Original article

Heart failure mortality in Bahia between 2013 and 2022

Mortalidade por insuficiência cardíaca na Bahia entre 2013 e 2022

Guilherme de Castro Quadrado[1]
Ricardo Ávila Chalhub[2]

[1]Corresponding author. Escola Bahiana de Medicina e Saúde Pública (Salvador). Bahia, Brazil. guilhermequadrado21.1@bahiana.edu.br
[2]Escola Bahiana de Medicina e Saúde Pública (Salvador). Bahia, Brazil.

ABSTRACT | OBJECTIVE: To analyze the profile of deaths from heart failure in the state of Bahia between 2013 and 2022. **METHOD:** Descriptive observational time series study using secondary data from the Mortality Information System (SIM). Deaths whose underlying cause was classified as heart failure (ICD-10: I50) were included. The variables analyzed were year of death, macro-region of residence, age group, gender, race/color, education level and marital status. **RESULTS:** Between 2013 and 2022, 18,990 deaths from heart failure were recorded in Bahia, an increase of 6,41% over the time series. Most deaths occurred among individuals of brown race/color (10,834 cases) and males (51.36%). The age group with the highest concentration of deaths was 80 years or older (43.96%). The Eastern macro-region had the highest proportion of deaths (25.3%), followed by the Central-Eastern (15.74%). Regarding the level of education, 33.77% of deaths were of people with no schooling. In relation to marital status, married people accounted for 28.39% of the total. **CONCLUSION:** The data shows inequalities in the profile of mortality from heart failure, reinforcing the need for public health strategies that prioritize comprehensive and equitable care, especially for the most vulnerable populations.

KEYWORDS: Heart Failure. Mortality. Deaths. Bahia.

RESUMO | OBJETIVO: Analisar o perfil dos óbitos por insuficiência cardíaca no estado da Bahia, no período de 2013 a 2022. **MÉTODO:** Estudo observacional descritivo do tipo série temporal, utilizando dados secundários do Sistema de Informação sobre Mortalidade (SIM). Foram incluídos os óbitos cuja causa básica foi classificada como Insuficiência Cardíaca (CID-10: I50). As variáveis analisadas foram: ano do óbito, macrorregião de residência, faixa etária, sexo, raça/cor, escolaridade e estado civil. **RESULTADOS:** Entre 2013 e 2022, foram registrados 18.990 óbitos por insuficiência cardíaca na Bahia, com aumento de 6,41% ao longo da série histórica. A maioria dos óbitos ocorreu entre indivíduos de raça/cor parda (10.834 casos) e do sexo masculino (51,36%). A faixa etária com maior concentração de óbitos foi a de 80 anos ou mais (43,96%). A macrorregião Leste apresentou a maior proporção de óbitos (25,3%), seguida da Centro-Leste (15,74%). Quanto à escolaridade, 33,77% dos óbitos foram de pessoas sem escolaridade. Em relação ao estado civil, os casados representaram 28,39% do total. **CONCLUSÃO:** Os dados evidenciaram desigualdades no perfil da mortalidade por insuficiência cardíaca, reforçando a necessidade de estratégias de saúde pública que priorizem o cuidado integral e equitativo, especialmente para populações mais vulneráveis.

PALAVRAS-CHAVE: Insuficiência Cardíaca. Mortalidade. Óbitos. Bahia.

Submitted Mar. 17th, 2025, Accepted May 9th, 2025,
Published July 28th, 2025
J. Contemp. Nurs., Salvador, 2025;14:e6176
http://dx.doi.org/10.17267/2317-3378rec.2025.e6176 | ISSN: 2317-3378
Assigned editors: Cátia Palmeira, Tássia Macêdo

How to cite this article: Quadrado GC, Chalhub RA. Heart failure mortality in Bahia between 2013 and 2022. J Contemp Nurs., 2025;14:e6176. http://dx.doi.org/10.17267/2317-3378rec.2025.e6176

1. Introduction

Heart failure (HF) is defined as a complex syndrome in which the heart is unable to pump blood adequately to meet the body's metabolic demands, either in the presence of normal filling pressures or only at the cost of elevated pressures[1-3]. This condition has numerous causes and several risk factors that predispose to it and may worsen the prognosis; it results from abnormalities in the structural, functional, or electrical conduction aspects of the heart[1,2].

