



OBESITY IN BRAZIL: ANALYSIS OF HOSPITALIZATIONS AND MORTALITY FROM 2013 AND 2024

OBESIDADE NO BRASIL: ANÁLISE DAS HOSPITALIZAÇÕES E MORTALIDADE ENTRE 2013 A 2024

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ABSTRACT: The objective was to analyze and characterize the reported cases of hospitalizations, deaths, and mortality rates due to obesity in Brazil between 2013 and 2024. This ecological study used data from the Brazilian Unified Health System Hospital Information System, covering the period from January 2013 to December 2024. A total of 132,541 hospitalizations for obesity were recorded, with the South and Southeast regions accounting for 44.3% and 40.7% of cases, respectively, showing significant differences among all regions ($p < 0.001$), and with a predominance among women (87.1%). Regarding deaths, 258 were recorded, with the Southeast and South regions representing 47.7% and 37.6%, respectively, also presenting significant differences among all regions ($p < 0.001$). The mortality rate was higher in men (0.54) compared to women (0.14) ($p < 0.001$). Hospitalizations and deaths due to obesity increased over the study period, especially among women, with a higher incidence in the 20 to 59-year age group; however, the impact was more severe among men.

KEYWORDS: Chronic disease indicators. Mortality registry. Disease notification. Public health. Metabolic syndrome.

RESUMO: O objetivo foi analisar e caracterizar os casos notificados de internações, óbitos e a taxa de mortalidade por obesidade no Brasil entre 2013 a 2024. Estudo ecológico utilizando dados do Sistema de Informações Hospitalares do SUS, de janeiro de 2013 a dezembro de 2024. Foram registradas 132.541 internações por obesidade. As regiões Sul e Sudeste concentrando 44,3% e 40,7% dos casos, respectivamente, apresentando diferença entre todas as regiões ($p < 0,001$). Com sua maioria entre as mulheres (87,1%). Quanto aos óbitos, 258 foram registrados, com as regiões Sudeste e Sul representando 47,7% e 37,6%, respectivamente, apresentando diferença entre todas as regiões ($p < 0,001$). A taxa de mortalidade foi maior nos homens (0,54) em comparação com as mulheres (0,14) ($p < 0,001$). As hospitalizações e óbitos por obesidade aumentaram, especialmente nas mulheres, com maior incidência entre 20 a 59 anos, mas o impacto é mais grave nos homens.

PALAVRAS-CHAVE: Indicadores de doenças crônicas. Registros de mortalidade. Notificação de doenças. Saúde pública. Síndrome metabólica.

INTRODUCTION

Obesity is a complex and chronic condition characterized by excessive accumulation of body fat¹ and represents one of the most significant public health challenges globally. Since 1990, obesity rates have more than doubled, with a particularly alarming rise among children and adolescents aged 5 to 19 years. This increasing trend has established obesity as a serious public health issue, with its incidence continuing to rise worldwide. In 2022, approximately 43% of adults were classified as overweight, and projections estimate that by 2025, around 20% of the global population will be living with obesity^{2,3}.

The lifestyle prevalent in the 21st century, marked by increased consumption of high-fat diets and ultra-processed foods, combined with sedentary behavior, is a key driver of the obesity epidemic. In Brazil, this scenario reflects an alarming reality: approximately 6.7 million individuals are affected by obesity, and in 2022, morbid obesity (defined as a Body Mass Index greater than 40 kg/m²) impacted 863,086 people^{4,5}.

The consequences of obesity extend beyond excess body weight, significantly compromising health, longevity, and quality of life. This condition is frequently associated with impaired social interaction, low self-esteem, and increased susceptibility to stress and depression⁶. Moreover, in addition to elevating the risk of premature mortality, obesity substantially raises the likelihood of developing chronic diseases such as type 2 diabetes mellitus, systemic arterial hypertension, and autoimmune disorders, including rheumatoid arthritis, psoriasis, and systemic lupus erythematosus, as well as various types of cancer⁷⁻⁹.

Therefore, obesity represents not only an individual health condition but also a growing epidemic that poses significant challenges to the Brazilian Unified Health System (SUS), due to its high morbidity and mortality rates and the substantial costs associated with its management, despite being largely preventable¹⁰. In Brazil, the costs related to chronic non-communicable diseases, including obesity, amounted to R\$ 3.45 billion in 2018, encompassing expenditures on hospitalizations, outpatient procedures, and medications¹¹. In 2019, approximately R\$ 1.5 billion was specifically allocated to the treatment and management of overweight and obesity¹².

As the number of obesity cases increases, there is a corresponding rise in the demand for immediate and coordinated health interventions¹³. The treatment of obesity is comprehensive and long-term, involving behavioral changes with an emphasis on nutritional interventions, regular physical activity, psychological support, and, when necessary, pharmacological or surgical approaches. The adoption of healthy habits and the promotion of sustained lifestyle modifications are fundamental pillars in the effective management of obesity¹⁴⁻¹⁶.

