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ARTIGO DE REVISÃO

HIGH INCIDENCE OF ACUTE MYOCARDIAL INFARCTION CASES IN BRAZIL, A STATISTICAL AND EPIDEMIOLOGICAL STUDY

Alta incidência de casos de infarto agudo do miocárdio no Brazil, um estudo estatístico e epidemiológico

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ABSTRACT

To analyze the prevalence and describe the epidemiological panorama of patients affected by acute myocardial infarction in Brazil. Methods: This is an observational, cross-sectional and descriptive study, carried out using epidemiological data collected from the Department of Information Technology of the Unified Health System (DATASUS), in the Mortality Information System (SIM) and Hospital Information System (SIH) subsections. Results: 4,382,252,951.84 cases of acute myocardial infarction were reported in Brazil from January 2011 to December 2021. Prevalence was higher in males (65.59%), aged between 60 and 69 years (32.11%) and white (45.4%). A total of 1,189,156 hospitalizations were identified, with the highest number in the Southeast region (49.9%), whites (40.22%) and a male-female ratio of approximately 1.74:1. In the SIM, the highest number of deaths was recorded in the Southeast region (46.33%), white race (52.88%) and age group of 80 years and over (26.39%) and male gender (59.1%). Conclusion: The profile of the patient most affected by acute myocardial infarction is male, white and between 60 and 69 years old. With regard to deaths, the highest prevalence is in the 80s, also with a predominance of the male and white population.

Keywords: Acute Myocardial Infarction, Brazil, Descriptive Epidemiology.

RESUMO

Analisar a prevalência e descrever o panorama epidemiológico dos pacientes acometidos por infarto agudo do miocárdio no Brasil. Métodos: Trata-se de um estudo observacional, transversal e descritivo, realizado com dados epidemiológicos coletados no Departamento de Informática do Sistema Único de Saúde (DATASUS), no Sistema de Informações sobre Mortalidade (SIM) e no Sistema de Informações Hospitalares (SIH). subseções. Resultados: Foram notificados 4.382.252.951,84 casos de infarto agudo do miocárdio no Brasil no período de janeiro de 2011 a dezembro de 2021. A prevalência foi maior em homens (65,59%), idade entre 60 e 69 anos (32,11%) e brancos (45,4%). Foram identificadas 1.189.156 internações, sendo o maior número na região Sudeste (49,9%), brancos (40,22%) e proporção homem-mulher de aproximadamente 1,74:1. No SIM, o maior número de óbitos foi registrado na região Sudeste (46,33%), raça branca (52,88%) e faixa etária de 80 anos ou mais (26,39%) e sexo masculino (59,1%). Conclusão: O perfil do paciente mais acometido pelo infarto agudo do miocárdio é do sexo masculino, branco e entre 60 e 69 anos. No que diz respeito aos óbitos, a maior prevalência ocorre na década de 80, também com predomínio da população masculina e branca.

Palavras-chave:: Infarto Agudo do Miocárdio, Brasil, Epidemiologia Descritiva.

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INTRODUCTION

Acute myocardial infarction (AMI) is the necrosis of part of the heart muscle. Its classification includes acute myocardial infarction without ST elevation (STEMI) and acute myocardial infarction with ST elevation (STEMI) [1].

STEMI is associated with partial occlusion of a coronary artery, generated by thrombi composed of platelets, while STEMI correlates with total occlusion of a coronary artery, caused by intact fibrin thrombi [2].

In addition, the angiographic absence of coronary stenosis of 50% or more leads to the diagnosis of myocardial infarction without obstructive coronary lesions (MINOCA) [3].

Although the treatment of AMI has improved considerably, it is still a worldwide disease with high morbidity and mortality [4].

The pathophysiology of AMI involves mechanisms of atherothrombosis due to instability of an atherosclerotic plaque and an imbalance between oxygen supply and demand for the heart muscle [5].

Occlusion occurs in the three epicardial coronary arteries (anterior descending, circumflex and right) and causes complications such as hemodynamic instability and cardiogenic shock [6].

In addition, when correlating etiological factors of AMI, there are genetic determinants involved in atherosclerosis, vascular injury and inflammatory processes, predisposing to the formation of plaques and thrombi [7].

Risk factors include age over 55 and 45 in men and women, respectively, smoking, dyslipidemia, diabetes mellitus (DM), early family history of cardiovascular disease and systemic arterial hypertension (SAH) [8].

Most patients with AMI present with retrosternal pain radiating to the jaw or left upper limb, which is triggered by physical exertion and relieved with nitrates or rest [9].

The clinical picture also includes signs of sweating, palpitations and vomiting. However, AMI can be masked by atypical symptoms such as syncope and dyspepsia in the elderly, women and patients with DM and heart failure (HF) [10].