In more developed countries, ventricular dysfunction is the most common underlying problem, mainly resulting from myocardial infarction (systolic dysfunction), hypertension (diastolic and systolic dysfunction), or, in many cases, both. In other countries, prevalent causes differ and may include valvular disease, Chagas cardiomyopathy, and endomyocardial fibrosis[1,2,4-6].

To successfully diagnose HF, it is necessary to conduct a detailed anamnesis and physical examination, looking for factors that contribute to the condition and its possible causes[1,2]. The main clinical manifestations of the syndrome include dyspnea, fatigue, poor exercise tolerance, and lower limb edema. Additionally, there are various ways of classifying this cardiac dysfunction that assist clinical reasoning, such as classification by symptoms, progression of structural changes, and ejection fraction[2].

Briefly, treatment aims to prevent cardiac injury or to halt the progression of structural remodeling if damage is already evident, and subsequently to delay the onset of symptomatic heart failure[1,7]. In clinical practice, to avoid mortality among affected individuals, the foundation of HF management is to identify the stage of signs and symptoms for the initiation of pharmacological therapies with proven benefits[1,2,5,6].

Despite technical advances in the management of HF cases, the syndrome undeniably affects a significant portion of the global population; one in five people worldwide will develop the condition, particularly in old age[5]. This cardiovascular disease is considered severe, affecting over 26 million people worldwide, with 2 million new cases diagnosed annually[2,5].

The national scenario is worrying, as HF is the leading cause of hospitalization due to cardiovascular disease in the country and presents a high risk of death and non-fatal adverse cardiovascular events when left untreated. In 2012, nearly 27,000 Brazilian cases of heart failure resulted in death, and more than one million patients were hospitalized due to circulatory system diseases, with HF accounting for 21% of all hospitalizations[3]. Additionally, the incidence is approximately 240,000 new cases per year, with a prevalence of 2 million people living with the disease.

Under these circumstances, in a country with continental dimensions, heart failure stands out as one of the leading causes of mortality, with a high incidence in the population and a negative impact on quality of life. These factors together generate healthcare expenditures of approximately 3 billion reais[3].

The situation is further aggravated by precarious healthcare services, with significant disparities in quality across different regions. Moreover, poor individual, economic, and social indicators contribute to increased patient mortality, which calls for a more critical look at the regional characteristics of these deaths[8,9]. It is important to highlight the influence of the social determinants of health on the epidemiology of the disease, helping to understand why certain populations are more severely affected by the manifestations of HF[10].

When dividing the country into its Brazilian macro-regions, a significant difference in mortality rates becomes evident, particularly in the Northeast region, which has a low Human Development Index (HDI) and where the current trend is an increase in mortality rates due to social, educational, or economic factors[8,11]. Therefore, it is essential to evaluate heart failure mortality in Bahia—a state of great relevance within this region—and its repercussions, especially in relation to individuals' biological or sociodemographic characteristics such as age group, sex, and macro-region of residence. This more specific spatial analysis is fundamental, as healthcare services such as Primary Care could better organize urgent demands within their territories. Consequently, necessary governmental investments could be more effectively directed to priority areas and population groups, allowing for the planning of targeted interventions to reduce deaths[3,4,8,11].

Thus, the objective of this study is to analyze the profile of deaths from heart failure in the state of Bahia from 2013 to 2022.

2. Method

This is a descriptive observational time series study.

The study was conducted in the state of Bahia, located in the Northeast region of Brazil and one of the country's 27 federative units. It has a territorial area of 564,760.429 km², bordering the states of Tocantins, Piauí, Pernambuco, Sergipe, Alagoas, Espírito Santo, Minas Gerais, and Goiás. According to the 2022 census, its population is 14,141,626 people distributed across 417 municipalities, making it the fourth most populous state in Brazil, with a demographic density of 25.04 inhabitants/km² [12]. Its Human Development Index (HDI) is 0.691, which is classified as medium, indicating a population with unsatisfactory conditions, especially in education, income, and health.

For data collection purposes, one of the ways of dividing Bahia, which was adopted in this study, is its division into nine macro-regions: Central-East, Central-North, Extreme South, East, Northeast, North, West, Southwest, and South. The study period comprised the last 10 years for which data were available, from January 2013 to December 2022.

Mortality data were obtained from the Mortality Information System (SIM), a national epidemiological surveillance system that compiles data on deaths occurring in the country[13]. The system's entry document is the standardized Death Certificate (DC), used throughout the national territory.

The study population consisted of individuals whose underlying cause of death was declared as heart failure (International Classification of Diseases, 10th Revision – ICD-10: I50) in the state of Bahia between 2013 and 2022.

