

Comparison of Clinical and Epidemiological Profiles Between Men and Women with ST-Elevation Myocardial Infarction in Salvador from 2021 to 2023

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Abstract

Background: ST-segment elevation myocardial infarction (STEMI) remains one of the leading causes of morbidity and mortality worldwide. Although studies indicate sex disparities in risk factors, symptomatology, and outcomes, there is a lack of local research validating these differences.

Objectives: To compare the clinical and epidemiological profiles, treatment times, and in-hospital outcomes of men and women diagnosed with STEMI at a private hospital in Salvador, Brazil from 2021 to 2023.

Methods: This retrospective observational study analyzed 75 patients, of whom 30.7% were women. Variables assessed included age, cardiovascular risk factors, symptom-to-door time, door-to-ECG time, door-to-reperfusion time, pharmacological therapy, and in-hospital outcomes.

Results: Women presented STEMI at a significantly older age compared to men (median age: 73.0 versus 62.5 years; $p = 0.002$). There were no statistically significant differences in treatment times (symptom-to-door, door-to-ECG, and door-to-reperfusion) between sexes. Women were more frequently treated with high-potency antiplatelet agents (prasugrel and ticagrelor) than men ($p = 0.047$ and $p = 0.012$, respectively). No differences in complications or mortality rates were observed between the groups.

Conclusions: Despite being older and using more potent antiplatelet therapy, women did not experience significant differences in treatment times or complications. The limited sample size may have affected the ability to detect more significant differences, underscoring the need for larger studies.

Keywords: ST Elevation Myocardial Infarction; Women; Brasil.

Introduction

Cardiovascular diseases remain the leading cause of death and disability worldwide, with acute coronary syndromes playing a central role. While developed countries have seen a decline in mortality from acute coronary disease, underdeveloped nations continue to experience rising incidence and mortality, particularly due to ST-segment elevation myocardial infarction (STEMI).^{1,2}

Historically, STEMI has been predominantly associated with men due to its higher incidence in this population. However, coronary artery disease is also a major cause of morbidity and mortality among women. Significant sex-related disparities

exist in risk factors, pathophysiology, symptomatology, treatment, and outcomes.³ Men are more prone to smoking and dyslipidemia, whereas women have a higher prevalence of hypertension, diabetes mellitus, obesity, and specific risk factors such as preeclampsia, gestational diabetes, and psychosocial stress.^{3,4} Additionally, women typically experience myocardial infarction later in life, around 8 years later than men, due to the cardioprotective effects of estrogen.^{3,5}

Pathophysiological differences further impact the clinical presentation and management of STEMI. While men often exhibit obstructive coronary artery disease, women are more likely to have microvascular dysfunction, coronary vasospasm, or spontaneous coronary artery dissection.⁶ Moreover, women frequently present with atypical symptoms such as nausea, dyspnea, and fatigue, leading to delays in symptom recognition and medical care. Studies indicate that women have a 34% longer symptom-to-door time and a 23% longer door-to-reperfusion time, contributing to worse clinical outcomes.⁷ These factors, combined with underrepresentation in clinical trials, result in lower rates of revascularization and pharmacological therapy for women, as well as a higher risk of complications, including cardiogenic shock, bleeding, and heart failure.^{5,7,8}

