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EDITORIAL

# Sociodemographic Disparities in Acute Myocardial Infarction in Rio de Janeiro State

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***Editorial referring to the article: Sociodemographic Profile of Acute Myocardial Infarction in Rio De Janeiro, Brazil (2010-2019)***

Cardiovascular diseases, particularly coronary artery disease (CAD), continue to occupy a prominent position with regard to morbidity and mortality in the modern world.[1] Acute myocardial infarction (AMI), the main pathology resulting from acute myocardial ischemia, persists with significant mortality rates in both developed and developing countries, despite significant advances in established protocols aimed at myocardial reperfusion.[2] Diagnosis of AMI, as well as its subtypes, has been consistently updated through consensus.[3] These updates have aimed to provide uniformity in the diagnosis and treatment of the pathology, in an attempt to reduce the disastrous impact of this disease on the population.

The concept of cardiovascular risk factors is linked to the development of coronary atherosclerosis and was developed from the Framingham Heart Studies in the United States, which began during the 1940s.[4] Questions remained, however, as to whether these risk factors were common across all continents. Subsequently, a case-control study demonstrated that such risk factors were associated with the appearance of a first AMI, in all countries, irrespective of the country's level of development. The study also concluded that a healthy diet with fruits and vegetables, moderate consumption of alcohol, regular physical activity, and a reduction of stress and depression all proved to be protective factors against AMI.[5] Furthermore, understanding the sociodemographic factors that are possibly involved in the occurrence of AMI as a cause of hospitalization and in-hospital death may be of assistance in planning public health policies, directing attention toward segments of the population of interest.

## Keywords

Sociodemographic; Social Conditions; Myocardial Infarction.

Within this context, this issue of the *International Journal of Cardiovascular Sciences* presents a study in which the authors have reported the sociodemographic profile of hospitalizations and deaths related to AMI, in the state of Rio de Janeiro (RJ), between 2010 and 2019. Taking into account the study design and the essentially descriptive analysis of the secondary data obtained from the Brazilian Unified Health System (SUS) online platform, without including an analysis of the temporal trends, the authors have reported frequencies in the hospitalization outcomes and hospital deaths due to AMI, according to sex, age group, race or skin color, educational level, and place of medical care per administrative microregion in the state of RJ.[6]

As main findings, the authors of the study have highlighted that the majority of hospitalizations due to AMI occurred in males and in the age group between 60 and 69 years, with males also being more frequently observed among the in-hospital death certificates due to AMI, for which the age group of 70 to 79 years was the most frequent, responsible for almost a third of these deaths. The most predominantly declared skin color described among those hospitalized for AMI and for in-hospital deaths from this cause was White. The microregion involving the state capital and the metropolitan region was responsible for more than 60% of the relative frequency of hospitalizations and in-hospital deaths due to AMI in the state of RJ. The authors also indicate that, although males were more frequently observed (56.5%) in the outcome of in-hospital death due to AMI, the rate of in-hospital death among women hospitalized due to AMI was described as being higher (16.8%) than that of men (12.3%).

Although descriptive data from ecological studies are limited in achieving causal inference, these same data are very useful for raising hypotheses on biological plausibility, as well as helping managers when planning

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health care actions. Thus, it has previously been described that, in Brazil, CAD and its complications remain the main cause of death, in contrast with the decline observed in high-income countries.[7] Additionally, hospitalizations and in-hospital mortality due to AMI in Brazil have not only demonstrated a tendency to increase over the last decade, but have also been described as being higher in the public sector, when compared to the private sector.[8,9] In this context, the study by Carvalho presents a temporal and descriptive profile of secondary data from public hospitals in the state of RJ that reflect findings previously reported in observational studies to assess risk factors for morbidity and mortality due to ischemic heart disease.

Among the main findings described in this study, we would highlight those related to age, sex, and microregion. By describing that the sum of the relative frequencies of hospitalizations and in-hospital deaths due to AMI, occurring in those aged over 60 years, exceeds two thirds of all its occurrences, the authors thereby corroborate the findings of increased morbidity and mortality due to CAD among older patients, as previously reported in indexed medical literature.[10,11] As these studies have suggested, factors such as atypical presentation of symptoms, delayed diagnosis, lower probability of effective therapies based on scientific evidence, and fragility may all explain the findings of a higher frequency of hospitalization and deaths due to AMI for this population in RJ.

