

DESCRIPTIVE ANALYSIS OF THE HOSPITAL MORBIMORTALITY DUE TO ACUTE MYOCARDIAL INFARCTION IN THE FEDERATIVE REPUBLIC OF BRAZIL

Análise descritiva da morbimortalidade hospitalar por infarto agudo do miocárdio na república federativa do brasil

Análisis descriptivo de la morbimortalidad hospitalaria por infarto agudo de miocardio en la república federativa del brasil

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ABSTRACT

Objective: To describe the hospital morbidity and mortality due to Acute Myocardial Infarction in Brazil between 2012 and 2017. **Methods:** ecological and descriptive study conducted with data obtained in the hospital information system. The variables were: 5 Brazilian regions, sex, age groups, and race. **Results:** it were registered 502.106 hospitalizations and 58.050 deaths, corresponding to a mortality of 11,56%. Southeast has highlighted highest percentage of hospitalizations (50,14%) and deaths (48,85%), while northeast highest mortality (12,67). The men have been highlighted in hospitalizations (63,46%) and deaths (55,77%), while the women highest mortality (13,99%). People aged between 60 and 64 years old had the highest prevalence in the hospitalizations (15,46%) and elderly aged 85 and above in deaths (22,39%) and mortality (26,6%). The Self-declared white people highlights in hospitalizations (40,82%) and deaths (39,46%) and indigenous in mortality (17,86%). **Conclusion:** it is necessary the improving the preventive and control measures of pathology, especially among the groups with a greater mortality.

Descriptors: Cardiovascular diseases, Public health, Information systems.

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RESUMO

Objetivo: Descrever a morbimortalidade hospitalar por Infarto Agudo do Miocárdio no Brasil entre 2012 e 2017. **Métodos:** estudo ecológico e descritivo realizado com dados do Sistema de Informações Hospitalares. As variáveis foram: as 5 regiões brasileiras, sexo, faixa etária e raça/cor. **Resultados:** houve registro de 502.106 internações e 58.050 óbitos, correspondendo a mortalidade de 11,56%. O sudeste obteve maior porcentagem de internações (50,14%) e óbitos (48,85%), enquanto o nordeste maior mortalidade (12,67%). Os homens se destacaram nas internações (63,46%) e óbitos (55,77%), enquanto as mulheres na mortalidade (13,99%). Pessoas entre 60 e 64 anos tiveram maior prevalência nas internações (15,46%) e idosos \geq 80 anos nos óbitos (22,39%) e mortalidade (26,6%). Os autodeclarados brancos se destacaram nas internações (40,82%) e óbitos (39,46%) e os indígenas na mortalidade (17,86%). **Conclusão:** torna-se necessário o aperfeiçoamento das medidas de prevenção e controle, especialmente nos grupos com maior mortalidade.

Descritores: Doenças cardiovasculares, Saúde pública, Sistemas de informação.

RESUMEN

Objetivo: Describir la morbimortalidad hospitalaria por infarto agudo de miocardio en Brasil entre 2012 y 2017. **Métodos:** estudio ecológico y descriptivo realizado con datos del sistemas de información hospitalaria. Las variables fueron: las 5 regiones brasileñas, sexo, grupo de edad y raza. **Resultados:** fueron registradas 502.106 hospitalizaciones y 58.050 muertes, que corresponde a mortalidad de 11,56%. Lo sudeste obtuvo el mayor porcentaje de hospitalizaciones (50,14%) y muertes (48,85%), y el nordeste ha tenido el mayor mortalidad (12,67%). Los hombres se destacaron en las hospitalizaciones (63,46%) y muertes (55,77%), y las mujeres en la mortalidad (13,99%). Personas de edad comprendida entre los 60 y los 64 años tuvieron mayor prevalencia en las hospitalizaciones (15,46%) y las personas mayores de edad igual o superior a 80 años mayor ocurrencia de muertes (22,39%) y mortalidad (26,6%). Las personas autopercebidas blanca se destacaron en las hospitalizaciones (40,82%) y muertes (39,46%) y los indígenas en la mortalidad (17,86%). **Conclusión:** se hace necesario el perfeccionamiento de las medidas de prevención y control de la patología, especialmente en los grupos con mayor mortalidad.