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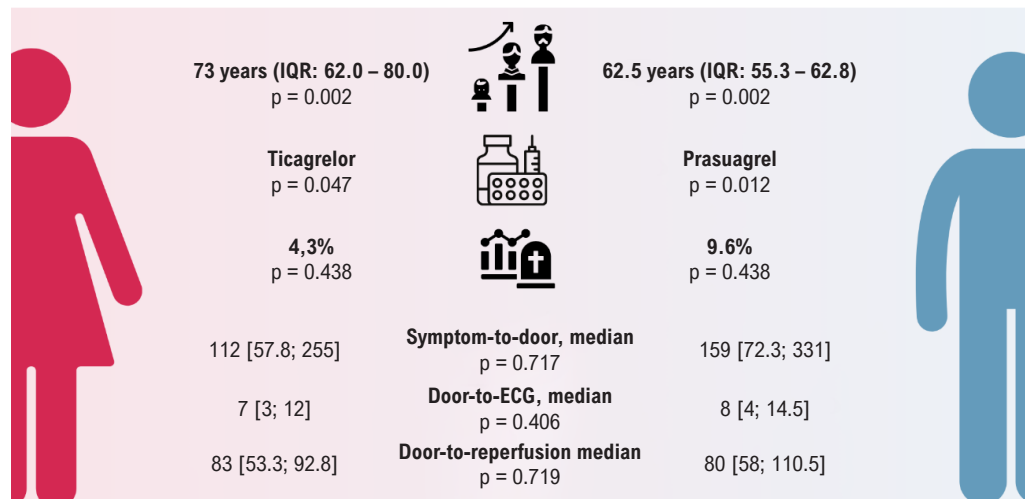
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Central Illustration: Comparison of Clinical and Epidemiological Profiles Between Men and Women with ST-Elevation Myocardial Infarction in Salvador from 2021 to 2023

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Despite growing awareness of these disparities, data on the clinical and epidemiological profiles of women with STEMI remain limited, particularly in the Brazilian population. This study aims to compare the clinical characteristics, risk factors, treatment strategies, and outcomes of men and women diagnosed with STEMI in a private hospital in Salvador, Brazil. By addressing these knowledge gaps, this study seeks to provide insights into sex-specific differences in STEMI management, ultimately contributing to more personalized and equitable cardiovascular care.

Methods

Study design

This is an analytical, cross-sectional, observational, and retrospective study using primary data.

Study population

The study included patients diagnosed with STEMI who underwent reperfusion therapy at a private hospital in Salvador, Brazil, between January 2021 and June 2023.

Inclusion criteria

This study included patients admitted with a STEMI diagnosis, as defined by the institutional protocol, and considered eligible for primary reperfusion therapy in the

emergency department of the private hospital between January 1, 2021, and June 1, 2023.

According to the institutional protocol, STEMI eligibility criteria include a clinical presentation suggestive of myocardial infarction, associated with an electrocardiogram (ECG) showing ST-segment elevation ≥ 2 mm in two or more contiguous leads or new or presumably new left bundle branch block, with symptom onset within 12 hours, and coronary angiography confirming a critical or occlusive obstructive lesion in the corresponding coronary artery.

Exclusion criteria

Patients whose STEMI diagnosis was not confirmed after coronary angiography and those who underwent thrombolytic therapy as a reperfusion strategy were excluded.

Data source

Data were collected from electronic medical records during patients' hospitalization.

Study variables

The selected variables included:

Demographic and clinical characteristics: sex (male or female, self-reported at hospital registration), age (continuous variable), presence or absence of systemic arterial hypertension, diabetes mellitus, dyslipidemia, obesity, smoking status, and prior myocardial infarction.

Risk stratification and time intervals: GRACE score (continuous variable), symptom-to-door time (minutes), door-to-ECG time (minutes), and door-to-reperfusion time (minutes).

Treatment and outcomes: revascularization therapy (primary percutaneous coronary intervention), Killip classification at admission (I: no signs of heart failure; II: heart failure present; III: severe heart failure; IV: cardiogenic shock), antiplatelet therapy (aspirin, clopidogrel, prasugrel, ticagrelor), and in-hospital mortality (present or absent).

Statistical analysis

Continuous variables were tested for normal distribution using the Kolmogorov-Smirnov distance test and the Shapiro-Wilk test. Parametric variables were expressed as mean $\pm$ standard deviation, while non-parametric variables were presented as median and interquartile range. ANOVA was used for comparisons between parametric variables, and the Kruskal-Wallis test for non-parametric variables.

Categorical variables were expressed as absolute and relative frequencies. Pearson's chi-square test was used to analyze associations. If more than 20% of the cells had expected frequencies below 5, Fisher's exact test was applied.

The sample size was determined based on time convenience. Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) software, version 22.0 for Windows (SPSS Inc, Chicago, Illinois, United States).

