

## CHARACTERIZATION OF THE EPIDEMIOLOGICAL PROFILE OF MORTALITY FROM CARDIOVASCULAR DISEASES IN SOBRAL- CE FROM 2015 TO 2020

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**Abstract:** **Introduction:** Global epidemiological transitions resulted in medical and social advances that led to gradual control of infectious diseases. The process of this transition consolidated chronic non-communicable diseases (NCDs) as the main causes of global mortality, and, among NCDs, cardiovascular diseases (CVD) became the main causes of death in the world.

**Objectives:** To evaluate the epidemiological profile of mortality from cardiovascular diseases, from 2015 to 2020, in Sobral – CE.

**Methodology:** This is an epidemiological and quantitative study, in which a survey of data on CVD mortality was carried out in the city of Sobral, CE, with the data collection period from: January 2015 to December 2020. The data were obtained through access to the Brazilian Civil Registry Office Information System. The following variables were studied: gender, age group, education and race.

**Results and Discussion:** There were 3184 deaths from CVD, 1705 of which were male and 1479 female. The most affected age group was “over 80 years” with 928 deaths, corresponding to 29.15% of the mortality rate. Followed by the age group “70 to 79 years”, with a total of 862 deaths, which corresponds to 27.07%. There were also 1,273 deaths in people with no education, which corresponds to 40% of the mortality rate. In people with 1 to 3 years of schooling, there were 829 deaths (26%). According to race, there is a greater predominance of deaths among brown people, with a total of 2602 deaths, which represents 81.72% of the mortality rate. **Conclusion:** It can be concluded that men, over 80 years old, with low education and of mixed race, represent the profile with the highest number of deaths from cardiovascular disease in the city of Sobral - CE.

**Keywords:** Chronic non-communicable diseases. Cardiovascular diseases. Mortality Profile.

## INTRODUCTION

Social changes in the world resulted in an epidemiological transition, through population migration to cities, related to medical and social advances that led to gradual control of infectious diseases, such as the creation of vaccines and improvements in basic sanitation. The epidemiological transition process consolidated chronic non-communicable diseases (NCDs) as the main causes of global mortality, and among NCDs, cardiovascular diseases (CVD) contributed to this increase in mortality (ROTH, 2018).

With these changes, CVDs have become the main causes of death in the world, although they are not yet in many low- and middle-income countries, where the epidemiological transition occurred later (WHO, 2020). Furthermore, the control of infectious and maternal and child diseases, the increase in life expectancy, the growing rate of urbanization and the severity of CVDs tend to increase, especially in low- and middle-income countries (NASCIMENTO, 2018).

In Brazil, in accordance with global changes, there was, in the 1960s, a major epidemiological change, in which chronic diseases began to present higher mortality rates than infectious diseases and nutritional deficiencies (RIBEIRO, 2016). This change was due to urbanization, the implementation of basic sanitation, the more effective immunization system and the economic growth that the country experienced in the same period, which contributed to this epidemiological transition. In addition to these changes in urbanization, globalization caused changes in lifestyle habits, such as greater caloric intake and sedentary lifestyle, which also favored the increase in CVD (RIBEIRO, 2016).

Low socioeconomic level is linked to a higher prevalence of cardiovascular risk factors and reduced survival (LOTUFO,

2017). In a country like Brazil, which provides significant social inequality, the decrease in mortality is observed in people who live in richer regions when correlated with those in poorer regions (RIBEIRO, 2016).

The term CVD is defined as a range of disorders that affect the heart and blood vessels (MACENO LK; GARCIA M dos S, 2022). The main reasons for death from CVD are: rheumatic heart disease, ischemic heart disease, cerebrovascular disease, hypertensive heart disease, cardiomyopathy and myocarditis, atrial fibrillation and flutter, aortic aneurysm, peripheral vascular disease, endocarditis, heart failure and pulmonary embolism (OLIVEIRA, 2020).

CVDs were responsible for 28.21% of Brazilian deaths in 2019, constituting a problem of great importance for public health. Among them, ischemic heart disease (12.14%) and cerebrovascular disease (9.28%) were, respectively, the first and second causes of death in Brazil. There was an increase in the death rate from CVD between 1990 and 2019, from 181.22 deaths per 100 thousand inhabitants to 183.69 per 100 thousand, with greater increases occurring in the age group over 50 years. When evaluating disability-adjusted years of life lost, CVDs are considered the main causes for all ages, with a rate of 4,089.91 per 100,000 in 2019. The rate of years lived with disability increased significantly between the 1990s and 2019, going from 248.56 to 337.47 per 100 thousand inhabitants (IHME, 2019).

There are several widely recognized risk factors for the development of CVD, such as: systemic arterial hypertension, hyperlipidemia, obesity, physical inactivity, diabetes, high smoking status and family history. Furthermore, other factors may explain the discrepancies in the incidence of CVD between populations over time, such as: sociodemographic, ethnic, cultural, dietary

factors and behavioral habits. (PRÉCOMA, 2019).