Diagnosis is made by an increase or decrease in myocardial necrosis markers combined with the clinical picture or changes in the electrocardiogram (ECG) or imaging [11].

The progression of ischemia to myocardial necrosis depends on determinants such as the capacity of the collateral artery network, myocardial oxygen consumption and early reperfusion. In this context, time is intrinsically related to prognosis [12].

For this reason, an ECG should be performed within two minutes of the patient's arrival and should be read within ten minutes. In this way, treatment should also be quick and efficient [13].

In STEMI, treatment is based on pharmacological therapy with antiaggregants and anticoagulation, while in STEMI, percutaneous coronary intervention (PCI) or chemical thrombolysis is performed, depending on the timeline and contraindications of each patient [14].

Objectives and reasons for the study

The aim of this study is to present the epidemiology and statistics of acute myocardial infarction, outlining the epidemiological profile of the most affected patients. Since this is a frequent emergency illness in contemporary times, the research is justified because it is relevant to society, since by identifying risk factors and outlining the patterns and characteristics of the most prevalent affected patients, early recognition and treatment of AMI becomes possible, thus reducing morbidity and mortality.

METHODS

This is a cross-sectional, descriptive study analyzing epidemiological data. The data was obtained from the Database of the Department of Informatics of the Unified Health System (DATASUS), in the subsections of the Mortality Information System (SIM) and the Hospital Information System (SIH), from 2011 to 2021. The information used is available for public access and therefore did not require the approval of the Research Ethics Committee (REC), in accordance with CNS resolution 510 of April 7, 2016, article 1 and item III, which exempts research using information in the public domain in the Humanities and Social Sciences from registration with the REC.

The data collected from the SIM for acute myocardial infarction covered the period from January 2011 to December 2021, relating the variables "region", "color/race", "age group", "sex", "schooling", "marital status" and "place of occurrence", with the object of study being deaths confirmed by the International Classification of Diseases (ICD-10) group I21. In the SIH, the variables "sex", "race", "age group" and "number of hospitalizations" were analyzed in all cases and in the number of deaths from the pathology.

SUS Hospital Morbidity (SIH/SUS)

Epidemiological data on acute myocardial infarction were analyzed in the SUS Hospital Morbidity section (SIH/SUS), in the Department of Informatics of the Brazilian Unified Health System (DATASUS), from January 2011 to December 2021, using the variables gender, race, age group, number of hospitalizations, deaths and mortality rate in Brazil. The analysis was based on a simple comparison of the results, highlighting those of greatest value in forming the epidemiological profile of patients affected by acute myocardial infarction.

RESULTS

According to the epidemiological data, there were 4,382,252,951.84 cases of acute myocardial infarction in Brazil between January 2011 and December 2021, with a predominance of males (65.59%). As for race, the highest number of cases was found among white people (45.4%) and in second place brown people

(28.8%). In addition, the epidemiological data shows that the most affected age group is 60 to 69 years old (32.11%).

Number of hospitalizations

A total of 1,189,156 hospitalizations due to acute myocardial infarction were identified in Brazil between January 2011 and December 2021. Prevalence was highest in the Southeast (49.9%), as opposed to the North, which had the lowest number of hospitalizations (4.10%). The Northeast (19.62%), South (19.53%) and Midwest (6.82%) regions occupy intermediate positions (FIGURE 1).

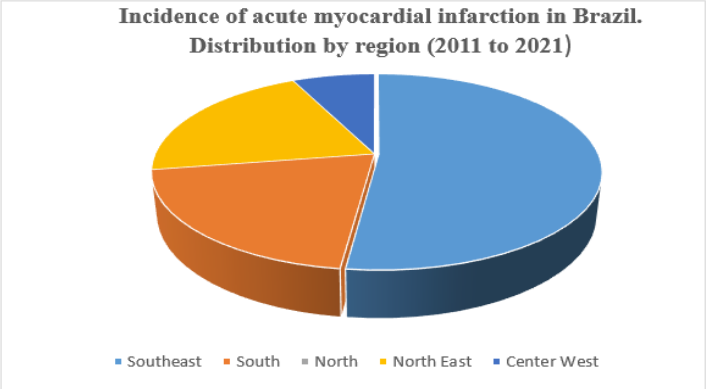

Figure 1. Incidence of acute myocardial infarction in Brazil. Distribution by region (2011 to 2021).
Source: Hospital Morbidity Session of the SUS (SIH/SUS), in the Department of Informatics of the Unified Health System of Brazil (DATASUS).

As for the sex of those affected, there was a greater number of hospitalizations among males than females, 63.57% among males and 36.42% among females. With regard to age, there was a predominance of hospitalizations in the 60-69 age bracket (29.96%). On the other hand, patients aged between 5 and 9 accounted for the lowest number of hospitalizations in the period, with 109 cases. When analyzing the data on color/race, there was a prevalence of white race, with 40.22%, followed by brown race, with 29.11% and, in third place, black race, with 3.35%.