Ethical considerations

The primary project, which provided the initial data for this study, was approved by the Ethics Committee under approval number 6.724.095. The study complies with Resolution 466/12 of the Brazilian National Health Council (CNS, acronym in Portuguese), which establishes ethical guidelines for research involving human subjects.

All data were used exclusively for research purposes, ensuring confidentiality and anonymity of participants. Researchers committed to using the collected information solely for academic purposes and presenting the results only at scientific events.

Potential benefits and risks

Although this study does not provide direct benefits to participants, its findings may contribute to medium- and long-term improvements in STEMI management, particularly in the treatment of female patients.

The risks associated with this study are minimal and primarily related to potential breaches of data confidentiality. To mitigate this risk, data were stored in a password-protected database on a dedicated computer, with data collection restricted to only two authorized researchers.

Results

Between 2021 and 2023, 75 patients were admitted to this private hospital unit with a diagnosis of STEMI and an indication for reperfusion therapy via primary angioplasty.

Of these, 30.7% (23) were female, with an average age of 65.63 years. Additionally, 70.7% had a prior diagnosis of systemic arterial hypertension; 34.7% were diabetic; 50.7% had dyslipidemia; 20% were obese; 10.7% were current smokers; and 9.3% had a history of prior myocardial infarction. Upon admission, 85.3% were classified as Killip I, and the median GRACE score was 115 (interquartile range [IQR]: 97.0 to 138.0). All patients underwent transthoracic echocardiography during hospitalization, with a median left ventricular ejection fraction (LVEF) of 53% (IQR: 44% to 62%).

Regarding reperfusion therapy, 93.3% of patients underwent primary angioplasty, with the radial access route being used in 92% of cases. Dual antiplatelet therapy consisted of aspirin as the first agent for all patients, combined with a P2Y12 inhibitor, with prasugrel or ticagrelor chosen in 86.7% of cases (Table 1).

When comparing female and male patients, women had a higher median age (73 versus 62.5 years; $p = 0.002$) and a higher median GRACE score (124 versus 110.5; $p = 0.056$).

Among women, the median age was 73 years (IQR: 62.0 to 80.0), while in men, it was 62.5 years (IQR: 55.3 to 62.8), a statistically significant difference ($p = 0.002$). Although there was a numerical difference, the incidence of hypertension (78.3% versus 67.3%; $p = 0.337$) and current smoking (0% versus 15.4%; $p = 0.183$) was not statistically significant. Other risk factors did not differ significantly between men and women. The proportion of patients classified as Killip I at admission was similar between female and male patients (82.6% versus 86.5%; $p = 0.404$). LVEF was also similar between sexes, with a median of 54% (IQR: 42% to 62%) in women and 53% (IQR: 47% to 62.75%) in men ($p = 0.752$).

Regarding P2Y12 inhibitors, prasugrel was more frequently used in men (48.1% versus 17.3%; $p = 0.012$), while ticagrelor was more commonly used in women (65.2% versus 40.4%; $p = 0.047$) (Table 2).

The recorded times in the medical records for symptom-to-door, door-to-ECG, and door-to-reperfusion were, respectively, 159 versus 112 minutes ($p = 0.717$), 8 versus 7 minutes ($p = 0.406$), and 80 versus 83 minutes ($p = 0.719$), between men and women (Figure 1).

The incidence of clinically significant hematoma occurred in three patients, all female. No vascular complications were reported in any patients. Six patients died, with a higher number of deaths among male patients (9.6% versus 4.3%; $p = 0.438$) (Table 3).