The broad scope of the obesity epidemic and its chronic consequences constitutes a significant public health concern that cannot be overlooked¹⁴. To enhance understanding of the epidemiological landscape of obesity in Brazil over the past decade, it is essential to examine and interpret hospitalization statistics alongside mortality rates. Such an analysis will contribute to a more comprehensive understanding of the country's epidemiological trends. Therefore, the objective of this study is to analyze and characterize the number of reported hospitalizations and deaths, as well as the mortality rate due to obesity in Brazil between 2013 and 2024.

METHODOLOGY

This is an ecological, retrospective, and descriptive study with a quantitative approach, based on data regarding the prevalence of hospitalizations and mortality due to obesity in Brazil over the last

decade. The data were extracted from the Hospital Information System (SIH) of the Department of Informatics of the Unified Health System (DATASUS), using the TABNET health data platform.

All reported cases of hospitalization and death due to obesity in Brazil during the study period were included. Data collection was conducted in March 2025 using the official platform of the Department of Informatics of the Unified Health System (DATASUS), available at: <https://datasus.saude.gov.br/informacoes-de-saude-tabnet/>. The analysis covered the period from January 1, 2013, to December 31, 2024. This time frame was selected to enable a comprehensive temporal evaluation, including data from before, during, and after the COVID-19 pandemic, thereby allowing for the identification of potential epidemiological shifts associated with this global health crisis.

To encompass the national scope, this study focused on Brazil and its five macro-regions (North, Northeast, Southeast, South, and Central-West), considering the total population. All cases reported in the DATASUS system were included. The following variables were extracted from the database: number of hospitalizations, number of deaths, and mortality rate. Data selection followed the internal criteria of the system, beginning with the selection of the ICD-10 chapter "Endocrine, nutritional and metabolic diseases," and subsequently the subcategory "Obesity (E66)" within the ICD-10 morbidity list. All records related to the macro-regions were included, taking into account sex, age group, and ethnicity.

Secondary data were tabulated using Microsoft Excel 365, version 2019 (Microsoft©, 2019) to quantify the percentage distributions of raw data. Normality tests (Shapiro-Wilk and Kolmogorov-Smirnov) and homogeneity of variance (Levene's test) were applied to all evaluated measures. The Mann-Whitney U test was used to compare hospitalization frequencies between sexes both nationally and by region, as well as deaths in the North, Northeast, and Central-West regions. The independent samples t-test was employed for comparisons of deaths between sexes in the Southeast and South regions. The Kruskal-Wallis test was used for comparisons involving the remaining variables. A significance level of $p < 0.05$ was adopted. All statistical analyses were conducted using SPSS (Statistical Package for the Social Sciences).

As this study utilized secondary data obtained from a publicly accessible database, submission to a Research Ethics Committee was not required, in accordance with Resolution No. 466/2012 and Resolution No. 510/2016 of the Brazilian National Health Council.

RESULTS

Between January 2013 and December 2024, a total of 132,541 hospitalizations due to obesity as the primary diagnosis were recorded in Brazil. The South region accounted for the highest proportion of cases (44.3%; 58,779 hospitalizations), followed by the Southeast (40.7%; 53,947), Northeast (9.7%; 12,893), Central-West (3.6%; 4,783), and North (1.6%; 2,139), with statistically significant differences observed among the regions ($p = 0.00$). In all regions, females predominated, comprising 87.1% (115,377) of the total hospitalizations (Table 1).

Regarding mortality, 258 deaths attributed to obesity were reported in the same period. The highest proportion occurred in the Southeast (47.7%; 123 deaths), followed by the South (37.6%; 97), Northeast (7.0%; 18), Central-West (5.8%; 15), and North (1.9%; 5). Nationally, females also accounted for the majority of deaths (64.3%; 166 cases) (Table 1).

Analysis by age group revealed that most hospitalizations and deaths due to obesity occurred among young adults aged 20–39 years (47.7%), followed by middle-aged adults aged 40–59 years (46.8%). Deaths were predominantly concentrated in individuals aged 40–59 years (57.4%), followed by the 20–

39-year group (22.1%). Children and adolescents represented less than 1% of total hospitalizations during the period (Table 1).

With respect to ethnicity, the majority of hospitalizations and deaths occurred among individuals who self-identified as white—58.1% (76,952 hospitalizations) and 47.7% (123 deaths), respectively—followed by individuals who identified as brown (27.2%; 36,083 hospitalizations and 36.4%; 94 deaths). Indigenous individuals represented less than 1% of cases, with 9 hospitalizations and no reported deaths during the period (Table 1).

Table 1. Sociodemographic data of reported cases of hospitalization and deaths by region in Brazil (2013-2024).

