The impact of brazilian’s quality of life on mortality due to acute myocardial infarction

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Abstract

Objective: To describe the mortality rate due to acute myocardial infarction in the last ten years in Brazil and its possible relationship to quality of life.

Method: Descriptive study of epidemiological nature, based on secondary data collected in the health information system of the department of informatics of the Unified Health System in 2021. Mortality rate was selected from the International Classification of Diseases-10 morbidity list: Infarction myocardial infarction. The variables year of service, State, sex and age group were collected.

Results: The mortality rate due to acute myocardial infarction among 2011 and 2021 in Brazil was 11.01. The highest mortality rate was in Acre (18.91) followed by Alagoas (17.12), Paraíba (16.76), Maranhão (14.34) and Sergipe (14.30). Mortality rate was higher in female individuals (13.32) than in males and in elderly aged 80 years and over (25.40), followed by elderly aged 70 to 79 years (15.80) and 60 to 69 years (9.84). A decrease in the mortality rate was observed over the 10 years analyzed.

Conclusion: The highest mortality rates were prevalent in the Northeast region, in female individuals and in the elderly. Relationships were found between incidence of mortality due to acute myocardial infarction and quality of life. Factors such as obesity, Diabetes Mellitus and arterial hypertension were prevalent in women and the elderly. Socioeconomic inequalities were observed in the Northeast. Despite decreasing, mortality rate due to acute myocardial infarction in Brazil is still high.

Keywords: Myocardial Infarction; Mortality; Quality of life
According to the World Health Organization (WHO), cardiovascular disease are the main cause of death in the world, among them is the Acute Myocardial Infarction (AMI), which in Brazil has a high prevalence. This type of cardiovascular dysfunction it is characterized as a process of ischemic necrosis, being considered the most common cause of cardiac lesions, causing significant loss of myocardial cells.

Such cardiovascular diseases are associated to changes in the age group population and increased exposure to risk behaviors, such as sedentary lifestyle, smoking, obesity, a diet lacking in fruits and vegetables and rich in meat and fats. Evidences demonstrate that 80% of the risks of AMI can be reduced through the adoption of a healthy lifestyle and good nutrition. Furthermore, socioeconomic inequalities and access to health services are factors that corroborate the favoring of early mortality, especially in the poorest regions of the Brazilian territory.

Early detection of AMI is extremely important for patients survival. The greater the area of cardiac muscle affected and the inappropriate conditions of treatment, greater the chances of premature death and sequelae, such as heart failure syndrome. The search for a quick diagnosis through the clinical history, electrocardiogram (ECG), analysis of cardiac enzymes and cardiac catheterization, determines the success of treatment and future of patients.

In this sense, it is important to analyze mortality rates due to AMI, in addition to understand the adverse behaviors associated with this condition in order to establish possible correlations for a better understanding of this scenario and ultimately guide the conduct of professionals and managers, for the planning of promotion and health prevention, as well as for the coherent elaboration of public policies based on the Unified Health System (SUS). Therefore, the objective of this study is to describe the rate of mortality due to Acute Myocardial Infarction in Brazil, in the last ten years, and its possible relationship to quality of life.

**METHODS**

Descriptive epidemiological study based on data on the rate of AMI mortality in Brazil.

The data used were collected electronically through the health information system (TABNET) of the Department of Informatics of the Unified Health System (DATASUS) July 2021. The mortality rate was selected based on the list of the International Classification of Diseases-10: Acute Myocardial Infarction. The selected variables were: year of service, federation unit, sex and age group notified in the period from May/2011 to May/2021.

The collected data were tabulated in the Microsoft Office Excel program (Microsoft©, 2010) and presented in graphs using descriptive statistics, with a coefficient of mortality per 100,000 inhabitants.

Because it is a study based on secondary data and in the public domain, it was not necessary to submit it to the Research Ethics Committee, in accordance with the resolution 510/2016 of the National Health Council.

**RESULTS**

The AMI mortality rate in Brazil between May 2011 and May 2021 was 11.01 deaths/100,000 inhabitants.

Regarding the variable year of service (Graph 1), it is observed that the rate of mortality from AMI in Brazil shows, in general, decreasing values over the course of the 10 years analyzed. In 2011, the mortality rate due to AMI in Brazil was 12.69, while in 2021 this rate was 9.62.