To collect data on deaths, the SIM was accessed through the Bahia State Health Secretariat website[14]. The "Health Information" tab was selected, and filters were applied for general mortality within the defined study period.

For each variable under study, a line was assigned in the data table; the columns corresponded to the variable "year of death," and deaths classified as heart failure (ICD – I50) were selected. Data were collected for the period from January 2013 to December 2022.

For this study, only deaths in individuals aged over 20 years were selected, as the frequency of deaths from heart failure in younger age groups is very low and could bias the results.

The study variables included: number of deaths, Bahia's macro-regions (East, Central-East, Northeast, North, Central-North, West, Southwest, South, and Extreme South), age group (20–29; 30–39; 40–49; 50–59; 60–69; 70–79; and 80+ years), sex (male and female), race/skin color (white, black, yellow, brown, or indigenous), education level (none, 1 to 3 years, 4 to 7 years, 8 to 11 years, 12 years or more), and marital status (single, married, widowed, legally separated, or other).

The database was created using Microsoft Excel® spreadsheet. Categorical variables were presented in absolute and relative numbers using proportion calculations. The mortality rate was calculated by dividing the number of deaths by place of residence per year (numerator) by the exposed population in the same year (denominator), with the result multiplied by 100,000. The same calculation was performed considering sex and age group. Data were consolidated and presented in tables and charts.

This study used only anonymous secondary data that are publicly accessible; therefore, submission to a Research Ethics Committee was not required, in accordance with Resolution 466/2012 of the Brazilian National Health Council[15]. Nevertheless, the researchers involved adhered to ethical principles, ensuring the accuracy of the data and results obtained.

3. Results

During the period analyzed, from 2013 to 2022, a total of 18,990 deaths due to heart failure (HF) were recorded in the state of Bahia. The year 2022 registered the highest number of deaths, with 1,992 (10.5%), while 2017 had the lowest count, with 1,786 deaths (9.4%). Over the time series, there was a 6.4% increase in the number of deaths due to HF, rising from 1,872 in 2013 to 1,992 in 2022. In the last year of the series, deaths accounted for 10.5% of the total (Table 1).

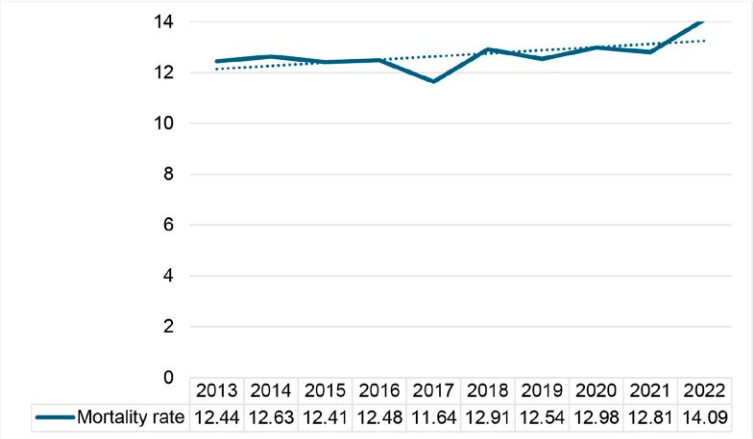
Table 1. Number, proportional distribution of deaths, and mortality rate due to heart failure by year. Bahia, 2013–2022

Year	N	%	Mortality rate *
2013	1,872	9.7%	12.4
2014	1,911	10.1%	12.6
2015	1,887	9.9%	12.4
2016	1,907	10.0%	12.5
2017	1,786	9.4%	11.6
2018	1,913	10.1%	12.9
2019	1,865	9.8%	12.5
2020	1,938	10.2%	13.0
2021	1,919	10.1%	12.8
2022	1,992	10.5%	14.1
Total	18,990	100.0	-

*Per 100,000 inhabitants
Source: SESAB/SUVISA/DIVEP/ Mortality Information System– SIM.

An analysis of the mortality rate from HF in Bahia over the study period showed an upward trend across the 10 years. In 2013, the risk of death from HF was 12.4 deaths per 100,000 inhabitants; by 2022, the final year of the series, this had increased to 14.1 deaths per 100,000, which suggests an increase in the risk of dying from HF (Graphic 1).

Graphic 1. Mortality rate (×10⁵) from Heart Failure by year. Bahia, 2013–2022



Source: SESAB/SUVISA/DIVEP/ Mortality Information System – SIM.