Variables	North		North East		Southeast		South		Midwest		p
		p		p		p		p		p	
Hospitalizations	2.139		12.893		53.947		58.779		4.783		0.00
Sex											
Male	290	0.00	1.813	0.00	6.758	0.00	7.810	0.00	493	0.00	0.00
Female	1.849		11.080		47.189		50.969		4.290		0.00
Age											
< 1 – 9 years	1		10		15		1		2		0.00
10 – 19 years	9		67		323		641		14		0.00
20 – 39 years	936	0.00	6.361	0.00	23.713	0.00	30.352	0.00	1.912	0.00	0.00
40 – 59 years	1.114		5.951		26.790		25.548		2.581		0.00
60 – 79 years	78		503		3.087		2.232		273		0.00
≥ 80 years	1		1		19		5		1		0.00
Ethnicity											
White	151		1.138		27.892		46.730		1.041		0.00
Black	56		452		3.172		1.869		99		0.00
Mixed-race	1.705	0.00	7.667	0.00	17.116	0.00	6.821	0.00	2.774	0.00	0.00
Asian	65		631		315		421		54		0.00
Indigenous	0		3		4		2		0		0.10
Uninformed	162		3.002		5.448		2.936		815		0.00
Deaths	5		18		123		97		15		0.00
Sex											
Male	2	0.62	7	0.21	35	0.00	46	0.72	2	0.00	0.00
Female	3		11		88		51		13		0.00
Age											
< 1 – 9 years	0		0		0		0		0		1.00
10 – 19 years	0		1		2		0		0		0.24
20 – 39 years	1	0.01	4	0.02	20	0.00	28	0.00	4	0.00	0.00
40 – 59 years	4		11		72		54		7		0.00
60 – 79 years	0		2		25		15		4		0.00
≥ 80 years	0		0		4		0		0		0.09
Ethnicity											
White	0		0		48		73		2		0.00
Black	0		0		10		2		0		0.00
Mixed-race	5	0.00	13	0.00	51	0.00	16	0.00	9	0.00	0.00
Asian	0		0		1		0		0		0.41
Indigenous	0		0		0		0		0		1.00
Uninformed	0		5		13		6		4		0.03

Source: Adapted from data reported from the DATASUS platform (2025).

Figure 1 illustrates a growing temporal trend in obesity-related hospitalizations, rising from 9,765 cases in 2013 to 15,504 in 2024, with an annual mean of $11,045.08 \pm 3,809.75$ cases. The number of hospitalizations peaked between 2018 (14,953 cases) and 2019 (16,454 cases), followed by a marked decline during the COVID-19 pandemic period. Similarly, the number of deaths showed notable fluctuations over the years, with an average of 21.50 ± 6.96 deaths annually. Prominent peaks were

observed in 2016 (32 deaths) and 2019 (35 deaths), which were likewise followed by a decline during the pandemic period.