Cases of CVD are a Public Health issue in the world and in Brazil, therefore it is necessary to implement health policies, including encouraging healthy lifestyle habits, access to measures for primary and secondary prevention of CVD, as It is still neglected by the population and the government.

Therefore, it is important to carry out studies on the topic to outline the epidemiological profile of mortality due to these adversities in the state of Ceará, with the aim of making contributions to action planning, as it will help in taking preventive measures for CVD. Therefore, the lack of awareness among public managers and the population about a disease that is today the main cause of death in the world was the factor that motivated the production of this work. The objective of this work is to evaluate the epidemiological profile of mortality from cardiovascular diseases, from 2015 to 2020, in Sobral, Ceará.

## METHODOLOGY

The present study consists of an ecological epidemiological study, with a quantitative approach, of a descriptive type, as a data collection was carried out through the Information System of the Civil Registry Offices of Brazil, which have records on mortality due to ICD- 10, focusing research on mortality from cardiovascular diseases in the city of Sobral, in Ceará.

They were considered as cases of deaths due to heart disease, in the period from January 2015 to December 2020. The inclusion criteria were: cases of deaths with ICD-10 of cardiovascular diseases, which were added to the system by the death certificate, having any age group, sex, level of education and ethnic group. The exclusion criteria were: not including the ICD-10 of cardiovascular diseases as the reason for death.

Regarding ethical aspects, the present study, as it is a characterization of the epidemiological profile based on secondary data, was not submitted to evaluation by the Research Ethics Committee, in accordance with Resolution 510/16 of the National Health Council (CNS), however, all established ethical precepts were respected with regard to ensuring the legitimacy of information, privacy and confidentiality of information, when necessary, making the results of this research public.

## RESULTS AND DISCUSSION

Data collected from the Brazilian Civil Registry Office Information System, through the Notifiable Diseases Information System platform, revealed that there were 3184 deaths due to cardiovascular diseases in the state of Ceará, 1705 of which were male and 1479 female, during the period from 2015 to 2020, with data for the years 2021 and 2022 being absent from the platform.

In Table 1, you can see the profile of deaths due to heart disease organized by age group. It is clear that there is an increase in deaths as age increases, showing that the population in the “70 to 79 years” range presented 862 (27.07%) and the population in the “80 years and over” age group presented 928 (29.15%) deaths, presenting the highest mortality rates.

Death from cardiovascular diseases in people over 60 years old corresponds to 76.48%, in line with the results of Kelly-Hayes 2010, which reports that aging is the non-modifiable risk factor most intensely linked to the occurrence of CVD, mainly stroke.

In addition to the data obtained by age group, data relating to education (length of study) were collected, which were shown in Table 2. The statistical data allow us to confirm that lower educational levels have a higher prevalence of deaths due to heart disease, with the population with no education has

the highest mortality, being affected by 1273 (40%) of the total, followed by the population with 1 to 3 years of education, with 829 (26%) of deaths and 4 to 7 years of education, with 287 (9 %) of deaths.

The data also allows us to establish a possible relationship with a decrease in cardiovascular diseases in people with greater education, since higher levels of education are related to higher socioeconomic levels, as greater purchasing power allows for greater educational access, in addition to greater access to healthcare. quality, enabling a reduction in death rates from heart disease. In this context, Lotufo, 2017 reports that low socioeconomic level is associated with a higher prevalence of cardiovascular risk factors and worse survival.

Data relating to ethnic factors, shown in Table 3, were analyzed, in which there was a huge discrepancy between the mixed-race population and the others. This ethnic group accounted for 2602 (81.72%) of the deaths in the period analyzed, followed by the white population, which accounted for 161 (5.06%) of the deaths.

Thus, it is clear to assess that the ethnic group most affected by heart disease in Sobral are brown people, followed by white, black, yellow and indigenous people. Furthermore, 391 individuals (12.28%) had their ethnicity ignored.

In Silva's 2022 study on the categorization of cardiovascular diseases in Brazil, there was a different result, with a greater predominance in white individuals, with a higher percentage in 2016, with 190,358 (52.57%), followed by brown individuals, black, ignored, yellow and indigenous, but there is a decrease in the death rate among white people.

## CONCLUSIONS

The ecological epidemiological study presented made it possible to evaluate the epidemiological profile of deaths due to the occurrence of cardiovascular diseases in the city of Sobral, in the period from 2015 to 2020, having as a limiting factor the absence of data referring to the years 2021 and 2022, possibly due to a underreporting during the pandemic period, allowing the identification of the main affected groups, which were separated by: sex, ethnicity, education and age group. Studies of this type allow for greater planning by local health teams, as efforts can be directed to population segments with the highest incidence of deaths from heart disease.

From the results, it can be inferred that possible relationships with the higher incidence in males are due to the lower demand for health services, when compared to females, which leads to the development of heart diseases, often associated with lifestyle.