In Bahia, most deaths from heart failure during the study period occurred in males (51.4%). Regarding age group distribution, the highest number of deaths occurred among individuals aged 80 years or older (44.0%), followed by the 70–79 age group (24.2%). The lowest number of deaths was observed in the 20–29 age group (0.9%), followed by the 30–39 group (1.8%). As for race/skin color, most deaths occurred among individuals identifying as brown (61.4%), followed by white individuals (19.9%) (Table 2).

It was also found that most deaths occurred among married individuals (28.4%), followed by widowed individuals (25.3%). Regarding education level, individuals with no formal education accounted for the highest number of deaths (33.8%). In addition, with respect to education, the second highest frequency of deaths was found (24.2%). By macro-region of residence, the Eastern region had the highest number of records (25.3%), followed by the Central-Eastern region (15.7%) (Table 2).

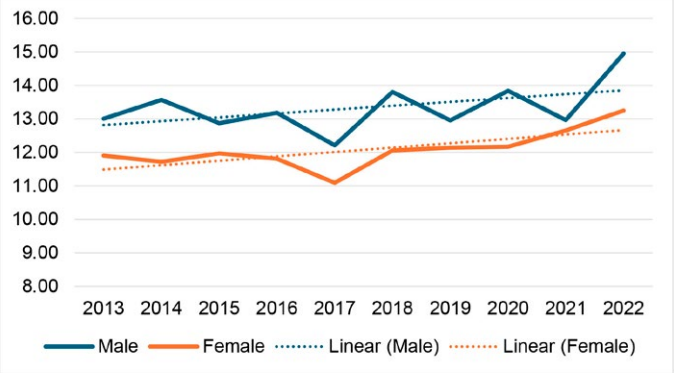
Table 2. Number and percentage distribution of deaths due to heart failure by age group, gender, race/skin color, marital status, education, and macro-region of residence. Bahia, 2013–2022

Variable	N	%
Age group (N = 18,852)		
20 to 29 years	173	0.9
30 to 39 years	340	1.8
40 to 49 years	848	4.5
50 to 59 years	1,700	9.0
60 to 69 years	2,952	15.7
70 to 79 years	4,552	24.2
80 years and over	8,287	44.0
Gender (N = 18,987)		
Male	9,752	51.4
Female	9,235	48.6
Race/Color (N = 17,650)		
White	3,519	19.9
Black	3,185	18.1
Yellow	66	0.4
Brown	10,834	61.4
Indigenous	46	0.3
Marital Status (N = 18,990)		
Single	4,564	24.0
Married	5,392	28.4
Widowed	4,810	25.3
Legally separated	494	2.6
Other	808	4.3
Ignored	2,922	15.4
Education (N = 18,990)		
Nenhuma	6,413	33.8
1 to 3 years	4,313	22.7
4 to 7 years	2,116	11.1
8 to 11 years	1,284	6.8
12 years and over	269	1.4
Ignored	4,595	24.2
Macro-region (N = 18,967)		
South	2,733	14.4
Southwest	2,545	13.4
West	1,115	5.9
North	1,245	6.6
Northeast	1,097	5.8
East	4,799	25.3
Far South	1,118	5.9
Central East	2,985	15.7
Centro North	1,330	7.0

Source: SESAB/MS/SVS/CGIAE –Mortality Information System – SIM.

The mortality rate by gender revealed that the risk of dying from heart failure in Bahia was higher for males throughout the study period. In 2013, the risk was 13.0 deaths per 100,000 men; by 2022, this had increased to 14.95 per 100,000. Among women, the risk rose from 11.9 deaths per 100,000 in 2013 to 13.3 per 100,000 in 2022. Despite these differences, both genders showed an upward trend in mortality rates (Graphic 2).

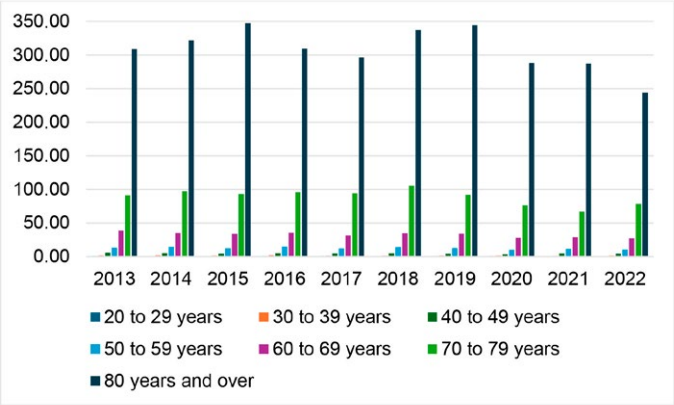
Graphic 2. Mortality rate (×10⁵) from Heart Failure by gender and year of death. Bahia, 2013–2022



Source: IBGE, DATASUS, Ministério da Saúde – MS, SESAB/ SUVISA/ DIVEP/ GT Demografia.