**Graph 1:** Mortality rates due to Acute Myocardial Infarction, according to year of service in Brazil, from May/2011 to May/2021. Source: Ministry of Health - TABNET/DATASUS. Prepared by the authors.
Regarding the gender variable (Graph 4), it is observed that the highest mortality rate by AMI occurred in female individuals.

Regarding federation unit (Graph 2 and Graph 3), the higher AMI mortality rates occurred in the North and Northeast states.

**DISCUSSION**

The present study observed that mortality rate due to AMI in Brazil presented, in general, a decrease over the 10 years analyzed. In the year 2011, the AMI mortality rate in Brazil was 12.69, while in 2021 this rate had a value of 9.62. The decrease in the values of mortality rates indicates the effectiveness of prevention for cardiovascular diseases in Brazil and the importance of its constant update, such as the Cardiovascular Prevention Guideline of the Brazilian Society of Cardiology, created in 2013 and last updated in 2019. This guideline, among others aspects, addresses issues related to quality of life, socioeconomic factors and diseases that affect the population, such as diabetes mellitus, obesity and hypertension.

The National Health Promotion Policy and the Program for Prevention and Control of Hypertension and Diabetes (HIPERDIA) was also implemented in Brazil as a way to reduce mortality from cardiovascular disease. Despite this, mortality rate for AMI in Brazil still has higher values than those observed in developed countries, which demonstrates a need to disseminate these health policies across the country, especially in places most affected by socioeconomic inequalities, its correct application by health professionals and constant updating from the observation of the groups most affected by cardiovascular diseases and their particular characteristics.

The analysis of data collected in DATASUS also demonstrated the largest mortality rates for AMI in the last ten years in Brazil occurred in the state of Acre, located in the North region, followed by states in the Northeast region of the country.

The observation of the Human Development Indexes of Brazil (HDIs) demonstrates that Northeast region presents the lowest values (0.663), followed by North region (0.067), The Southeast (0.766), South (0.754) and Midwest (0.757) regions present the higher HDIs. Furthermore, per capita income in the North and Northeast is almost half that of comparison with the other regions. In the present study, Acre was the state that presented the highest AMI mortality rate in Brazil, having the second lowest HDI (0.663) in the North region, followed by the states of the Northeast region, which have the highest rates of AMI mortality and the lowest HDIs, such as Alagoas (0.631), Paraíba (0.658), Sergipe (0.665) and Maranhão (0.639). These differences are related to historical, social and economic factors in each region.

Gomes et al. recorded the existence of a relationship between socioeconomic inequalities and the development of cardiovascular diseases, since the lower purchasing power provides the individuals residing in places with precarious infrastructure and with greater difficulty in access to health services, being a possible justification for the higher mortality rates observed in these places. A current study by Santos et al. corroborates the results found, since a reduction in the risk of mortality from AMI was observed in all regions of Brazil, with the exception of the Northeast region. The authors point out that this scenario comes from socioeconomic inequalities observed in Northeast when compared to other Brazilian regions.

Regarding sex, the analysis of the collected data showed a prevalence of greater mortality rate due to Acute Myocardial Infarction in the last ten years, in Brazil, between female individuals. Vaccarino et al. analyzed 306 patients...
who had recently suffered an AMI with the objective of verifying the relationship between sex and Mental Stress-induced Myocardial Ischemia (MSIMI), since MSIMI is shown to be a vulnerability marker cardiovascular disease in the face of emotional stress and is highly frequent in individuals with Coronary Artery Disease (CAD). The authors observed that women diagnosed with AMI had more vulnerable sociodemographic and psychosocial conditions, including low income, lower educational level and higher rate of depression and post-traumatic stress, when compared to men. The study concluded that women diagnosed with AMI were twice as likely to develop MSIMI compared to men and that microvascular dysfunction and peripheral vasoconstriction related to mental stress are implicated in MSIMI only among women, which possibly reflects their tendency to develop ischemia due to microcirculatory abnormalities.