Deaths from acute myocardial infarction according to sex, race and age group

With regard to the number of deaths caused by acute myocardial infarction, the highest prevalence is between 70 and 79 years of age, corresponding to 38,107 deaths out of a total of 130,322 (29.24%). There is a predominance of males, with 55.94%. Females account for 44.05% of deaths. Associating the number of deaths with race, the most affected race is white (39.08%), followed by brown (27.01%), in third place black (3.20%), and in last place indigenous (0.02%). No information is available on 29.54% of deaths (FIGURE 2).

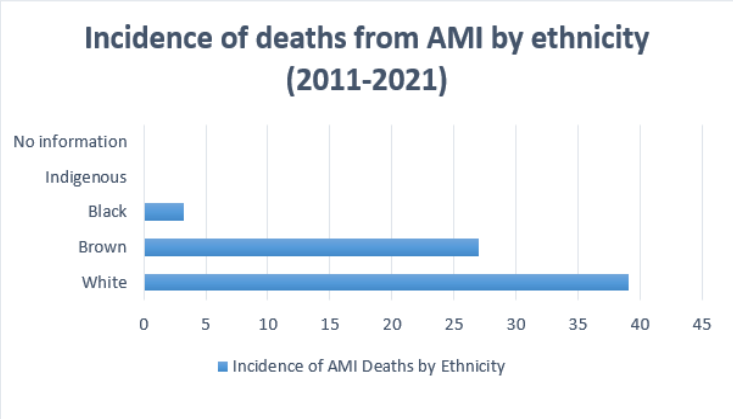

Figure 2. Incidence of deaths from AMI by ethnicity (2011-2021). Source: SUS Hospital Morbidity Session (SIH/SUS), at the Department of Informatics of the Brazilian Unified Health System (DATASUS).

Mortality Information System (SIM)

A total of 992,757 deaths from acute myocardial infarction were recorded between January 2011 and December 2021. The data was analyzed using the SIM using the following variables: region, year of death, age group, gender, color/race, schooling, marital status and place of occurrence.

Color/race

The white race represented the highest percentage of deaths from acute myocardial infarction, with 52.88% of the total, followed by the brown race with 35.6% and the black race with 7.72%. The yellow and indigenous races accounted for the lowest percentage, with 0.57% and 0.18% of all deaths, respectively. 30,020 (3.02%) of the deaths were unknown in terms of color/race classification (FIGURE 3).

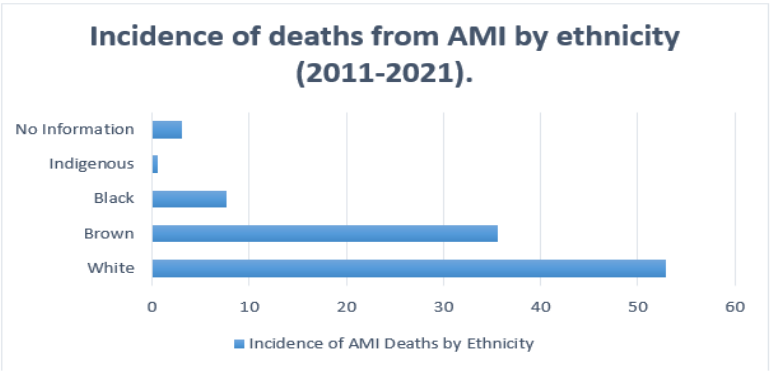

Figure 3. Incidence of deaths from AMI by ethnicity (2011-2021). Source: Mortality Information System (SIM)

Schooling and age group

With regard to schooling, the 1 to 3 years of schooling category accounted for the largest number of deaths, with 24.81% of the total. This was followed by 4 to 7 years of schooling with 21% and no schooling with 17.98%. In contrast, the 12 and over years of schooling class accounted for 5.03% of deaths. In terms of age group, 80

years and over had the highest mortality rate (26.39%), followed by 70 to 79 years (25.04%), 60 to 69 years (23.45%) and 50 to 59 years (15.44%).

Sex, marital status and place of occurrence

Analysis of the SIM based on the gender variable shows a prevalence of males (50.1%) compared to females (40.9%) in deaths from acute myocardial infarction. According to marital status, the highest prevalence was married (40%), followed by widowed (23.56%), single (19.61%), legally separated (7.07%) and other (3.17%). 6.55% were unknown. Regarding the place of death, the hospital had the highest prevalence, accounting for 50.67% of deaths, followed by 34.34% at home and 2.05% on public roads.

