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Epidemiological profile of acute myocardial infarction in brazil between 2009 and 2019

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1 INTRODUCTION

Acute myocardial infarction (AMI) is a syndrome with classic clinical manifestations, laboratory evidence of necrosis due to cardiac muscle ischemia, and characteristic changes in the electrocardiogram (ECG). AMI can be classified into several types according to electrocardiographic, pathophysiological, clinical, prognostic, and etiological criteria, which is valid because it allows specific and more assertive interventions to be carried out1.

Since the 17th century, cases compatible with AMI have been described, but its initial recognition in a living patient was only described in 1896. Even though it was a fatal event whenever it happened, AMI only came to be considered a public health problem, being investigated and treated with greater caution from the beginning of the 1900s, when several researchers contributed with reports to demonstrate the global importance of AMI2.

In most cases, AMI happens when an atherosclerotic plaque ruptures, leading to coronary thrombosis and reduction of myocardial perfusion intense enough to cause necrosis of cardiac muscle tissue. Understanding the pathophysiological process made known the various risk factors for AMI that can be categorized into non-modifiable such as age, gender, and family history; modifiable factors such as smoking, alcoholism, sedentary lifestyle, obesity, arterial hypertension, diabetes, and dyslipidemia3.

The classic clinical picture of AMI consists of angina, a deep, visceral chest pain, in tightness or oppression (rarely in stabbing or burning), located in the precordial region, which possibly radiates to the neck, jaw, upper limb, shoulder, or scapula of the left hemibody. Women, diabetics, and the elderly are populations that may not have angina in the face of an AMI, but anginal equivalents such as epigastric pain, nausea, vomiting, cold sweating, and dyspnea4.

The association between anginal pain or equivalent clinical picture, the elevation of myocardial necrosis markers, and electrocardiographic alterations are the three elements necessary to define the diagnosis of an AMI. The ECG should be performed within 10 minutes after admission of a patient with

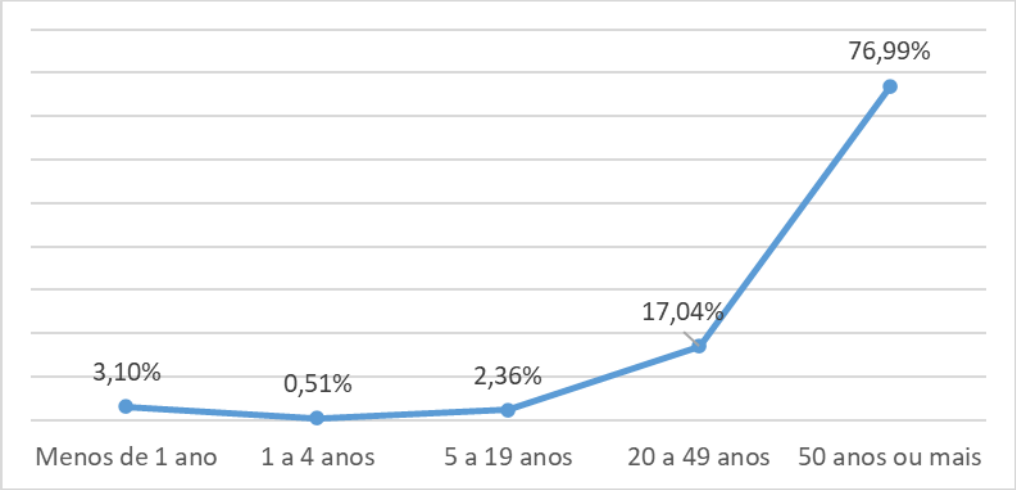
suspected AMI because it is enough to associate the clinical picture with the presence of elevation of the junction point between the QRS complex and the ST segment to define the diagnosis of AMI5. There are serum biomarkers that suggest myocardial necrosis and, even though they are important to differentiate unstable angina from AMI, they are not essentially mandatory for the patient to start being treated early, considering that they have different levels of sensitivity and specificity6.

Several patients with AMI develop complications such as complete atrioventricular block, Mobitz type II block, and cardiogenic shock, a medical emergency whose mortality approaches 90% when untreated and 50% within 30 days, even treated early7. Acute and long-term mortality rates from AMI remain substantially high, and it is considered the most common cause of death worldwide. This situation is influenced by several factors, such as the availability of emergency medical care networks, delay in diagnosis and initiation of treatment with reperfusion therapy, percutaneous intervention, antithrombotic therapy, and secondary prevention8.