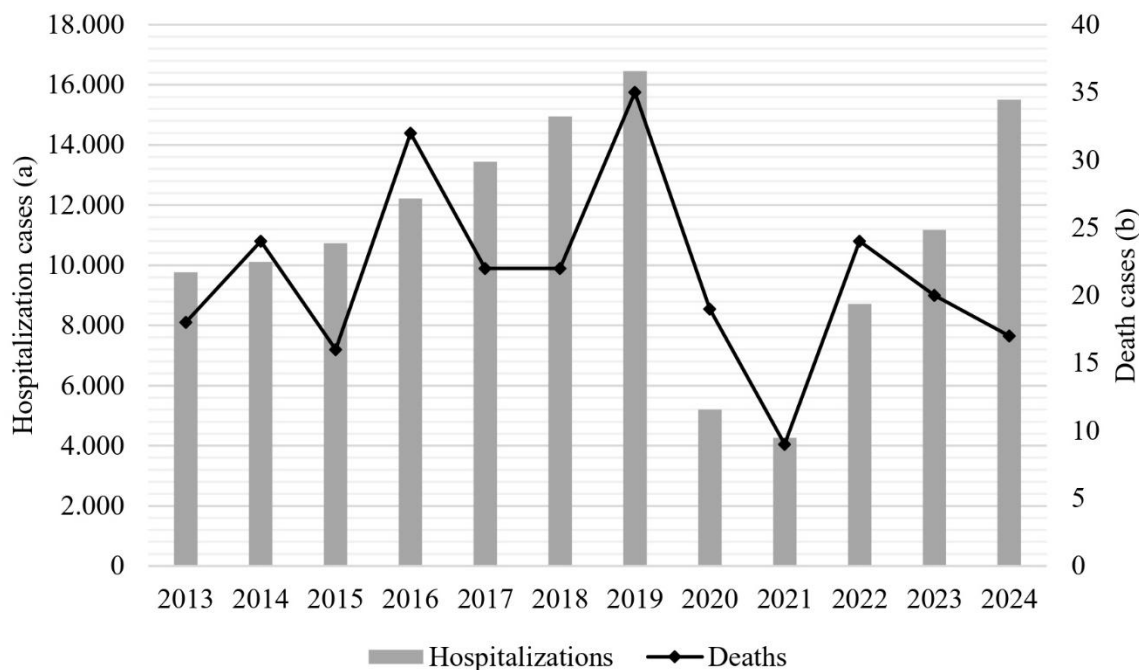


Figure 1. Annual trend of notified obesity hospitalization cases (a) and obesity death cases (b) registered per year in Brazil (2013 to 2024). Source: Adapted from data reported from the DATASUS platform (2025).

At the national level, women presented an annual average of $9,614.75 \pm 3,279.30$ hospitalizations due to obesity (87.1%), whereas men accounted for an average of $1,430.33 \pm 535.97$ hospitalizations per year (12.9%) ($p = 0.00$). This sex-based disparity was observed across all Brazilian regions, with statistically significant differences ($p = 0.00$). Regarding mortality, women also predominated, with an annual average of 13.83 ± 5.47 deaths (64.3%), compared to 7.67 ± 2.15 deaths per year among men (35.7%) ($p = 0.00$). The predominance of female deaths remained statistically significant in the Southeast and Central-West regions ($p = 0.00$); however, no significant sex-based differences in mortality were observed in the North ($p = 0.62$), Northeast ($p = 0.21$), and South ($p = 0.72$) regions. Figure 2 illustrates the comparison between sexes, emphasizing hospitalizations and deaths due to obesity across the country's macro-regions during the study period.

Hospitalizations are more frequent than deaths across all age groups. As shown in Figure 3, the highest concentration of hospitalizations and deaths due to obesity occurs among individuals aged 20 to 59 years. Specifically, individuals aged 20 to 39 years had an annual average of $5,272.83 \pm 1,872.95$ hospitalizations, accounting for 47% of the total. Those aged 40 to 59 years had an annual average of $5,165.33 \pm 1,813.64$ hospitalizations, representing 46.8%. Regarding deaths, the majority occurred among individuals aged 40 to 59 years, with an annual average of 12.33 ± 5.26 deaths (57.4%), followed by those aged 20 to 39 years, with an annual average of 4.75 ± 1.76 deaths (22.1%).

Across all regions, individuals aged 20 to 59 years showed a predominance in the number of registered cases. In the 20 to 39 age group, the Northeast region had an annual average of 530.08 ± 270.04 cases (49.3%), while the South region reported an annual average of $2,529.33 \pm 1,396.11$ cases (51.6%). In the 40 to 59 age group, the North region showed a prevalence with an annual average of 92.83 ± 123.05 cases (52.1%), followed by the Southeast region with $2,232.67 \pm 673.61$ cases (49.7%), and the Central-West region with 215.08 ± 141.23 cases (54.0%). When comparing these age groups across the

five regions, a statistically significant difference was observed for both the 20 to 39 age group ($p = 0.00$) and the 40 to 59 age group ($p = 0.00$).