DISCUSSION

AMI is the leading cause of morbidity and mortality worldwide 15. In this context, Brazil had 1,189,156 hospitalizations between January 2011 and December 2021, reflecting the global epidemiology. In addition, the prognosis is associated with heart failure, in which patients evolve with the need for a multimodal approach and excessive hospital care due to decompensation [16].

Thus, the public goal is to reduce morbidity and mortality rates, with a consequent increase in patients' quality of life and a reduction in healthcare costs and hospitalizations [17].

Furthermore, according to epidemiological data, the highest prevalence was found in the southeast region (49.9%), since, in addition to having the largest population, it is the location with the largest industrial and urban areas and encompasses all of the capitalist machinery. In this sense, working night shifts is associated with an increased risk of AMI and a worse prognosis [18].

Thus, living in rural or less urbanized areas is associated with fewer hospitalizations for AMI, as they include healthier lifestyles, as can be seen in the lower hospitalization rates in the less industrialized regions of Brazil, such as the North (4.10%) and Midwest (6.82%) [19].

Contemporary lifestyles are also reflected in AMI incidence rates. Anxiety is associated with poor short- and long-term prognoses in AMI patients. Patients with anxiety had a 23% higher risk of short-term complications and a 27% higher risk of adverse long-term prognosis compared to those without anxiety [20].

Similarly, insomnia and fewer hours of sleep are highly associated with an increased incidence of AMI [21].

In addition, obesity was associated with younger age and a 30% reduction in survival, so a combination of obesity and diabetes further reduced the survival rate [22]. Therefore, a comprehensive clinical approach to AMI prevention should be applied, which can be achieved through lifestyle interventions in addition to drug therapy [23].

Similarly, bariatric surgery is associated with a reduction in mortality from AMI and a reduction in the incidence of various cardiovascular diseases in patients with obesity [24].

Therefore, Mediterranean and low-fat diets, with or without physical activity or other interventions, reduce mortality from AMI in patients at increased cardiovascular risk [25].

In terms of mortality, AMI is lethal for patients due to insufficient blood perfusion to vital organs, with cardiogenic shock being the most common cause of mortality [26].

In Brazil, there were a total of 992,757 deaths in the period studied, and in relation to the place of death, the hospital had the highest prevalence, accounting for 50.67% of deaths and 34.34% at home, with out-of-hospital cardiac arrest being the main cause of death, with a worse prognosis and poor neurological outcomes [27] .

This trend goes hand in hand with an increase in cardiovascular risk factors, such as hypertension and diabetes mellitus, but the number of male cases is still prevalent, which reflects the Brazilian percentage, with 63.57% of men in contrast to 36.42% of women affected by AMI [28].

There are important differences between the sexes in coronary artery disease. Women with chest pain have different risk factors, symptoms and prognosis compared to men [29-30].

This is why there is a need for adequate and coherent clinical investigation according to gender.

Similarly, the likelihood of bleeding too much was higher for women than for men undergoing percutaneous coronary intervention, and for both sexes, higher among those with chronic kidney disease [31].

In terms of age group, those aged between 60 and 69 were the most affected (29.96%), while those over 80 had the highest mortality rate (26.39%).

Thus, advanced age is one of the main determinants of poor prognosis in patients with STEMI [32] .

However, there have been reports of an increase in cases of AMI in young patients, with the involvement of risk factors such as male gender, active smoking and premature coronary artery disease [33].

Young patients with myocardial infarction usually have eccentric atherosclerotic plaques with inflammatory characteristics, but fewer lesions, and are more likely to be smokers, obese and have a poor lifestyle, such as inactivity and alcohol consumption.

Compared to older patients with MI, younger patients are more likely to be men, have combined familial hyperlipidemia and increased levels of lipoprotein-a. In addition, MI in younger patients may be related to cannabis use, cocaine use and anabolic androgenic steroids [34-35].

The mechanical complications of AMI include rupture of the papillary muscle, ventricular septum and free wall. Since the advent of acute coronary reperfusion, there has been a significant reduction in the incidence of these complications [36].

Furthermore, with regard to complications and prognosis, in patients with AMI and reduced ejection fraction, lower systolic blood pressure and higher heart rate were strongly associated with arrhythmic death [37].

CONCLUSION

AMI is one of the main causes of morbidity and mortality today and encompasses socioeconomic and genetic factors. The epidemiological profile of the patient most affected by AMI is male, white and between 60 and 69 years old. With regard to the number of hospitalizations, there is a higher prevalence in the Southeast. With regard to mortality, the highest prevalence is also found in males aged over 80 and in white individuals.

Finally, it is extremely important to recognize the epidemiology and intrinsic characteristics of AMI in order to improve quality of life, prevention, prognosis and reduce health costs.

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Observação: os/(as) autores/(as) declaram não existir conflitos de interesses de qualquer natureza.