In 1950, the United Nations proposed the Swaroop-Uemura Index, a tool designed to quantify the general levels of health in a place based on the crude values of proportional mortality of people aged 50 or over. In addition, years later, the Nelson de Moraes Curve was created, which provides a graphical representation of proportional mortality data from all causes and by age group to assess the level of health in a region9.

Between 2009 and 2019, Brazil was excellent in terms of general health care, according to its Swaroop-Uemura index equal to 76.99% and the Nelson de Moraes Curve type IV10. Thus, it is expected that Brazil has improved the management of AMI, as well as other similar countries regarding the general level of health, to reduce the epidemiological impact of this disease8.

Figure 1: Nelson de Moraes do Brasil curve between 2009 and 2019.



Subtitle; Less than 1 year / 1 to 4 years / 5 to 19 years / 20 to 49 years / 50 years or more

This ecological study aimed to explore the epidemiological profile of AMI in Brazil between 2009 and 2019 based on health indicators. This is to show whether the management of this important disease was improved and its morbidity and mortality decreased during the investigated time interval.

2 METHODOLOGY

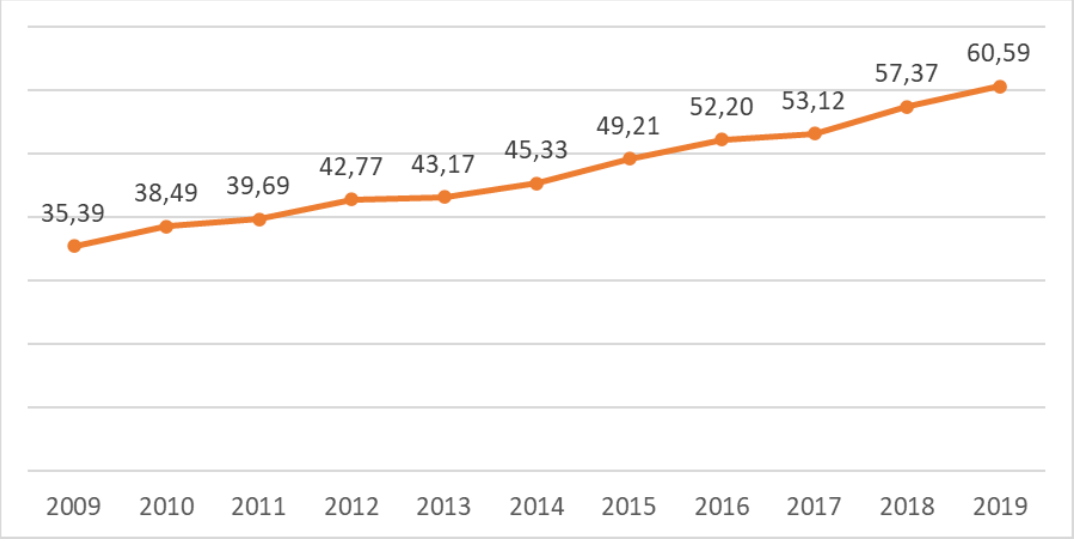
The study was prepared based on the Mortality Information System (SIM), the SUS Hospital Information System (SIH/SUS), and the Management of Studies and Analysis of Demographic Dynamics of the IBGE Research Board. In such information systems, the values of deaths per residence per year were collected according to region, age group, and ICD-10 category - I21 acute myocardial infarction; hospitalizations per year of care according to Federation Unit and ICD-10 morbidity list; second-year resident population. The entire national territory and the years from 2009 to 2019 were considered.

From the collected values, a researcher calculated the prevalence rates of hospitalizations, specific mortality and proportional mortality due to acute myocardial infarction so that, later, a comparative analysis of the values obtained could be carried out.