Descriptorios: Enfermedades cardiovasculares, Salud pública, Sistemas de información.

INTRODUCTION

The rapid process of urbanization, associated with industrialization and technological expansion, has led to significant changes in people's lifestyles around the world. In the midst of these changes, the health-damaging eating habits and sedentariness stand out, factors that have effectively contributed to the change in the epidemiological profile of the population and the favoring of the manifestation of Chronic Non Transmissible Diseases (CNTD).¹

Among CNTD, Cardiovascular Diseases (CVD), especially Acute Myocardial Infarction (AMI),² which is characterized by insufficient blood support to the coronary arteries, causing partial or total failure of the heart muscle, are prominent. Some relevant risk factors are also evident, such as Diabetes Mellitus (DM), Systemic Arterial

Hypertension (SAH), excessive consumption of lipid foods, reduced intake of fruits and vegetables and the maintenance of ethylist, smoker and sedentary habits.³⁻⁴

In view of this, AMI is a disease of great magnitude and incidence in a significant part of the Brazilian population, constituting the main cause of death in countries of any economic classification,² which makes it a worldwide public health problem.⁵ "In 2011, about 20 million individuals suffered from cardiovascular diseases worldwide, of which approximately 12 million were fatal victims of AMI".⁶

In order to achieve a reduction in morbidity and mortality due to CVD, Brazil, through the Ministry of Health, has created and implemented the National Health Promotion Policy and the Program for Prevention and Control of Hypertension and Diabetes (HIPERDIA).⁷ However, mortality still remains high compared to other countries, mainly due to AMI.⁸

In this perspective, the study presents its relevance for providing the dissemination of epidemiological knowledge of AMI in Brazil. With this, it will be possible to promote critical-reflexive discussions about the pathology and health actions that Primary Care may implement for the prevention and control of CNTD. Thus, the objective of this study is to describe the hospital morbidity and mortality by AMI in Brazil between 2012 and 2017.

METHODS

It is a descriptive study of the ecological type, carried out with data on AMI from the Hospital Information System (SIH) of the Departamento de Informática do Sistema Único de Saúde (DATASUS). The study scenario adopted refers to Brazil, a South American country whose population reaches approximately 207.7 million inhabitants living in a territory of 8.6 million square meters.

Data on morbidity and mortality (hospitalizations, deaths and mortality rate) were correlated to the following variables: regions of the country, gender (male and female), age group (< 1 year at \geq 80anos) and race/color (white, black, brown, yellow and indigenous). The mortality rate was calculated considering the ratio between the number of deaths and hospitalizations, multiplied by 100. All data were collected from January 1, 2012 to December 31, 2017.

The data collection, tabulation and evaluation took place in April 2018 through the HIS electronic platform. The simple descriptive analysis was adopted and the results were presented by means of absolute and relative frequencies. Because it was a study whose data were obtained secondarily through a health information system with public domain, there was no need for submission to the Research Ethics Committee, in accordance with Resolution 466/2012 of the National Health Council.

RESULTS AND DISCUSSION

Table 1 shows hospitalizations, deaths, and mortality

rates according to the 5 Brazilian regions and years of study. It is noteworthy that the Southeastern region had the highest number of hospitalizations with 251,762 (50.14%) and deaths with 28,359 (48.85%). The northeast region stood out for showing a higher mortality rate in the period studied (12.67%). Brazil, in turn, registered 502,106 hospitalizations, 58,050 deaths and a mortality rate of 11.56%.