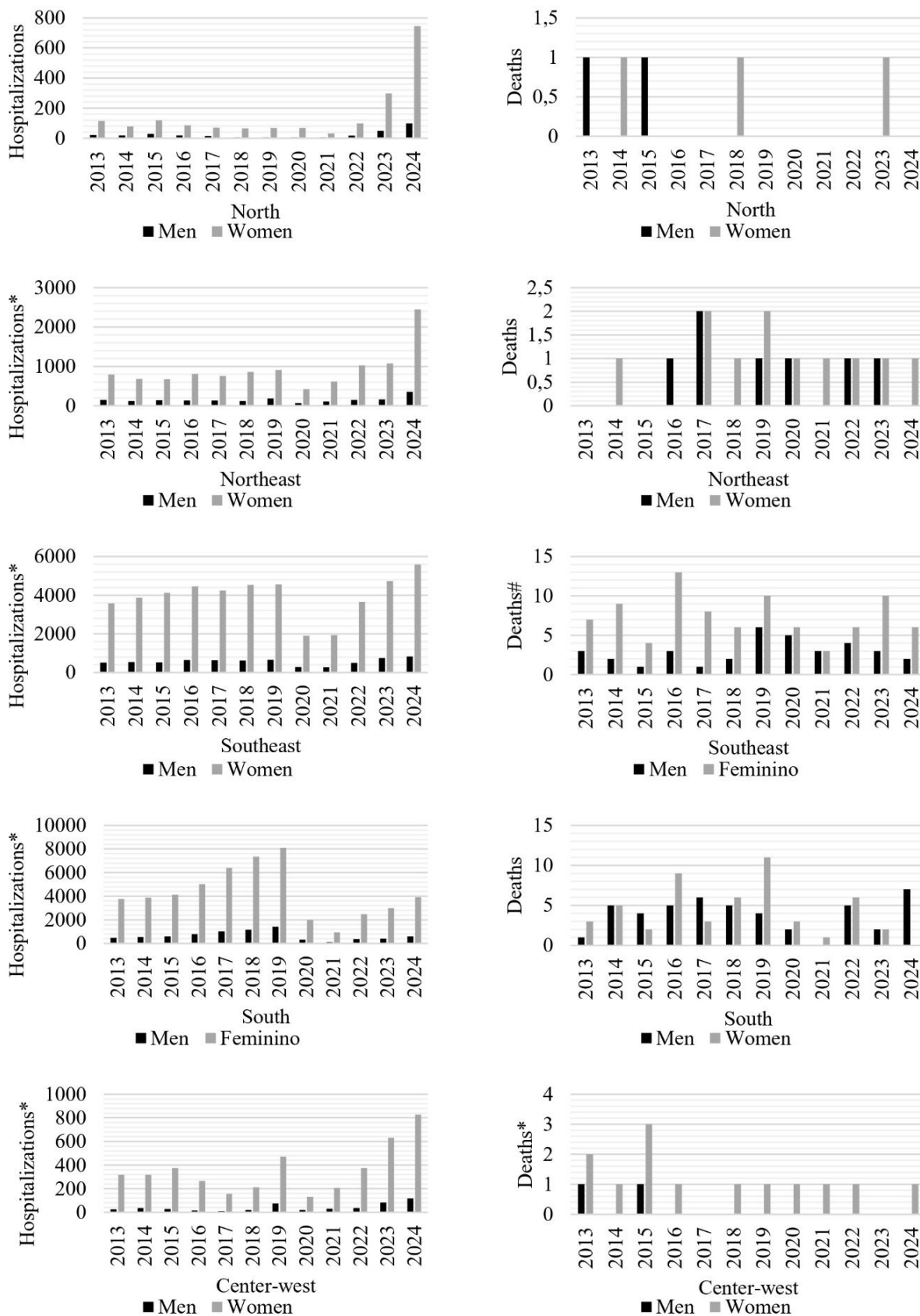


Figure 2. Annual distribution of reported hospitalization cases and death cases due to obesity, by sex and region in Brazil (2013 to 2024). Note: *Mann-Whitney test and #T-test for independent samples with significant differences ($p < 0.05$).

Source: Adapted from data reported from the DATASUS platform (2025).