3 RESULTS

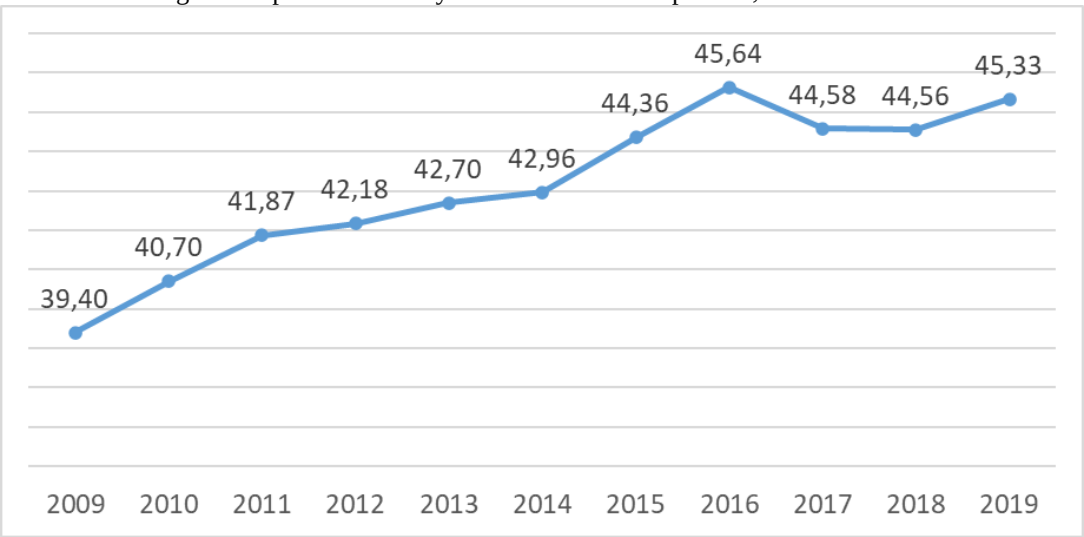
How a There were 68,497 hospitalizations for AMI in Brazil in 2009 and progressively higher values were found each year, considering the 75,244 hospitalizations in 2010, 78,353 in 2011, 85,222 in 2012, 86,795 in 2013, 91,912 in 2014, 100,617 in 20715, 7 in 20715 2016, 110,304 in 2017, 120,010 in 2018 and 127,641 in 2019. The IBGE population estimate allows us to determine that 35.39 out of every 100,000 people were hospitalized for AMI in Brazil in 2009, a prevalence that also increased to reach values close to 60, 59 hospitalizations per 100,000 inhabitants in 2019.

Figure 2. Prevalence of hospitalizations due to AMI in Brazil per 100,000 inhabitants.



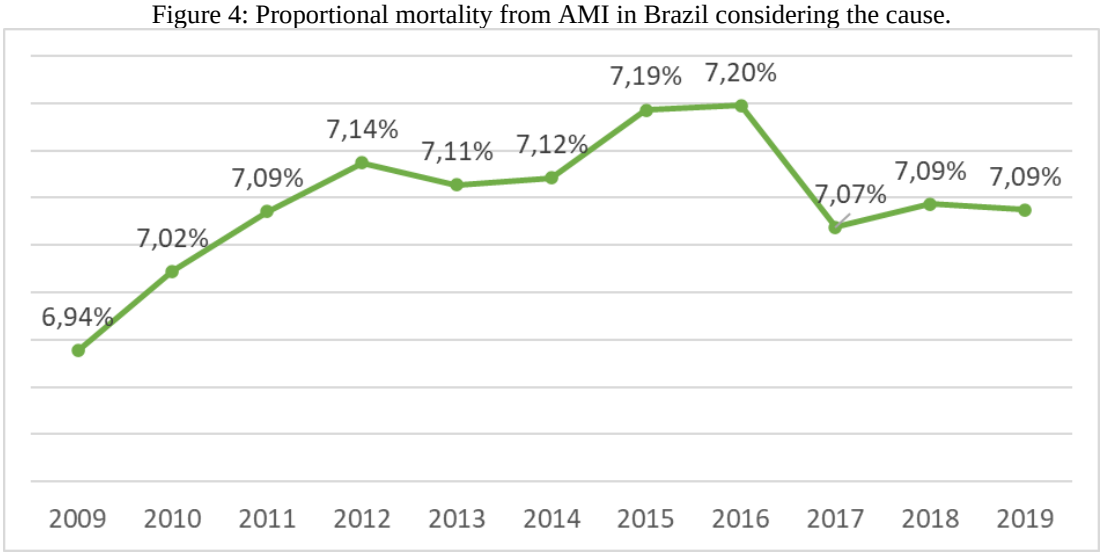
Of the 961,479 deaths for AMI registered in the time interval, 76,258 occurred in 2009, 79,560 in 2010, 82,643 in 2011, 84,032 in 2012, 85,840 in 2013, 87,118 in 2014, 90,967 in 2015, 94,046 in 2016, 92,583 in 2017, 93,206 on 2018 and 95,496 in 2019. Thus, specific mortality from AMI varied between 39.40 in 2009 and 45.64 deaths per 100,000 inhabitants in 2016, decreasing slightly until 2018 to rise again in 2019.