Table 1 - Hospitalizations, deaths and mortality rate due to acute myocardial infarction in Brazil, stratified by year of care and regions. Jequié, BA, 2018

Variables	2012	2013	2014	2015	2016	2017	Total	%
Hospitalizations								
North	511	3.515	3.703	4.129	4.516	4.248	20.622	4,11
Northeast	1.487	17,24	19,40	19,662	20,006	20,487	98,292	19,58
Southeast	3.273	44,54	48,06	50,411	53,920	51,590	251,76	50,14
South	1.522	16,55	18,98	20,886	22,653	21,305	101,91	20,34
Central West	543	4,931	5,193	5,529	6,480	6,844	29,520	5,88
Total	7.302	86,79	95,34	100,61	107,57	104,47	502,10	100
Deaths								
North	69	451	416	570	571	493	2.570	4,43
Northeast	206	2.257	2.487	2.428	2.601	2.473	12.452	21,45
Southeast	389	5.376	5.402	5.848	5.929	5.415	28.359	48,85
South	153	2.013	2.147	2.283	2.294	2.094	10.984	18,92
Central West	64	688	735	708	779	711	3.685	6,35
Total	881	10,78	11,18	11,837	12,174	11,186	58,050	100
Mortality								
North	13,5	12,83	11,23	13,8	12,64	11,61	12,46	12,46
Northeast	13,8	13,09	12,82	12,35	13	12,07	12,67	12,67
Southeast	12,0	12,07	11,24	11,6	11	10,5	11,26	11,26
South	10,0	12,16	11,31	10,93	10,13	9,83	10,78	10,78
Central West	11,7	13,95	14,15	12,81	12,02	10,39	12,48	12,48
Total	12,0	12,43	11,73	11,76	11,32	10,71	11,56	11,56

Source: Ministry of Health - SUS Hospital Information System (HIS/SUS)

Regarding sex, men stand out for the higher prevalence of hospitalizations with 318,624 (63.46%) and deaths with 32,373 (55.77%), while women presented a higher mortality rate (13.99%), according to **Table 2**.

Table 2 - Hospitalizations, deaths and mortality due to acute myocardial infarction in Brazil stratified by sex. Jequié, BA, 2018

Sex	Hospitalizations	%	Deaths	%	Mortality (%)
Male	318.624	63,46	32.373	55,77	10,16
Female	183.482	36,54	25.677	44,23	13,99
Total	502.106	100	58.050	100	11,56

Source: Ministry of Health - SUS Hospital Information System (HIS/SUS)

According to **Table 3**, the highest number of hospitalizations was recorded in persons aged between 60 and 64 years with 77,621 (15.46%). In relation to deaths and mortality rate, there is a higher prevalence among the elderly with age ≥ 80 years, totaling 12,995 (22.39%) and 26.6%, respectively.

Table 3 - Hospitalizations, deaths and mortality rate due to acute myocardial infarction in Brazil, stratified by age group. Jequié, BA, 2018.

Age group	Hospitalizations	%	Deaths	%	Mortality (%)
<1	443	0,09	37	0,06	8,35
1 to 4	111	0,02	6	0,01	5,41
5 to 9	50	0,01	1	0,00	2
10 to 14	93	0,02	6	0,01	6,45
15 to 19	617	0,12	42	0,07	6,81
20 to 24	1.148	0,23	62	0,11	5,4
25 to 29	2.112	0,42	123	0,21	5,82
30 to 34	4.601	0,92	244	0,42	5,3
35 to 39	9.622	1,92	508	0,88	5,28
40 to 44	19.842	3,95	1.005	1,73	5,07
45 to 49	36.244	7,22	2.044	3,52	5,64
50 to 54	56.274	11,21	3.387	5,83	6,02
55 to 59	72.182	14,38	5.288	9,11	7,33
60 to 64	77.621	15,46	7.195	12,39	9,27
65 to 69	70.933	14,13	8.323	14,34	11,73
70 to 74	56.957	11,34	8.573	14,77	15,05
75 to 79	44.400	8,84	8.211	14,14	18,49
≥ 80	48.856	9,73	12.995	22,39	26,6
Total	502.106	100	58.050	100	11,56

Source: Ministry of Health - SUS Hospital Information System (HIS/SUS)

In relation to race/color, whites had a higher percentage in hospitalizations with 204,954 (40.82%) and deaths with 22,906 (39.46%). However, the highest mortality rate was identified among indigenous people (17.86%).