Discussion

Cardiovascular diseases are among the leading causes of morbidity and mortality worldwide, affecting both men and women.^{2,8} However, there is a common misconception that women are at a lower risk, based on the belief that they are less susceptible to cardiovascular diseases. Moreover, the presentation of conditions such as STEMI in women often differs from that in men, who typically experience the classic symptom of chest pain. Women, on the other hand, tend to present with other signs and symptoms that can obscure the initial diagnostic suspicion, delaying self-recognition,

Table 1 – Baseline characteristics of the population with STEMI in a private hospital in Salvador, Brazil, from 2021 to 2023

Variables	
Age, median [p25; p75]	64 [58; 75]
Sex, n (%)	
Female	23 (30.7)
Male	52 (69.3)
HTN, n (%)	53 (70.7)
DM, n (%)	26 (34.7)
Hyperlipidemia, n (%)	38 (50.7)
Obesity, n (%)	15 (20)
Current smoking, n (%)	8 (10.7)
Previous MI, n (%)	7 (9.3)
Killip class, n (%)	
I	64 (85.3)
II	3 (4)
III	2 (2.7)
IV	5 (6.7)
GRACE score, median [p25; p75]	115 [97;138]
LVEF (%), median [p25; p75]	53 [44; 62]
PCI, n (%)	
Primary	70 (93.3)
Facilitated	1 (1.3%)
Rescue	1 (1.3%)
Access route, n (%)	
Radial	69 (92)
Femoral	5 (6.7)
Others	1 (1.3)
ASA, n (%)	75 (100)
P2Y12 inhibitor, n (%)	
Ticagrelor	36 (48)
Prasugrel	29 (38.7)
Clopidogrel	10 (13.3)

ASA: aspirin; DM: diabetes mellitus; HTN: hypertension; LVEF: left ventricular ejection fraction; MI: myocardial infarction; PCI: primary coronary intervention.

seeking emergency medical care, and diagnosis by healthcare professionals. The Central Illustration summarizes the main differences observed between male and female patients with STEMI in terms of treatment times and clinical characteristics.

Large registries and observational studies on patients with acute coronary syndrome have reported a male predominance, with approximately 70% of cases occurring in men and 30% in women.^{4,9-12} These findings are consistent

with the results of the present study, which found 69.3% of cases in men and 30.7% in women, reflecting a higher diagnosis rate of STEMI in the male population. Furthermore, this sex disparity highlights the underrepresentation of women in major clinical trials that have tested the therapies currently used for treating these patients.

In our study, the median age was higher in women, aligning with previous literature that reports an older average age among female patients.^{4,9} This phenomenon may be explained by the loss of hormonal protection after menopause, which is associated with a lower incidence of cardiovascular events in younger women.^{4,6,13} As described by Mehta et al., the decline in estrogen levels leads to increased endothelial dysfunction and lipid deposition in blood vessels.³

The risk factors for STEMI are well established in both the medical literature and clinical practice, though their prevalence may vary between sexes. Risk factors traditionally associated with the female population, such as hypertension, dyslipidemia, and obesity, have been reported in previous studies.^{3,4,6,11,14-17} In the Brazilian VICTIM registry, conducted in the state of Sergipe with a population similar to that of the present study, women were found to have higher rates of diabetes mellitus (42% versus 28.5%; $p < 0.001$) and hypertension (75.1% versus 59%; $p < 0.001$) compared to men. However, in our study, no statistically significant difference was observed in the prevalence of risk factors between sexes, which may be attributed to a potential type II error resulting from a small sample size, insufficient to detect significant differences.

Smoking is a major risk factor for coronary artery disease, with an unequal incidence between sexes, being more prevalent among men. This has been reported by Ya'qoub et al., Gabani et al., Riehle et al., Arias-Mendoza et al., and Valero-Masa et al. This discrepancy may be linked to socioeconomic and cultural factors, as well as a higher prevalence of risk behaviors among men.^{4,11,17} However, no such difference was observed in the present study.

The study analyzed the Killip classification, used for stratifying heart failure severity, and the GRACE score, employed to assess morbidity and mortality risk in patients with acute coronary syndrome from hospitalization to 6 months post-event. Regarding these tools, no statistically significant differences were found in the distribution of Killip classes or median GRACE scores between sexes. However, other studies, such as the Mexican retrospective cohort by Arias-Mendoza et al., reported that 49.9% of women presented with Killip class II, III, or IV, compared to 38.2% of men. This finding was supported by the Brazilian VICTIM registry, which also indicated a higher proportion of women with Killip class II or higher (21.4% versus 14.1%; $p = 0.018$). These data suggest a potentially greater disease severity and higher mortality rate among women, aligning with the findings of Silva et al.¹⁵