In 2013, at the beginning of the time series, the age group of 80 years and over had the highest risk of death (309.0 per 100,000 inhabitants), followed by the 70–79 age group (91.3 per 100,000). In 2022, this same age group remained at the top, with a mortality rate of 243.8 per 100,000 inhabitants, again followed by the 70–79 group (78.7 per 100,000). Thus, these two age groups presented the highest mortality rates both at the start and end of the study period, with a clear proportional increase in mortality with advancing age (Graphic 3).

Graphic 3. Mortality rate (×10⁵) from Heart Failure by year of death and age group. Bahia, 2013–2022



Source: IBGE, DATASUS, Ministério da Saúde – MS, SESAB/ SUVISA/ DIVEP/ GT Demografia.

4. Discussion

This study aimed to analyze the profile of deaths due to heart failure in the state of Bahia from 2013 to 2022. Additionally, it sought to characterize these deaths according to biological and sociodemographic variables and to estimate mortality rates by year, sex, and age group. Over the analyzed period, a 6.41% increase was observed in the heart failure mortality rate between the first and last year of the time series.

A study on heart failure mortality trends in Brazil from 1998 to 2019 showed a decreasing trend in the number of deaths in the Northeast region, unlike the South, Southeast, Central-West, and North regions, which had increasing trends. However, the North and Northeast still showed the lowest mortality rates during the study years[11]. Likewise, a study by Santos et al. reported a reduction in mortality rates across all Brazilian federative units from 2009 to 2018[16]. This heterogeneous rise in mortality may be explained by disparities in infrastructure and the lack of healthcare resources across regions, which affect access to services, adoption of health promotion strategies, and proper health management[11].

A study carried out in 2022 showed that social and structural disparities in Brazil are so pronounced that they can vary even within a single city, between municipalities in the same state, and among states within the same region. This inequality aggravates unequal access to the healthcare system[8]. In this context, managing one's health becomes more difficult in underprivileged regions due to a shortage of hospitals and limited availability of services, hindering disease diagnosis and treatment. Unaware of their condition, many people may see their clinical status worsen and ultimately die, which helps explain the rising mortality rates[8,11].

When the difference in mortality rates by sex was analyzed in this study, it was possible to see that men had a higher mortality rate throughout the entire period analyzed, and therefore a higher risk of death compared to women. The study Trends in mortality due to heart failure in Brazil: 1998 to 2019 found similar results, indicating a higher mortality rate in men. However, it showed a difference in the proportion of deaths, which was higher in women[11].

Regarding the higher male mortality rate, several contributing factors can be inferred, such as worse prognoses in men with heart disease and their lower tendency to seek regular healthcare[3,11].

This makes diagnosis more difficult among men, as ongoing clinical monitoring is needed to evaluate signs and symptoms and understand the progression of the disease. Consequently, these individuals may forgo treatment or fail to follow medical recommendations, lacking consistent follow-up, which can aggravate the condition and increase the likelihood of death[3,8,11].

This study also found that the highest proportion of heart failure deaths in Bahia occurred among individuals identifying as brown. A Brazilian study on the epidemiological profile of hospitalizations due to HF over the past five years similarly showed that most cases involved self-declared brown individuals[17].

There are no definitive explanations yet for the significant differences in mortality between groups — particularly among brown individuals — but international studies have shown that the prevalence of risk factors for HF, such as hypertension, diabetes, and cerebrovascular disease, is higher among Black populations, which could contribute to more complications and, consequently, higher mortality[18,19].

However, a U.S. study found that Black individuals had lower in-hospital mortality compared to white patients[19,20]. In Brazil, and particularly in Bahia, census data from 2022 show that most of the population self-identifies as brown (59.8%)[12]. While the pathophysiological impacts of race/color on the development of HF remain unclear, the higher number of brown individuals in the population increases the likelihood of deaths occurring within this group[8].