Table 4 - Hospitalizations, deaths and mortality due to acute myocardial infarction in Brazil stratified by race/color. Jequié, BA, 2018

Color/race	Hospitalization	%	Deaths	%	Mortality (%)
White	204.954	40,82	22.906	39,46	11,18
Black	15.747	3,14	1.711	2,95	10,87
Brown	139.366	27,76	15.009	25,86	10,77
Yellow	4.204	0,84	500	0,86	11,89
Indigenous	84	0,02	15	0,03	17,86
No information	137.751	27,43	17.909	30,85	13
Total	502.106	100	58.050	100	11,56

Source: Ministry of Health - SUS Hospital Information System (HIS/SUS)

The Southeast region is the second smallest region in terms of territorial extension and the main industrial, commercial and economic region of the country, being responsible for 55.2% of the Brazilian Gross Domestic Product (GDP).⁹ From this perspective, it is possible to infer that the supply and access to health services in the three levels of complexity in this region are facilitated mainly due to its higher urbanization rate among the Brazilian regions¹⁰ and economy, which explains the higher number of hospitalizations with 251,762 (50.14%) and deaths with 28,359 (48.85%), occupying the second lowest mortality rate among all regions of the country (11.26%), according to **Table 1**.

Changes in the behavior of mortality rates suggest changes in the relationships between individuals and modifiable and non-modifiable risk factors.⁷ Furthermore, some Brazilian regions have insufficient resources to ensure accurate diagnosis and treatment, as is the case of the Northeast,¹¹ obtaining the highest AMI mortality rate (12.67%), according to **Table 1**.

It should also be emphasized that access to the three levels of health care is hampered in this region because a considerable part of the population lives in rural areas and/or in small municipalities that do not have fast and effective life support units.¹² This reality may explain the

lower incidence of hospitalizations and deaths by the information system, since many evolve to death without even undergoing medical assistance.

The results evidenced in this study reveal the progressive decrease of AMI mortality rate in Brazil and significant variations between its regions. It should be taken into account that in each geographic division of the country, residents are exposed to different conditions of vulnerability as a result of educational, economic, political and cultural diversity.² Moreover, in general, the high mortality rate from AMI in the Brazilian population is attributed to difficulties in accessing health services and therapeutic measures in their various modalities.¹³

Regarding sex, men stand out for the higher prevalence of hospitalizations with 318,624 (63.46%) and deaths with 32,373 (55.77%). It is worth mentioning that these results may be directly related to the higher male exposure to some risk factors such as smoking (22.5%), overweight (56.5%), physical inactivity (16.2%), among others,¹⁴ evolving to a fatal outcome. In addition, it is worth mentioning the lower tendency of men to seek health services¹⁵ for their promotion and protection due to social constructions related to masculinity.⁸

A study produced in 2013 by the Instituto Brasileiro de Geografia e Estatística (IBGE) found that 78.0% of women sought some medical service in the last 12 months compared to 63.9% of men,¹⁶ showing a difference of 14.1% between genders. It is noteworthy, therefore, the importance of medical consultations and periodic examinations for early detection of comorbidities and, consequently, greater therapeutic success.