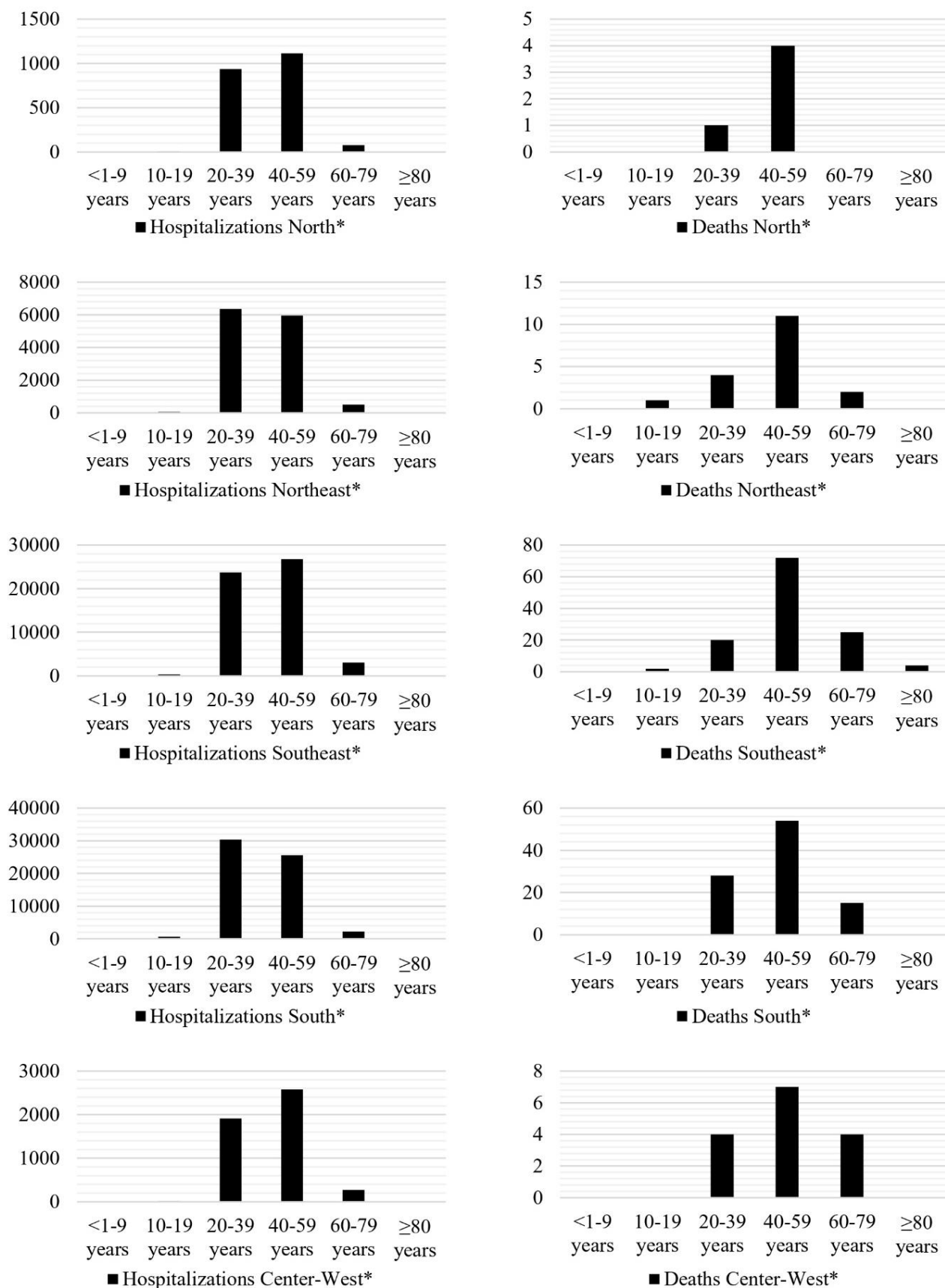


Figure 3. Distribution of reported hospitalization cases and death cases due to obesity, by age and region in Brazil (2013 to 2024). Note: *Kruskal-Wallis test with significant differences ($p < 0.05$). Source: Adapted from data available on the DATASUS platform (2025).

In a general analysis, the national mortality rate was 0.54 for males and 0.14 for females. When comparing the rates from 2013 to 2024, a statistically significant difference was observed between the mortality rates of men and women ($p = 0.00$). Analyzing mortality rates by region, males had the highest rate in the North (0.69), followed by the South (0.59), Southeast (0.52), Central-West (0.41), and Northeast (0.39), with a statistically significant difference between regions ($p = 0.01$). Among females, the highest mortality rate was observed in the Central-West (0.30), followed by the Southeast (0.19), North (0.16), and both the Northeast and South (0.10), also with a statistically significant difference between regions ($p = 0.01$).

These results indicate a greater severity of the disease among the male population. However, when comparing mortality rates between sexes within each region, statistically significant differences were found only in the Southeast ($p = 0.00$), South ($p = 0.00$), and Central-West ($p = 0.02$) regions. To illustrate the trend in mortality rates between sexes, Figure 4 presents a comparison of the rates for males and females over the study period, both at the national level and across the regions of the country.