Figure 3: Specific mortality from AMI in Brazil per 100,000 inhabitants.



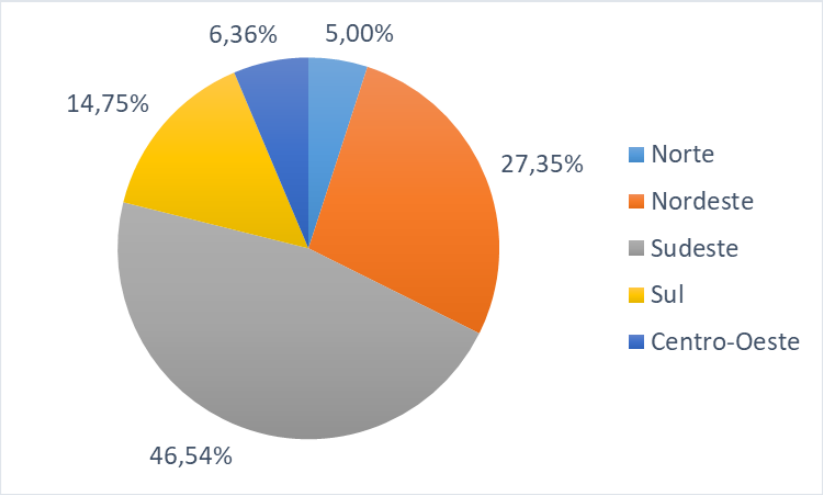
The proportional mortality due to AMI rose from 6.94% in 2009 to 7.14% in 2012, then decreased to 7.11% in 2013 to rise successively to 7.20% in 2016. In 2017, AMI represented 7.07 % of causes of death in the country, while in the following two years it was responsible for 7.09% of deaths.

Figure 4: Proportional mortality from AMI in Brazil considering the cause.



Of the total number of people who died from AMI during the period evaluated, 58.92% were men (566,435) while 41.08% were women (394,958). 447,444 deaths occurred in the Southeast region, while in the Northeast region there were 262,930, another 141,831 in the South region, 61,176 in the Midwest region and 48,098 in the North region.

Figure 5: AMI mortality ratio according to the region of the country of occurrence.



Subtitle: North/ Northeast/ Southeast/ South/ Midwest

4 DISCUSSION AND CONCLUSION

The prevalence of hospitalizations due to AMI in Brazil increased every year between 2009 and 2019, which, despite suggesting an increase in the incidence of AMI, also indicates optimization of access to emergency services with a consequent increase in the number of patients diagnosed with AMI8. Although this seems ideal, it has an important economic impact considering the health costs due to hospitalization, as well as the psychosocial impact on each patient13. In addition, hospitalization for AMI is associated with a higher risk of readmissions and new cardiovascular events with greater severity14.

Mortality indicators should decrease over the years considering the high level of health in the country, but this did not happen. Even with the decline in recent years, AMI is still responsible for a large proportion of the number of deaths in the country and this contrasts with expectations, revealing that clinical management has not been improved enough to stabilize the number of deaths and lead to its reduction. To improve the profile, it is recommended to implement national health programs aimed at prevention, in addition to greater investments in technologies for more efficient diagnosis and treatment15.

It is possible to conclude, therefore, that Brazil needs to invest in more efficient strategies for diagnosing and treating AMI, as well as in primary and secondary prevention measures, so that fewer people develop AMI and progressively smaller numbers of deaths occur in the coming years.

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