Women in this study had a higher mortality rate (13.99%), refuting findings from other research.^{8,17-18} Regarding the physiological aspects, the female gender presents natural cardiac protection until 75 years of age due to the action of the estrogen hormone in the cardiovascular system in such a way that the women who develop coronary atherosclerosis before that age, present greater chances of being affected by more aggressive diseases.¹⁵

It is also important to note that a study¹⁹ conducted in a city in the Northeast region of Brazil did not find significant differences between the variable related to sex, although they registered a prevalence of 56.2% in males. These results differ from another study²⁰ conducted in Rio de Janeiro, Brazil, in which women presented higher hospital mortality rates up to 2.3 times compared to males. However, there are still discussions among researchers as to whether female sex is in fact constituted as a biological factor for the development of AMI or a methodological bias in the surveys.²⁰

In relation to the age group, people aged between 60 and 64 years had a higher percentage of admissions with 77,621 (15.46%), according to Table 3. In relation to deaths and mortality rate, there is a higher prevalence among elderly people with age \geq 80 years, totaling 12,995 (22.39%)

and 26.6%, respectively.

Nevertheless, the results of this study show a progressive increase in mortality, especially from 65 years of age. Such data corroborate a study conducted in Brazil,¹⁷ in which the increasing progressive behavior of mortality parallel to the aging process was demonstrated, especially in people over 50 years of age.

The development of cardiovascular diseases is facilitated as age progresses, because in this age group there is the natural development of arteriosclerosis, which hinders vascular absorption of the impact generated by blood pressure. As a result, the chances of involvement by SAH, atherosclerosis and cardiac ischemia increase significantly, which in turn contributes to the risk of developing coronary artery disease.¹⁵

Still in this sense, the higher mortality in the aforementioned age group is directly related to the accumulation of long exposure to risk factors (environmental and/or behavioral) throughout life,⁸ in addition to having a higher incidence in the presence of comorbidities such as DM, SAH, previous heart attack, angina, stroke, heart failure, among others.¹⁹ Moreover, the therapeutic resources for AMI in the different age groups contribute in parts to the maintenance of this profile, since the elderly tend to be submitted to less invasive therapies due to their physiological characteristics.⁸

Regarding race/color aspects, the results from this study reaffirm the epidemiological profile outlined in similar research¹ when reporting the majority incidence of cardiovascular events, including AMI, as well as the predominance of pathological elements at risk and cardiac symptoms in the self-declared white population. However, the data explained here still differ from the study, which points out the condition of race/black color as a predictor of triggering cardiovascular event.²¹

Through this fact, it is perceptible the inexistence of consensus in the scientific production of the subject regarding the racial interference in the determination of cardiovascular vulnerability. It is also clear the lack of detailed research on this variable, highlighting the need for ethnic-racial exploitation. Despite this, it has already been scientifically proven that DM and SAH present clinical circumstances that favor the occurrence of AMI and are closely linked to the black population for genetic reasons and modifiable situations.²²

On the other hand, difficulties in national racial stratification are observed since this is based on self-declaration and encompasses several aspects related to self-identification. As soon as we see the extensive demographic miscegenation in the last demographic census,²³ dated 2010, in which, of the 191 million inhabitants, 47.7% declared themselves white, 7.6% black, 43.1% brown, 1.1% yellow and only 0.4% indigenous.

When we analyze the mortality rate due to AMI in the indigenous community, we find that this picture reflects,

mainly, the low level of access to health services, since the derisory and deficient offer of promotion and maintenance of indigenous health in the high and medium complexity areas provides greater risk for the development of certain diseases.²⁴

Thus, the lack of advice, assistance, and often knowledge about pathological characteristics, prevention, and their treatment, can contribute to the high mortality rate. In addition, organizational, local and cultural factors can influence contact with assistance and also the health situation of this population.²⁴

CONCLUSIONS

The present study highlighted the disparities in morbidity and mortality due to AMI related to gender, age group, race/color and Brazilian regions, making it known that the pathology continues to be one of the main causes of death due to cardiovascular diseases. Therefore, it is essential to improve prevention and control measures of the pathology, especially in the indigenous population with the highest mortality rate. Furthermore, this is a population that has some difficulties in accessing health services because they often live in rural areas.

Finally, it should be noted that the results of this study may contain limitations due to the place of data collection. Because it is an Information System, DATASUS is fed by service professionals, who, in turn, may be influenced by factors such as delay in filling out data, thus causing inaccuracy in the records.

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