Regarding the P2Y12 inhibitor used as an antiplatelet agent, our study found a preference for more potent drugs (ticagrelor and prasugrel over clopidogrel), regardless of sex. Ticagrelor was more frequently prescribed to women, while prasugrel was predominantly used in men. This difference in drug selection is directly related to the institutional protocol,

Table 2 – Comparison of clinical characteristics between men and women

	Women (n = 23)	Men (n = 52)	P value
Age, median [p25; p75]	73 [62; 80]	62.5 [55.3; 62.8]	0.002
HTN, n (%)	18 (78.3)	35 (67.3)	0.337
DM, n (%)	8 (34.8)	18 (34.6)	0.989
Hyperlipidemia, n (%)	11 (47.8)	27 (51.9)	0.743
Obesity, n (%)	3 (13)	12 (23.1)	0.353
Current smoking, n (%)	19 (82.6)	8 (15.4)	0.183
Previous MI, n (%)	1 (4.3)	6 (11.5)	0.479
Killip class, n (%)			
I	19 (82.6)	45 (86.5)	0.404
II	2 (8.7)	1 (1.9)	
III	0 (0)	2 (3.8)	
IV	2 (8.7)	3 (5.8)	
GRACE score, median [p25; p75]	124 [106;141]	110.5 [94.25;132.75]	0.085
LVEF (%), median [p25; p75]	54 [42; 62]	53 [47; 62.75]	0.339
PCI, n (%)			0.639
Primary	21 (91.3)	49 (94.2)	
Access route, n (%)			
Radial	22 (95.7)	47 (90.4)	0.104
Femoral	0 (0)	5 (9.6)	
Others	1 (4.3)	0 (0)	
ASA, n (%)	23 (100)	52 (100)	.
P2Y12 inhibitor, n (%)			
Ticagrelor	15 (65.2)	21 (40.4)	0.047
Prasugrel	4 (17.4)	25 (48.1)	0.012
Clopidogrel	4 (17.4)	6 (11.5)	0.492

ASA: aspirin; DM: diabetes mellitus; HTN: hypertension; LVEF: left ventricular ejection fraction; MI: myocardial infarction; PCI: primary coronary intervention.

which recommends more potent antiplatelet agents as first-line therapy. The higher frequency of ticagrelor use in women may be associated with their median age of 73 years, as per institutional protocol and scientific evidence, which advise against prasugrel in older patients due to an increased risk of bleeding.^{1,18}

Sex-related differences documented in the literature extend beyond disease presentation, diagnosis, and management, with women experiencing a higher incidence of post-STEMI complications, including cardiogenic shock and procedural complications such as hematomas at the access site.^{5,7,10,12,19-21} The current study showed a low incidence of clinically significant hematomas and vascular complications in both sexes, which may be attributed to the adoption of a specific institutional protocol for the procedure and post-procedural care.

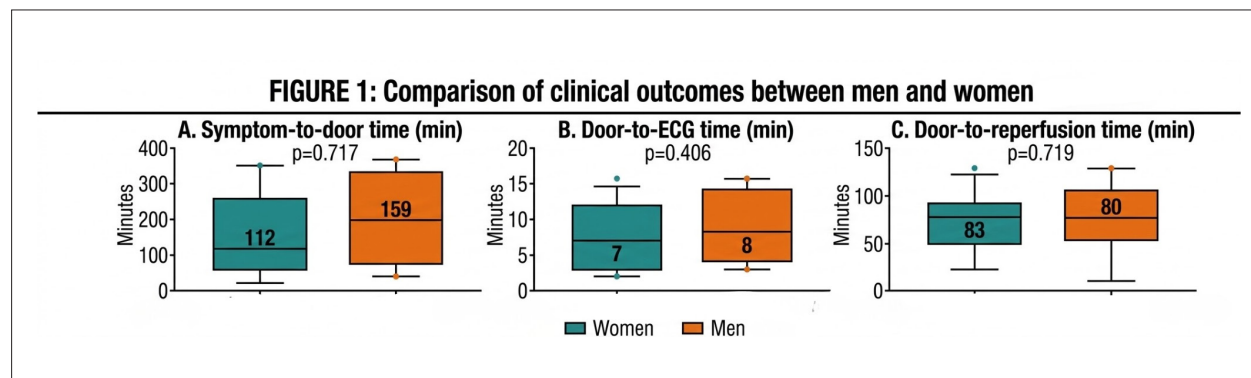
Regarding initial diagnosis and management, this study also compared symptom-to-door, door-to-ECG,