Arora et al. observed that rate of hospitalization due to AMI, between 1995-2014, in the United States, was especially higher among women, even showing trend of constant increase among women in this period and decrease among men. The mortality rate due to AMI, when comparing genders, showed a similar value, however, in one-year follow-up, women had a slightly higher mortality rate after AMI. It is also interesting to observe the result found by the authors that women hospitalized for AMI had less probability of receiving specific, guideline-based actions for AMI when compared to men, such as lipid-lowering drugs, antiplatelet agents, angiography and revascularization.

In the same sense, Alabas et al. carried out a study in Sweden and analyzed gender differences in treatment, relative survival and mortality after the occurrence of AMI. The authors observed that women presented lower relative survival rate and higher excess mortality when compared to men, and this data was even more relevant when related to age increase. The authors analyzed the maintenance of these rates after adjusting the application of treatment guidelines for AMI among women, demonstrating a decrease in excess mortality among women when treatment guidelines are applied correctly in this group.

Regarding risk factors for the occurrence of AMI, an analysis carried out by Fiório et al., in the State of São Paulo, demonstrated that women had greater prevalence of arterial hypertension, with a 20% greater chance than men of having this condition. A survey carried out by the Brazilian Ministry of Health demonstrated that, in 2019, women had a higher prevalence of obesity, Diabetes Mellitus and arterial hypertension when compared to men.

The correlation of the results found in this article with the scientific literature points to the possibility that higher mortality rate among female individuals is a phenomenon with a growing trend in countries other than Brazil. A prevalence of risk factors influenced by quality of life, such as conditions vulnerable sociodemographic and psychosocial characteristics, obesity, Diabetes Mellitus and arterial hypertension, demonstrates a correlation between mortality rate due to AMI and quality of life.

In addition, there is an urgent need to analyze the application of protocols and guidelines for the treatment of AMI, specifically in the group of women admitted for hospitalization for this cause in Brazil, since the literature demonstrates a possible discrepancy in the medical conduct applied to men and women, a factor that can also be related to the higher mortality rate observed in women in the recent ten years by AMI in the country.

Regarding the age group of individuals affected by AMI in the last ten years in Brazil, it was observed, through the data analyzed, that the group of elderly aged 80 years and over had the highest mortality rate, followed by the elderly aged 70 to 79 years and 60 to 69 years old.

Age is one of the factors that influence the incidence and mortality of diseases, and the aging process is a multifactorial and complex phenomenon, not only in Brazil, but in the world. The prevalence of cardiovascular diseases among the elderly becomes common mainly in relation to food, whose deregulation is one of the causes of obesity, a risk factor for AMI. In parallel, it was found that in all regions of the country and in both genders, there is a growing increase in AMI mortality rate with advancing age.

Older adults tend to receive restricted treatments for AMI when compared to younger individuals, explaining the high mortality rate in patients aged 80 or over, especially in Brazilian Northeast, considering that it is one of the poorer regions of the country with precarious conditions of basic sanitation and the difficulty of health services access. Furthermore, reduction of these rates in developed countries occurs due to quality of pre-hospital care, early diagnosis, availability of intensive care beds and a team specialized in the treatment of IAM.

It was also observed that elderly people diagnosed with AMI presented associative to obesity, formulating an intimate relationship between food and manifestation of cardiovascular diseases in the elderly population. During the process of human senescence, body fat increases by about 20 to 30%, and the lack of a diet rich in vegetables, fruits and greens corroborate alterations in the distribution of the fat pattern.

In a national health survey conducted by the Brazilian Institute of Geography and Statistics (IBGE), about 64.4% of the population aged 60 years or over were overweight, while 24.8% were obese. In this sense, a research carried out by the Ministry of Health attested to an increase in the incidence of obesity in Brazil, from 11.8% in 2006 to 20.3% in 2019, being overweight present in 55.4% of the population. Both obesity and overweight increased with age, with a higher prevalence among the elderly aged 65 years or older. In addition, along with the group of female individuals, older adults had a greater prevalence of Diabetes Mellitus and arterial hypertension when compared to other age groups.

Analysis carried out in the state of São Paulo by Fiório et al. demonstrated higher prevalence of arterial hypertension in the group of people aged 60 years or older when compared to other age groups. These data are even more alarming through the projection of growth of older adults population, which according to Silveira et al., by 2025, the elderly population in Brazil will be the sixth largest in the world, which will probably increase the occurrence of AMI in the country.
In addition, the high rate of AMI mortality in individuals younger than 1 year was a relevant data found in the present research, which accounted for the fourth highest mortality rate from AMI in the last five years in Brazil, lower only than that of older adults.