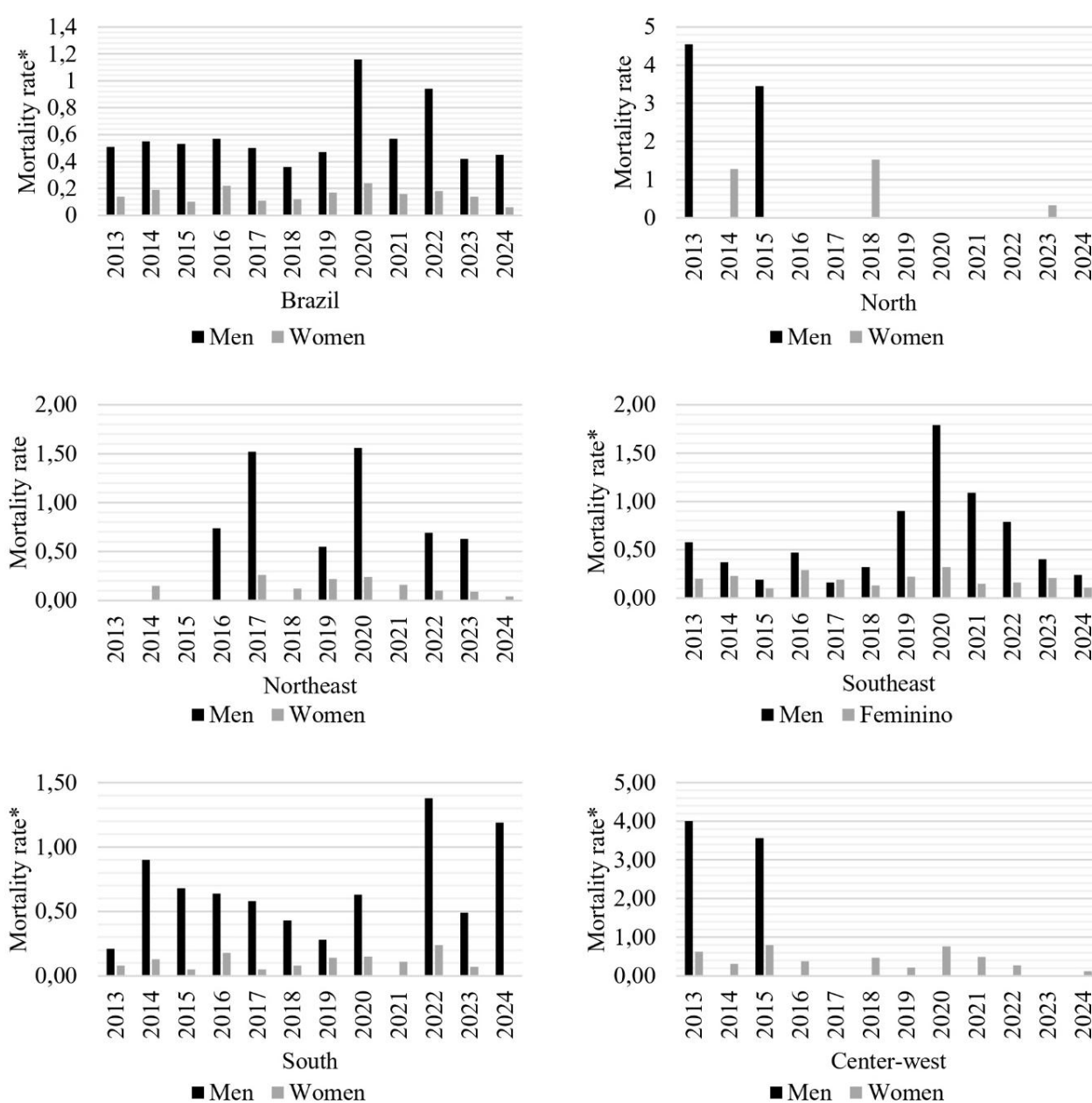


Figure 4. Trend of national and regional mortality rates between sexes (2013 to 2024). Note: *Mann-Whitney test with significant differences ($p < 0.05$). Source: Adapted from data available on the DATASUS platform (2025).

DISCUSSION

The number of hospitalizations showed a consistent and significant increase over time, with the exception of the period from 2020 to 2022, during which a reduction in records was observed—likely due to underreporting associated with the COVID-19 pandemic. From 2023 onwards, a significant rise in hospitalizations was noted, returning to pre-pandemic levels. This trend highlights the need for ongoing surveillance, particularly given that obesity is associated with severe outcomes in various chronic diseases, including hypertension, diabetes, autoimmune disorders, cancer, and an increased risk of mortality^{6,7,17-19}, and may lead to complications in adulthood^{20,21}.

Positive energy balance is often cited as the primary cause of obesity, which tends to reduce the complexity of the issue to purely biological factors, overlooking the influence of social markers and social determinants of health. Gender, race/skin color, and social class are significant social markers in the context of obesity; however, these relationships are rarely explored or adequately addressed in public health policies²².

In Basic Health Units, the approach to obesity remains incipient, with notable disparities across different regions of Brazil. The lack of personalized care and inadequate infrastructure for diagnosis, monitoring, and evaluation contribute to lower-quality treatment and an increased risk of complications. It is estimated that individuals with obesity in Brazil require approximately twice as much healthcare compared to those with a healthy weight, including more frequent consultations, diagnostic tests, and hospitalizations due to conditions such as hypertension and diabetes, when compared to individuals of normal or low weight^{23,24}. Given the multifactorial nature of obesity, a range of treatment strategies is indicated, including surgical interventions, pharmacological therapies, psychiatric care, and psychological support²⁵.

In the child and adolescent population, obesity results from the interaction between genetic predisposition, lifestyle habits, such as dietary patterns and excessive consumption of ultra-processed foods, and environmental exposure²⁶. In adults, obesity is associated with advancing age, cohabitation with a partner, low educational attainment, and a history of smoking in both sexes^{7,27}. Women were the most frequently affected group, with obesity correlated not only with biological factors but also with social determinants, reproductive history, and household income equal to or less than two minimum wages. Additionally, the condition is associated with the presence of comorbidities such as hypertension, diabetes, high cholesterol, and early menarche (first menstruation before the age of 12)²⁸.

Previous studies have shown a rising trend in overweight and obesity among the Brazilian population^{7,25}. The present study confirms a significant increase over time, with the exception of the COVID-19 pandemic period, during which a reduction in both hospitalizations and deaths was observed. Although obesity has been identified as a risk factor for the worsening of COVID-19 outcomes²⁹, the findings of this study reveal a discrepancy, likely reflecting underreporting during the pandemic. This may be attributed to the strain on health systems, which led to disruptions in data collection and required adjustments in public services and healthcare professionals' actions to respond to the crisis.