and door-to-reperfusion times. However, no statistically significant differences were observed between sexes in these parameters. Previous studies, however, have reported longer treatment times for women compared to men.^{17,22-24} This discrepancy may be explained by the implementation of an institutional protocol for STEMI management, in place for over 10 years at our institution, as well as the fact that most emergency patients were already being followed in the hospital's cardiology outpatient clinic.

Consistent with our findings, studies such as the one by Kaul et al. have shown a trend toward reduced treatment times over the years.²³ Their study compared data from two cohorts in different periods (2000 to 2002 and 2006 to 2008) and found that the median symptom-to-door time decreased from 121 to 81 minutes in women and from 84 to 59 minutes in men ($p < 0.01$), highlighting a reduction in delays in seeking medical care.

Table 3 – Comparison of clinical outcomes between men and women

	Women	Men	P value
Hematoma, n (%)	2 (8.7)	0 (0)	
Symptom-to-door time, median [p25; p75]	112 [57.8; 255]	159 [72.3; 331]	0.717
Door-to-ECG time, median [p25; p75]	7 [3; 12]	8 [4; 14.5]	0.406
Door-to-reperfusion time, median [p25; p75]	83 [53.3; 92.8]	80 [58; 110.5]	0.719


Figure 1 – Comparison of treatment times between female and male sex in a private hospital in Salvador, Brazil, from January 2021 to June 2023

The study by Riehle et al., a large German cohort, also compared patient outcomes between 2008 and 2019, showing a reduction in symptom-to-door and door-to-reperfusion times in both sexes.¹⁷ However, these times remained longer for women. Such findings reflect improvements in processes, including institutional protocols and staff training, but also indicate room for further improvements to provide a more tailored treatment approach that considers sex-specific disease characteristics.

This study had some limitations inherent to its observational design. Firstly, it was conducted at a single center, specifically a private institution in an affluent neighborhood of Salvador, where a standardized protocol and a trained team manage acute coronary syndromes. This setting limits the generalizability of the results, as socioeconomic differences and variations in hospital resources may influence treatment outcomes. Additionally, the presence of a structured STEMI management protocol at the study site may have introduced institutional bias, impacting data uniformity. The relatively small sample size also reduced the statistical power of the analysis, limiting the ability to detect significant differences between groups.

These limitations highlight the need for caution when extrapolating these findings to other populations and settings. Multicenter studies with larger and more diverse samples may enhance the external validity of the results and overcome some of the identified barriers, allowing for more robust and comprehensive analysis of the clinical and epidemiological profile of STEMI in different contexts.

Conclusion

Cardiovascular diseases, particularly STEMI, remain one of the leading causes of global morbidity and mortality, significantly affecting both sexes. However, women often have different pathophysiological mechanisms than men, tend to have more risk factors, and present with atypical clinical manifestations. These factors contribute to delays in self-recognition, diagnosis, and treatment, negatively impacting outcomes. As a result, response times and risk and mortality stratification scores tend to be less favorable for the female population.

Although some progress has been made in reducing response times, treatment disparities between the sexes remain evident worldwide. However, our study, conducted at a private institution with an institutional STEMI care protocol managed for over 10 years, suggests that it is possible to equalize these data between men and women.

This reinforces the need to equitably include women in clinical trials and to adapt guidelines that account for their biological and clinical specificities. Recognizing the differences in pathophysiology, presentation, and progression of STEMI between the sexes is essential for implementing more personalized care. Such personalization can result in more effective interventions, contributing to improved clinical outcomes for women and a more efficient approach to managing cardiovascular diseases in general.