The age group with the highest proportion of deaths was 80 years or older, which also presented the highest mortality risk at both the beginning and end of the study period. The study by Arruda et al. found that the HF mortality rate increased with age in all Brazilian regions and was concentrated among individuals aged 80 and above[11].

Despite regional differences, both studies align in demonstrating an increased risk of death among individuals aged over 80. This suggests that aging and the rising life expectancy of the Brazilian population contribute to the elevated mortality rates among the elderly. These people, having already lived for many years, can be considered more fragile due to the onset of illnesses and are more subject to the presence of various comorbidities that facilitate the development of HF, such as high blood pressure, dyslipidemia, smoking, among others[3,11].

Moreover, the "I Brazilian Heart Failure Registry" found that elderly individuals often do not use HF medications correctly, making them more vulnerable to complications from the disease. By not adhering to medical recommendations, they present a higher risk of death. It is important to emphasize that many of the medications mentioned are evidence-based for reducing HF mortality and could potentially increase survival[1,3]. This reinforces the idea that challenges in continuing treatment may worsen the clinical condition and ultimately lead to death[11,21].

Regarding education level, this study showed that most heart failure deaths occurred among individuals with no schooling. A study on self-care and HF-related hospitalizations found that patients with lower educational levels were more frequently hospitalized. This can be explained by a lack of understanding about the disease, which impairs recognition of signs and symptoms. Consequently, treatment adherence is inadequate from the outset, increasing the risk of complications and adverse cardiac events[22].

The previously mentioned study by Albuquerque et al. supports this notion, having identified poor medication adherence as the main cause of HF decompensation[3]. Without prior understanding, many individuals may lose interest in their own health and neglect self-care[22,23].

When analyzing deaths by macro-region residence, the Eastern region of Bahia had the highest number of deaths, followed by the Central-Eastern region. This may be due to the fact that these two regions have the largest population among the state's regional clusters, thus increasing the likelihood of more deaths occurring[24]. Similarly, other cardiovascular diseases, such as systemic arterial hypertension and acute myocardial infarction—which are also HF risk factors—showed high death proportions in the Eastern and Central-Eastern macro-regions, mirroring the pattern observed in HF[25].

Given the high mortality associated with heart failure, it is essential to consider alternatives for reducing its burden. In the Brazilian context, Primary Care plays an undeniably critical role in promoting health for a large portion of the population, especially in Bahia. This branch of the Unified Health System (SUS) aims to provide comprehensive care through health education practices[26,27].

In the context of cardiovascular disease, the presence of a multidisciplinary Primary Care team—including cardiologists, nurses, physical therapists, and nutritionists—plays a key role in secondary prevention. Specifically, physicians provide pharmacological treatment; nurses manage patient guidance; physiotherapists offer cardiac rehabilitation, improving functional capacity; and nutritionists oversee dietary plans, focusing on fluid and sodium restrictions. Continuous, multidisciplinary follow-up improves therapeutic adherence and symptom control, helping to prevent disease decompensation, hospitalization, and ultimately, death[28].

Regarding study limitations, it is important to acknowledge the use of secondary data from the Mortality Information System (SIM), which, although officially recognized, may contain misclassification biases for the underlying cause of death—often due to errors in completing death certificates[13]. Furthermore, it was difficult to ensure the quality of data for variables such as education and marital status due to a high proportion of missing information. Nevertheless, SIM is a high-coverage epidemiological surveillance system nationwide and is essential for organizing and planning public health policies. Therefore, the results presented in this study robustly reflect the situation of heart failure mortality in Bahia and can help guide policies aimed at reducing mortality from this cause.

5. Conclusion

This study concludes that heart failure represents a significant public health issue due to its high mortality rate among the population of Bahia. In this context, the profile of deaths from heart failure in the state between 2013 and 2022 was predominantly composed of brown-skinned men over the age of 80, mostly residing in the Eastern macro-region, married, and with low levels of education. Furthermore, the risk of dying from heart failure increased over the years and followed a consistent pattern higher among males and individuals aged over 80.

Therefore, the findings of this study may prove useful and relevant for healthcare services and public health authorities in guiding further investments and research on heart failure, as well as in implementing health promotion policies and strategies aimed at preventing the disease's risk factors.

Author contributions

The authors declare that they made substantial contributions to the work in terms of the conception or design of the research; acquisition, analysis, or interpretation of data; and drafting or critical revision of the manuscript for important intellectual content. All authors approved the final version to be published and agreed to take public responsibility for all aspects of the study.