The COVID-19 pandemic negatively impacted various aspects of daily life, as well as the behavior and lifestyle of the Brazilian population. These changes contributed to an increase in mental health issues among both children and adults, particularly those living with obesity. Conditions such as anxiety, depression, and loneliness have been associated with increased food intake as a coping mechanism to seek pleasure and emotional relief^{30,31}. In this context, investigating the epidemiological trends of hospitalizations and deaths related to obesity in Brazil became essential to better understand the scope of the problem and inform public health strategies.

The study found that the highest number of hospitalizations due to obesity occurred in the South region, followed by the Southeast, with a predominance among women. A similar pattern was observed for deaths, which were most concentrated in the Southeast region, also with the highest number occurring among women. Lopes et al.²³ noted that women represent the majority of individuals receiving obesity-related care in UBS in Brazil. These findings are consistent with previous studies that identified the South region as having the highest number of cases, particularly among individuals over 30 years of age living in rural areas^{17,24}. While research indicates that both overweight and obesity have increased across both sexes, in Brazil, the prevalence of overweight is higher among men, whereas obesity is more prevalent among women^{7,32,33}.

The prevalence of obesity among women has been progressively increasing over the past decade. Studies have identified a strong association between obesity and factors such as age, reproductive history, family history of obesity, having three or more pregnancies, and a physically inactive lifestyle^{34,35}. Although women exhibit higher rates of hospitalizations and deaths due to obesity, men present higher obesity-related mortality rates. When analyzing deaths in this population, a progressive increase is observed from the age of 20, with the majority occurring among individuals aged 20 to 59 years. In contrast, very few deaths are reported among children and adolescents. It is important to note, however, that childhood obesity is highly prevalent in Brazil and has reached alarming levels³⁶. Nonetheless, reported deaths are predominantly concentrated in older age groups, highlighting how comorbidities and obesity-related diseases tend to accumulate over time, especially with aging, thereby increasing the risk of mortality.

Understanding the social determinants of health is essential for interpreting obesity patterns. Although Black individuals have been identified as a population at higher risk for obesity⁷, the greater prevalence of hospitalizations among White individuals may reflect increased access to diagnosis and healthcare services. Conversely, factors such as poverty, food insecurity, and limited health education significantly affect vulnerable populations¹⁰, especially considering that obesity requires substantial investment in treatment and management²⁴. To mitigate these disparities, public policies should aim to reduce social inequalities and ensure universal access to effective prevention and treatment programs.

In Brazil, public policies prioritize the promotion of adequate and healthy eating, as well as the encouragement of regular physical activity³⁷. In addition to federal initiatives, municipal strategies have also played a significant role, including the regulation of school cafeterias and the restriction of food advertising targeted at children within school environments. Within this framework, the Healthy Growth Program, part of the Health in School Program (PSE), stands out as a key strategy in combating childhood obesity³⁸. These measures have the potential to promote healthier growth trajectories, improve dietary patterns, and, consequently, positively influence both population health indicators and overall quality of life.

Obesity is undoubtedly a global epidemic³⁹ and, in Brazil, represents a complex collective challenge encompassing social, economic, and behavioral dimensions. In this context, the care provided to individuals with obesity within the Unified Health System (SUS) must extend beyond the mere training of healthcare professionals. It is essential to offer comprehensive care that includes preventive measures and health promotion actions, alongside the encouragement of healthy dietary practices. Such care should incorporate early diagnosis and evidence-based treatment strategies, ensuring coordinated implementation across all three levels of government^{40,41}. Only through a comprehensive and integrated approach, with strategies aimed at reducing obesity and its associated chronic conditions, which significantly contribute to hospitalizations and severe complications, can improvements in the quality of life of affected populations be effectively achieved.

CONCLUSION

There was a progressive increase in the number of hospitalizations due to obesity throughout the analyzed historical series, except during the COVID-19 pandemic period. These hospitalizations were predominantly recorded in the South region and were more frequent among white female individuals aged between 20 and 59 years. In contrast, obesity-related deaths were more concentrated in the Southeast region, also with a predominance among females.

Although the Southeast and South regions presented the highest absolute number of deaths, the mortality rate was highest in the North region, which may reflect disparities in access to healthcare and diagnostic services. Furthermore, the mortality rate was higher among males, suggesting a greater severity of the disease in this group.

These findings underscore the urgent need to enhance public health strategies focused on the prevention and control of obesity in Brazil. Expanding and improving public policies, increasing investments, and broadening access to community physical activity programs, such as the implementation of popular gyms in more municipalities, may contribute to reducing obesity-related mortality rates across the country.

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