educational attainment[23,26]. In their investigation of socioeconomic and environmental determinants in Brazilian municipalities, Araújo and André[26] found that higher levels of population aging and unemployment are associated with higher suicide rates, suggesting that deteriorating living conditions increase the vulnerability of this population. Low educational attainment, in turn, not only restricts access to information and services but is also associated with a reduced ability to cope with adverse situations, which may contribute to the development of depressive symptoms and an increased risk of suicide[19]. The findings of the present study corroborate this association by revealing a higher concentration of suicides among older adults with low educational attainment, particularly among men.

Despite the overall increase in rates, some states showed a decrease in suicide mortality among older adults, such as Roraima, Mato Grosso do Sul, and Paraná. Although the factors explaining these declines have not been clearly identified in the literature, a plausible hypothesis is the strengthening of public policies aimed at promoting mental health and preventing suicide. For example, Ministry of Health Ordinance No. 3,491/2017 allocated funds for state-level suicide prevention projects and may have contributed to expanding access to psychosocial services in these states[27].

In recent decades, Brazil has made remarkable progress in the quality and coverage of mortality data, driven by the strengthening of the Mortality Information System and by public policies aimed at improving civil registration[28]. The expansion of the reach of health information systems, the computerization of records, and the training of professionals have contributed to a reduction in the underreporting of deaths, particularly in the North and Northeast regions, which have historically been more vulnerable to this problem[29]. However, it is important to note that part of the observed increase in suicide mortality rates may reflect, at least in part, improved reporting and not necessarily a real increase in the number of events[30]. Thus, the analysis of temporal and regional

trends must consider the evolving context of data quality, avoiding simplistic interpretations of the phenomenon.

Despite progress, underreporting of suicide deaths persists in the country, posing a significant challenge for epidemiological surveillance. The literature indicates that the actual number of suicides tends to be underestimated in several countries, including Brazil, making it difficult to obtain reliable estimates[30,31]. Among the factors contributing to underreporting are the incorrect completion of death certificates, the existence of clandestine cemeteries, requests by family members to change the cause of death, and the social stigma surrounding suicide[32,33]. Furthermore, it is common for deaths to be recorded according to the nature of the injury (e.g., drowning or motor vehicle accident) or classified as unknown or undetermined causes, masking the true magnitude of suicide among older adults[34,35]. These issues are most evident in regions with weaker investigative infrastructure and in historical periods before the consolidation of information systems.

Despite the robustness of the method used, this study has limitations inherent to the use of secondary data and to the ecological design, which does not allow for individual-level inferences and may introduce biases associated with regional heterogeneity in data quality. Furthermore, regional comparisons should be interpreted with caution since some of the observed variations may reflect improvements in data recording over the past few decades[36]. It is essential to recognize that some of the identified variations may stem from improvements in registration quality and a reduction in underreporting, rather than solely from changes in social and health determinants. The continuous improvement of information systems, combined with the training of health care teams and integration between civil registration and public health agencies, is essential to ensure greater reliability of suicide mortality data. The incorporation of adjustment methods for underreporting and the reclassification of ill-defined causes[37], in this regard, can more accurately estimate the actual impact of suicide among older adults in Brazil and should be encouraged in future studies. Nevertheless, the results consistently point to an upward trend in suicide among the older adult population, highlighting the urgent need for more effective strategies for early risk identification, strengthening of primary mental health care, and intersectoral actions aimed at the well-being and social integration of older adults.

## Conclusion

The results of this study showed that suicide mortality rates among older adults exhibited a statistically significant upward trend between 1996 and 2022 in Brazil. The persistent pattern of worsening suicide rates in old age indicates that suicide prevention remains a significant public health challenge in Brazil. The persistence of high rates in states such as Rio Grande do Sul, as well as the increase in regions historically less affected, such as the North and Northeast, reinforce the need for interventions that are sensitive to regional contexts and social inequalities. Our findings point to the need for integrated public prevention policies focused on expanding access to mental health care, strengthening social support networks, and addressing structural inequalities. Investments in education, the promotion of active aging, and initiatives to combat social isolation are essential for reducing the risk of suicide in this population.

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