Author Contributions

Conception and design of the research, acquisition of data, analysis and interpretation of the data and critical revision of the manuscript for intellectual content: Moraes HGM, Carneiro MGB, Dracoulakis MDA; statistical analysis: Carneiro MGB, Dracoulakis MDA; writing of the manuscript: Moraes HGM.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Study Association

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References

1. Ibáñez 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. *Rev Esp Cardiol*. 2017;70(12):1082. doi: 10.1016/j.rec.2017.11.010.
2. Ralapanawa U, Sivakanesan R. Epidemiology and the Magnitude of Coronary Artery Disease and Acute Coronary Syndrome: A Narrative Review. *J Epidemiol Glob Health*. 2021;11(2):169-77. doi: 10.2991/jegh.k.201217.001.
3. 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.
4. Valero-Masa MJ, Velásquez-Rodríguez J, Díez-Delhoyo F, Devesa C, Juárez M, Sousa-Casasnovas J, et al. Sex Differences in Acute Myocardial Infarction: Is it Only the Age? *Int J Cardiol*. 2017;231:36-41. doi: 10.1016/j.ijcard.2016.11.010.
5. Mahowald MK, Alqahtani F, Alkhouli M. Comparison of Outcomes of Coronary Revascularization for Acute Myocardial Infarction in Men versus Women. *Am J Cardiol*. 2020;132:1-7. doi: 10.1016/j.amjcard.2020.07.014.
6. Oliveira GMM, Almeida MCC, Rassi DDC, Bragança ÉOV, Moura LZ, Arrais M, et al. Position Statement on Ischemic Heart Disease - Women-Centered Health Care - 2023. *Arq Bras Cardiol*. 2023;120(7):e20230303. doi: 10.36660/abc.20230303.
7. Liakos M, Parikh PB. Gender Disparities in Presentation, Management, and Outcomes of Acute Myocardial Infarction. *Curr Cardiol Rep*. 2018;20(8):64. doi: 10.1007/s11886-018-1006-7.
8. 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.
9. Arias-Mendoza A, González-Pacheco H, Álvarez-Sangabriel A, Gopar-Nieto R, Rodríguez-Chávez LL, Araiza-Garaygordobil D, et al. Women with Acute Myocardial Infarction: Clinical Characteristics, Treatment, and in-Hospital Outcomes from a Latin American Country. *Glob Heart*. 2023;18(1):19. doi: 10.5334/gh.1196.

Ethics Approval and Consent to Participate

This study was approved by the Ethics Committee of the Hospital da Bahia under the protocol number 6.724.095. All the procedures in this study were in accordance with the 1975 Helsinki Declaration, updated in 2013. Informed consent was obtained from all participants included in the study.

Use of Artificial Intelligence

During the preparation of this work, the author(s) used Chat GPT (Open AI) for language editing and grammar correction. After using this tool/service, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the published article.

Availability of Research Data

All datasets supporting the results of this study are available upon request from the corresponding author.