When the authors report that the in-hospital death rate among women who were hospitalized for AMI was higher than the same rate among men, we refer to the far from recent knowledge that women, during the post-menopausal period of life, share some of the adverse characteristics described for older people. It is known that, during the premenopausal phase, hormonal characteristics function as a protective factor against coronary disease. After menopause, women become vulnerable; their cardiovascular risk increases and, consequently, so does the likelihood of AMI. The literature reports that, when women suffer their first AMI, they are, on average, 15 years older than men. Factors such as higher pain threshold, delay in seeking specialized care, neglecting the presented symptoms, and an increase in comorbidities, in addition to anatomical characteristics such as greater tortuosity and thinner coronary arteries, also influence the application of coronary flow restoration procedures and increased mortality, as reported in the study.[12,13]

Lastly, the finding that the administrative microregion involving the state capital and the metropolitan region of RJ was responsible for the highest relative frequency of hospitalizations due to AMI, even though this same microregion presented the lowest in-hospital mortality rate due to age-adjusted AMI, leads us to question whether these reports are a reflection of heterogeneity in the distribution of resources among the microregions, which would go against the principles that govern SUS, principles that may guide us in preventing unfavorable outcomes with such unequal frequencies among the various microregions of the same state.[14]

## References

1. Virani SS, Alonso A, Aparicio HJ, Benjamin EJ, Bittencourt MS, Callaway CW, et al. Heart Disease and Stroke Statistics-2021 Update: A Report from the American Heart Association. Circulation. 2021;143(8):e254-e743. doi: 10.1161/CIR.0000000000000950.

2. Ibanez B, James S, Agewall S, Antunes MJ, Bucciarelli-Ducci C, Bueno H, et al. 2017 ESC Guidelines for the Management of Acute Myocardial Infarction in Patients Presenting with ST-Segment Elevation: The Task Force for the Management of Acute Myocardial Infarction in Patients Presenting with ST-Segment Elevation of the European Society of Cardiology (ESC). Eur Heart J. 2018;39(2):119-77. doi: 10.1093/eurheartj/ehx393.

3. Thygesen K, Alpert JS, Jaffe AS, Chaitman BR, Bax JJ, Morrow DA, et al. Fourth Universal Definition of Myocardial Infarction (2018). J Am Coll Cardiol. 2018;72(18):2231-64. doi: 10.1016/j.jacc.2018.08.1038.

4. Chen G, Levy D. Contributions of the Framingham Heart Study to the Epidemiology of Coronary Heart Disease. JAMA Cardiol. 2016;1(7):825-30. doi: 10.1001/jamacardio.2016.2050.

5. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, et al. Effect of Potentially Modifiable Risk Factors Associated with Myocardial Infarction in 52 Countries (the INTERHEART Study): Case-Control Study. Lancet. 2004;364(9438):937-52. doi: 10.1016/S0140-6736(04)17018-9.

6. Carvalho LA. Sociodemographic Profile of Acute Myocardial Infarction in Rio de Janeiro, Brazil (2010-2019). Int J Cardiovasc Sci. 2023;36:e20210275.

7. Roth GA, Mensah GA, Johnson CO, Addolorato G, Ammirati E, Baddour LM, et al. Global Burden of Cardiovascular Diseases and Risk Factors, 1990-2019: Update from the GBD 2019 Study. J Am Coll Cardiol. 2020;76(25):2982-3021. doi: 10.1016/j.jacc.2020.11.010.

8. Oliveira GMM, Brant LCC, Polanczyk CA, Malta DC, Biolo A, Nascimento BR, et al. Cardiovascular Statistics - Brazil 2021. Arq Bras Cardiol. 2022;118(1):115-373. doi: 10.36660/abc.20211012.

9. Piva e Mattos LA, Berwanger O, Santos ES, Reis HJ, Romano ER, Petriz JL, et al. Clinical Outcomes at 30 Days in the Brazilian Registry of Acute Coronary Syndromes (ACCEPT). Arq Bras Cardiol. 2013;100(1):6-13. doi: 10.1590/s0066-782x2013000100003.

10. Kuller LH, Lopez OL, Mackey RH, Rosano C, Edmundowicz D, Becker JT, et al. Subclinical Cardiovascular Disease and Death, Dementia, and Coronary Heart Disease in Patients 80+ Years. J Am Coll Cardiol. 2016;67(9):1013-22. doi: 10.1016/j.jacc.2015.12.034.

11. Paneni F, Diaz Cañestro C, Libby P, Lüscher TF, Camici GG. The Aging Cardiovascular System: Understanding It at the Cellular and Clinical Levels. J Am Coll Cardiol. 2017;69(15):1952-67. doi: 10.1016/j.jacc.2017.01.064.

12. Solimene MC. Coronary Heart Disease in Women: A Challenge for the 21st Century. Clinics. 2010;65(1):99-106. doi: 10.1590/S1807-59322010000100015.

13. Mehta LS, Beckie TM, DeVon HA, Grines CL, Krumholz HM, Johnson MN, et al. Acute Myocardial Infarction in Women: A Scientific Statement from the American Heart Association. Circulation. 2016;133(9):916-47. doi: 10.1161/CIR.0000000000000351.

14. Brant LCC, Passaglia LG. High Mortality for Myocardial Infarction in Latin America and the Caribbean: Making the Case for Systems of Care Implementation in Brazil. Arq Bras Cardiol. 2022;119(6):979-80. doi: 10.36660/abc.20220825.