AMI in children is rare, despite showing an increase in recent years. Genetic, hereditary or congenital factors are the main causes of AMI in children, since the Brazilian Society of Cardiology states that 80% of children have some kind of heart murmur during life. Myocarditis is another disease associated with the mismatch of the heart during childhood, and mainly caused by contact with pathogens such as viruses and bacteria. This pathology is an inflammation of the heart muscle that prevents adequate blood pumping, leading to heart failure and, in the most severe form, a heart attack.16

It is observed, therefore, that incidence of AMI in children under one year of age has etiology that differs from other population groups analyzed, since the rate of AMI mortality found in children younger than 1 year is not related to quality of life. Through this, the investigation of family history for heart disease accompanied by a specific professional is essential to avoid early cases of IAM, not only in Brazil, but in the world.

In the same sense of the analyzed data, a study by Maier et al., about the factors risk factors related to AMI, demonstrated that individuals diagnosed with this condition showed analogous risk factors related to quality of life, such as diabetes mellitus, smoking and arterial hypertension. The authors also highlighted in agreement with data found in the present study, that the groups most affected by AMI are over 55 years old and manifest factors such as sedentary lifestyle, obesity, poor eating habits and psychosocial stress.17

In view of the observed aspects, it is important to identify the social profile of people affected by AMI, considering their limitations and individual aspects, in addition to the influence of the environment in which they live. The relationship between quality of life, region, age group and sex are agents that contribute to implementation of health policies aimed at preventing and reducing risk factors for this pathology, especially in the places most affected by socioeconomic inequality.

**CONCLUSION**

Data collected showed that the highest mortality rates due to AMI in the Brazil, in the last ten years, were prevalent in the state of Acre, located in the North region, followed by states in the Northeast region of the country, in female individuals and in the group of seniors.

There is an intimate relationship between the incidence of mortality due to AMI, the quality of life and Brazil’s social and economic inequalities. Risk factors for the occurrence of AMI such as obesity, diabetes mellitus and arterial hypertension, were prevalent in both female individuals and seniors. On the other hand, the difficulty of accessing health services contribute to increased mortality of these patients.

Although AMI mortality rate has decreased over 10 years in Brazil, this value is still high when compared to developed countries.

Therefore, the importance of elaborating and implementing public policies aimed at intervening in the conditions that contribute to the incidence of risk factors for AMI, such as eating behavior, sedentary lifestyle, stress psychosocial and inequalities in health services access.

**REFERENCES**


Resumo

Objetivo: Descrever a taxa de mortalidade por Infarto Agudo do Miocárdio nos últimos dez anos no Brasil e sua possível relação com a qualidade de vida.


Resultados: A taxa de mortalidade por Infarto Agudo do Miocárdio entre 2011 e 2021 no Brasil foi de 11,01. Maior taxa de mortalidade ocorreu no Acre (18,91) seguido pelos estados de Alagoas (17,12), Paraíba (16,76), Maranhão (14,34) e Sergipe (14,30). Maior taxa de mortalidade ocorreu em indivíduos do sexo feminino (13,32) e nos idosos com 80 anos ou mais (25,40), seguido pelos idosos de 70 a 79 anos (15,80) e de 60 a 69 anos (9,84). Observou-se diminuição da taxa de mortalidade ao longo dos 10 anos analisados.

Conclusão: As maiores taxas de mortalidade foram prevalentes na região Nordeste, nos indivíduos do sexo feminino e nos idosos. Encontraram-se relações entre a incidência de mortalidade por Infarto Agudo do Miocárdio e a qualidade de vida. Fatores como obesidade, diabetes mellitus e hipertensão arterial mostraram-se prevalentes nas mulheres e nos idosos. Desigualdades socioeconômicas foram observadas no Nordeste. Apesar da diminuição de seu valor, a taxa de mortalidade por Infarto Agudo do Miocárdio no Brasil ainda é elevada.

Palavras-chave: Infarto do Miocárdio; Mortalidade; Qualidade de Vida