10. Otten AM, Maas AH, Ottervanger JP, Kloosterman A, van 't Hof AW, Dambrink JH, et al. Is the Difference in Outcome between Men and Women Treated by Primary Percutaneous Coronary Intervention Age Dependent? Gender Difference in STEMI Stratified on Age. *Eur Heart J Acute Cardiovasc Care*. 2013;2(4):334-41. doi: 10.1177/2048872612475270.
11. Ya'qoub L, Lemor A, Dabbagh M, O'Neill W, Khandelwal A, Martinez SC, et al. Racial, Ethnic, and Sex Disparities in Patients with STEMI and Cardiogenic Shock. *JACC Cardiovasc Interv*. 2021;14(6):653-60. doi: 10.1016/j.jcin.2021.01.003.
12. Oliveira JC, Barros MPS, Barreto IDC, Silva RC Filho, Andrade VA, Oliveira AM, et al. Access to Reperfusion Therapy and Mortality in Women with ST-Segment-Elevation Myocardial Infarction: VICTIM Register. *Arq Bras Cardiol*. 2021;116(4):695-703. doi: 10.36660/abc.20190468.
13. Brush JE Jr, Krumholz HM, Greene EJ, Dreyer RP. Sex Differences in Symptom Phenotypes among Patients with Acute Myocardial Infarction. *Circ Cardiovasc Qual Outcomes*. 2020;13(2):e005948. doi: 10.1161/CIRCOUTCOMES.119.005948.
14. Humphries KH, Norris CM, Pilote L. Sex Differences in Acute Myocardial Infarction: Good News and Bad News. *Can J Cardiol*. 2022;38(11):1661-3. doi: 10.1016/j.cjca.2022.08.227.
15. Silva JSN, Barros IML, Guimarães JAN, Cao D, Martins SM, Carvalho TXM, et al. Beyond the GRACE ACS Score: Do We Need a Different Model for Men and Women after STEMI? *Arq Bras Cardiol*. 2024;121(4):e20230060. doi: 10.36660/abc.20230060.
16. Cenko E, Yoon J, Kedev S, Stankovic G, Vasiljevic Z, Krljanac G, et al. Sex Differences in Outcomes after STEMI: Effect Modification by Treatment Strategy and Age. *JAMA Intern Med*. 2018;178(5):632-9. doi: 10.1001/jamainternmed.2018.0514.
17. Riehle L, Gothe RM, Ebbinghaus J, Maier B, Bruch L, Röhnisch JU, et al. Implementation of the ESC STEMI Guidelines in Female and Elderly Patients Over a 20-Year Period in a Large German Registry. *Clin Res Cardiol*. 2023;112(9):1240-51. doi: 10.1007/s00392-023-02165-9.
18. Piegas L, Timerman A, Feitosa G, Nicolau J, Mattos L, Andrade M, et al.. V Diretriz da Sociedade Brasileira de Cardiologia sobre Tratamento do Infarto Agudo do Miocárdio com Supradesnível do Segmento ST. *Arq Bras Cardiol*. 2015;105(2):1-21. doi: 10.5935/abc.20150107.

19. Sielski J, Kaziród-Wolski K, Jurys K, Wafek P, Siudak Z. The Effect of Periprocedural Clinical Factors Related to the Course of STEMI in Men and Women Based on the National Registry of Invasive Cardiology Procedures (ORPKI) between 2014 and 2019. *J Clin Med*. 2021;10(23):5716. doi: 10.3390/jcm10235716.
20. Sawano M, Lu Y, Caraballo C, Mahajan S, Dreyer R, Lichtman JH, et al. Sex Difference in Outcomes of Acute Myocardial Infarction in Young Patients. *J Am Coll Cardiol*. 2023;81(18):1797-806. doi: 10.1016/j.jacc.2023.03.383.
21. Sun Y, Feng L, Li X, Gao R, Wu Y. The Sex Difference in 6-Month MACes and Its Explaining Variables in Acute Myocardial Infarction Survivors: Data from CPACS-3 Study. *Int J Cardiol*. 2020;311:1-6. doi: 10.1016/j.ijcard.2020.03.043.
22. Bugiardini R, Ricci B, Cenko E, Vasiljevic Z, Kedev S, Davidovic G, et al. Delayed Care and Mortality among Women and Men with Myocardial Infarction. *J Am Heart Assoc*. 2017;6(8):e005968. doi: 10.1161/JAHA.117.005968.
23. Kaul P, Armstrong PW, Sookram S, Leung BK, Brass N, Welsh RC. Temporal Trends in Patient and Treatment Delay among Men and Women Presenting with ST-Elevation Myocardial Infarction. *Am Heart J*. 2011;161(1):91-7. doi: 10.1016/j.ahj.2010.09.016.
24. Brush JE Jr, Chaudhry SI, Dreyer RP, D'Onofrio G, Greene EJ, Hajduk AM, et al. Sex Differences in Symptom Complexity and Door-to-Balloon Time in Patients with ST-Elevation Myocardial Infarction. *Am J Cardiol*. 2023;197:101-7. doi: 10.1016/j.amjcard.2023.03.009.



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