Competing interests

No financial, legal, or political conflicts involving third parties (government, private companies and foundations, etc.) have been declared for any aspect of the submitted work (including but not limited to grants and funding, advisory board membership, study design, manuscript preparation, statistical analysis, etc.).

Indexers

The Journal of Contemporary Nursing is indexed in DOAJ and EBSCO.

References

1. Rohde LEP, Montera MW, Bocchi EA, Clausell NO, Albuquerque DC, Rassi S, et al. Diretriz brasileira de insuficiência cardíaca crônica e aguda. Arq Bras Cardiol [Internet]. 2018;111(3):436–539. Erratum in: Arq Bras Cardiol. 2019;112(1):116. https://doi.org/10.5935/abc.20180190

2. Rogers JG, O'Connor CM. Heart failure: pathophysiology and diagnosis. In: Goldman L, Schafer AI, editors. Goldman-Cecil Medicine. 26th ed. Rio de Janeiro: Guanabara Koogan; 2022. p. 306–14.

3. Albuquerque DC, Neto JD S, Bacal F, Rohde LEP, Bernardez-Pereira S, Berwanger O, et al. I Brazilian registry of heart failure - Clinical aspects, care quality and hospitalization outcomes. Arq Bras Cardiol [Internet]. 2015;104(6):433–42. Erratum in: Arq Bras Cardiol. 2015;105(3):208. https://doi.org/10.5935/abc.20150031

4. Nogueira PR, Rassi S, Corrêa KS. Epidemiological, clinical, and therapeutic profile of heart failure in a tertiary hospital. Arq Bras Cardiol [Internet]. 2010;95(3):392–8. https://doi.org/10.1590/S0066-782X2010005000102

5. McMurray JJ, Pfeffer MA. Heart failure. Lancet [Internet]. 2005;365(9474):1877–89. https://doi.org/10.1016/S0140-6736(05)66621-4

6. McMurray JJV, Pfeffer MA. Heart failure: management and prognosis. In: Goldman L, Schafer AI, editors. Goldman-Cecil Medicine. 26th ed. Rio de Janeiro: Guanabara Koogan; 2022. p. 314–31.

7. Marcondes-Braga FG, Moura LAZ, Issa VS, Vieira JL, Rohde LE, Simões MV, et al. Emerging topics update of the brazilian heart failure guideline – 2021. Arq Bras Cardiol [Internet]. 2021;116(6):1174-212. https://doi.org/10.36660/abc.20210367

8. Cestari VRF, Garces TS, Sousa GJB, Maranhão TA, Neto JDS, Pereira MLD, et al. Spatial distribution of mortality for heart failure in Brazil, 1996–2017. Arq Bras Cardiol [Internet]. 2022;118(1):41–51. https://doi.org/10.36660/abc.20201325

9. Gaui EN, Klein CH, Oliveira GMM. Mortality due to heart failure: extended analysis and temporal trend in three states of Brazil. Arq Bras Cardiol [Internet]. 2010;94(1):55-61. https://doi.org/10.1590/S0066-782X2010000100010

10. Albuquerque NLS, Oliveira FJG, Machado LD, Araujo TL, Caetano JA, Aquino PS. Social determinants of health and heart failure hospitalizations in Brazil. Rev Esc Enferm USP [Internet]. 2020;54:e03641. https://doi.org/10.1590/S1980-220X2019002503641

11. Arruda VL, Machado LMG, Lima JC, Silva PRS. Trends in mortality from heart failure in Brazil: 1998 to 2019. Rev Bras Epidemiol [Internet]. 2022;25:e220021. https://doi.org/10.1590/1980-549720220021.2

12. Instituto Brasileiro de Geografia e Estatística (IBGE). Panorama censo 2022 [Internet]. [cited 2024 Sept. 28]. Available from: https://censo2022.ibge.gov.br/panorama/

13. Secretaria da Saúde do Estado da Bahia. Sistema de Informação sobre Mortalidade (SIM) [Internet]. 2022 [cited 2024 Sept. 28]. Available from: https://www.saude.ba.gov.br/suvisa/vigilancia-epidemiologica/sistema-de-informacoes-sobre-mortalidade-sim/

14. Secretaria da Saúde do Estado da Bahia. Vigilância Epidemiológica [Internet]. 2025 [cited 2024 Sept. 28]. Available from: https://www.saude.ba.gov.br/suvisa/vigilancia-epidemiologica/