Furthermore, it is possible to infer a relationship between the highest deaths due to heart disease being among the population without any education, as the lack of information about heart diseases, as well as their aggravating factors and the need to seek specialized help favor cardiovascular deaths.

Based on the above, it is necessary to implement health policies, including encouraging healthy lifestyle habits, access to measures for primary and secondary prevention of CVD, since heart disease is still largely neglected by the population. and by the government.



Ethnicity	N	%
White	161	5,056
Black	26	0,816
Brown	2602	81,72
Yellow	03	0,094
Indian	01	0,031
Without information	391	12,29
<b>TOTAL</b>	<b>3184</b>	<b>100,00</b>

**Table 1.** Mortality from cardiovascular diseases organized by ethnicity, in the city of Sobral, Ceará, from 2015 to 2020.

**Source: Own Authorship (2023).**

Education (Study Time)	N	%
No one	1273	39,981
1 to 3 years	829	26,036
4 to 7 years	287	09,013
8 to 11 years	234	07,350
12 years or over	99	03,110
Ignored	462	14,510
<b>TOTAL</b>	<b>3184</b>	<b>100,00</b>

**Table 2.** Mortality from cardiovascular diseases organized by education level (time studied), in the city of Sobral, Ceará, from 2015 to 2020.

**Source: Own Authorship (2023).**

Age	N	%
Less than one year	15	00,471
1 to 4 years	05	00,157
5 to 9 years	06	00,188
10 to 14 years	06	00,188
15 to 19 years	11	00,345
20 to 29 years	43	01,350
30 to 39 years	87	02,733
40 to 49 years	185	05,811
50 to 59 years	391	12,281
60 to 69 years	645	20,258
70 to 79 years	862	27,073
80 years or over	928	29,145
<b>TOTAL</b>	<b>3184</b>	<b>100,00</b>

**Table 3.** Mortality from cardiovascular diseases organized by age group, in the city of Sobral, Ceará, from 2015 to 2020.

**Source: Own Authorship (2023).**

Gender	N	%
Male	1705	53,548
Female	1479	46,452
<b>TOTAL</b>	<b>3184</b>	<b>100,00</b>

**Table 4.** Mortality from cardiovascular diseases organized by sex, in the city of Sobral, Ceará, from 2015 to 2020.

**Source: Own Authorship (2023).**

## REFERENCES

INSTITUTE FOR HEALTH METRICS AND EVALUATION. **GBD Compare [Internet]**. Healthdata.org. 2019. Available from: <https://vizhub.healthdata.org/gbd-compare/>

Kelly-Hayes M. **Influence of Age and Health Behaviors on Stroke Risk: Lessons from Longitudinal Studies**. Journal of the American Geriatrics Society [Internet]. 2010 Oct;58(2):S325–8. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3006180/>

LOTUFO, Paulo Andrade. **Cardiovascular secondary prevention in primary care setting: an immediate necessity in Brazil and worldwide**. Sao Paulo Medical Journal, v. 135, p. 411-412, 2017.

MACENO, Lindhisey Kianny; GARCIA, M. dos S. **Fatores de risco para o desenvolvimento de doenças cardiovasculares em jovens adultos/Risk factors for the development of cardiovascular diseases in young adults**. Brazilian Journal of Health Review, v. 5, n. 1, p. 2820-2842, 2022.

NASCIMENTO, Bruno Ramos et al. **Cardiovascular disease epidemiology in portuguese-speaking countries: data from the Global Burden of Disease, 1990 to 2016**. Arquivos brasileiros de cardiologia, v. 110, p. 500-511, 2018.

OLIVEIRA, Gláucia Maria Moraes de et al. **Cardiovascular statistics–brazil 2020**. Arquivos Brasileiros de Cardiologia, v. 115, p. 308-439, 2020.

PRECOMA, Dalton Bertolim et al. **Updated cardiovascular prevention guideline of the Brazilian Society of Cardiology-2019**. Arquivos brasileiros de cardiologia, v. 113, p. 787-891, 2019.

RIBEIRO, Antonio Luiz P. et al. **Cardiovascular health in Brazil: trends and perspectives**. Circulation, v. 133, n. 4, p. 422-433, 2016.

ROTH, Gregory A. et al. **Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the Global Burden of Disease Study 2017**. The Lancet, v. 392, n. 10159, p. 1736-1788, 2018.

Silva MVB da, Alves BV dos S, Sales M da S, Filho CA de L, Oliveira A da S, Barros GLP de, et al. **Caracterização do perfil epidemiológico da mortalidade por doenças cardiovasculares no Brasil: um estudo descritivo**. Enfermagem Brasil [Internet]. 2022 Apr 30;21(2):154–65. Available from: <https://convergenceseditorial.com.br/index.php/enfermagembrasil/article/view/5030>

World Health Organization, **Global action plan for the prevention and control of noncommunicable diseases**. Geneva, Switzerland, 2013.