15. Resolução nº 466, de 12 de dezembro de 2012 (Brazil). Dispõe sobre as diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos. Ministério da Saúde; Conselho Nacional de Saúde; 2012. Available from: https://bvsms.saude.gov.br/bvs/saudelegis/cns/2013/res0466_12_12_2012.html

16. Santos SC, Villela PB, de Oliveira GMM. Mortality due to heart failure and socioeconomic development in Brazil between 1980 and 2018. Arq Bras Cardiol [Internet]. 2021;117(5):944–51. https://doi.org/10.36660/abc.20200902

17. Soares FL, Junqueira MB, Silva DG, Sampaio KRF, Braz JPMR, GRPT, et al. Epidemiological profile of hospitalizations due to heart failure in Brazil between 2019 and 2023. Braz J Implantol Health Sci [Internet]. 2024;6(4):887–96. https://doi.org/10.36557/2674-8169.2024v6n4p887-896

18. Oliveira GMM, Brant LCC, Polanczyk CA, Malta DC, Biolo A, Nascimento BR, et al. Cardiovascular Statistics - Brazil 2023. Arq Bras Cardiol [Internet]. 2024;121(2):e20240079. https://doi.org/10.36660/abc.20240079

19. Goyal P, Paul T, Almarzooq ZI, Peterson JC, Krishnan U, Swaminathan RV, et al. Sex- and race-related differences in characteristics and outcomes of hospitalizations for heart failure with preserved ejection fraction. J Am Heart Assoc [Internet]. 2017;6(4):e003330. https://doi.org/10.1161/JAHA.116.003330

20. Shan J, Zhang L, Holmes AA, Taub CC. The Impact of Race on the Prognosis of Preclinical Diastolic Dysfunction: A Large Multiracial Urban Population Study. Am J Med [Internet]. 2016;129(2): 222.e1-10. https://doi.org/10.1016/j.amjmed.2015.08.036

21. Fernandes ADF, Fernandes GC, Mazza MR, Knijnik LM, Fernandes GS, Vilela AT, et al. A 10-year trend analysis of heart failure in the less developed brazil. Arq Bras Cardiol [Internet]. 2020;114(2):222–31. https://doi.org/10.36660/abc.20180321

22. Linn AC, Azzollin K, Souza EN. Association between self-care and hospital readmissions of patients with heart failure. Rev Bras Enferm [Internet]. 2016;69(3):500–6. https://doi.org/10.1590/0034-7167.2016690312i

23. Arrigo M, Jessup M, Mullens W, Reza N, Shah AM, Sliwa K, et al. Acute heart failure. Nat Rev Dis Primers [Internet]. 2020;6(16). https://doi.org/10.1038/s41572-020-0151-7

24. Decreto nº 16.075, 14 de maio de 2015. Define o âmbito de atuação territorial dos Núcleos Regionais de Saúde, instituídos pela Lei nº 13.204, de 11 de dezembro de 2014, e dá outras providências. Diário Oficial do Estado da Bahia [Internet]. 2015. Available from: https://www.legislabahia.ba.gov.br/documentos/decreto-no-16075-de-14-de-maio-de-2015#

25. Plano Estadual de Saúde (PES) 2024-2027 [Internet]. [cited 2024 Sep 28]. Available from: https://www.saude.ba.gov.br/wp-content/uploads/2024/02/PLANO-ESTADUAL-DE-SAUDE-2024-2027-21.12.23.pdf

26. Mendes EV. O cuidado das condições crônicas na atenção primária à saúde: o imperativo da consolidação da estratégia da saúde da família [Internet]. Brasília: Organização Pan-Americana da Saúde; 2012. 512 p. Available from: https://bvsms.saude.gov.br/bvs/publicacoes/cuidado_condicoes_atencao_primaria_saude.pdf

27. Barreto ACO, Rebouças CB A, Aguiar MIF, Barbosa RB, Rocha SR, Cordeiro LM, et al. Perception of the Primary Care multiprofessional team on health education. Rev Bras Enferm [Internet]. 2019;72:266–73. http://dx.doi.org/10.1590/0034-7167-2017-0702

28. Santos LN, Souza AKS, Canguçu AJL, Fernandes GC, Gregory GG, Galli GYA, et al. Manejo multidisciplinar da insuficiência cardíaca: integração de abordagens clínicas, nutricionais e de reabilitação para melhoria do prognóstico. CLCS [Internet]. 2025;18(3):e16048. https://doi.org/10.55905/revconv.18n.3-048