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# Gender differences in the characteristics of acute coronary syndromes in Malagasy patients

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## Abstract

**Introduction:** Acute coronary syndromes constitute a diagnostic and therapeutic emergency. A difference has been observed between the sexes in the characteristics of these pathologies in terms of clinical, electrical and evolutionary manifestations [1, 2]. This first Malagasy study aims to determine the gender-specific characteristics of acute coronary syndromes with a view to implementing an appropriate and personalised diagnostic and therapeutic approach.

**Methods:** This is a retrospective descriptive and comparative study over a two-year period of 242 patients admitted to the cardiology department of the CHU-JR Befelatanana Antananarivo hospital with acute coronary syndrome.

**Results:** We found a male predominance of acute coronary syndromes with a sex ratio of 1.72. The average age of onset of these conditions was later in women than in men (p = 0.027). Women experienced more atypical pain, while men experienced more anginal pain (p = 0.006 and 0.001). Men had a four times higher risk of in-hospital death than women (p = 0.042).

**Conclusion:** A gender difference was also found in Malagasy patients with regard to the characteristics of acute coronary syndromes. Knowledge of these gender-specific characteristics of these pathologies plays a significant role in conducting an appropriate diagnostic approach to improve patient prognosis according to their individual risk.

**Keywords:** Clinical and electrocardiographic aspects; Gender; Acute coronary syndrome; Prognosis

## 1. Introduction

Acute coronary syndromes (ACS) constitute a major medical emergency. Previous studies have highlighted gender differences in the manifestation of ACS [1,2]. Furthermore, according to a meta-analysis, differences have been found in cardiovascular disease between males and females [3]. This article aims to explore these differences in the Malagasy population by determining the gender-based differences in the clinical and electrical characteristics of ACS.

## 2. Methods

This was a retrospective, comparative and analytical study of Malagasy patients admitted to the conventional cardiology department of the CHU-JR Befelatanana, Antananarivo, Madagascar between 2021 and 2023. We included all patients

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admitted with clinical, electrical and biological signs of acute coronary syndromes with or without permanent ST segment elevation. Due to the inaccessibility of coronary angiography for financial reasons, all patients with a strong suspicion of myopericarditis based on a combination of clinical, electrical and/or biological arguments were excluded.

## 3. Results

Of the 240 patients selected, our study found a predominance of males, representing 63.33% (n = 152) compared to 36.67% (n = 88) for females, giving a sex ratio of 1.72. ACS occurred later in women than in men, with respective mean ages of 62.76 ± 10.17 years and 59.32 ± 12.29 years. This difference was significant with p = 0.027. There was no significant difference between genders in terms of whether or not chest pain was perceived (p = 0.457). However, women experienced more atypical chest pain (p = 0.006; OR = 0.44[0.23 - 0.82]), unlike men, who experienced more anginal pain (p = 0.001, OR = 2.59[1.38 – 4.92]). ACS with persistent ST-segment elevation was more common in men than in women (37.5% vs. 30.68%). As for ACS without persistent ST segment elevation, it was more prevalent in women, whether myocardial infarction without persistent ST segment elevation (45.45% versus 45.39%) or unstable angina (23.86% versus 17.11%). However, these differences were not significant (p = 0.177, 0.549 and 0.135, respectively). In terms of outcome, men were four times more likely to die in hospital than women (p = 0.042; OR = 4 [0.99–26.73]).

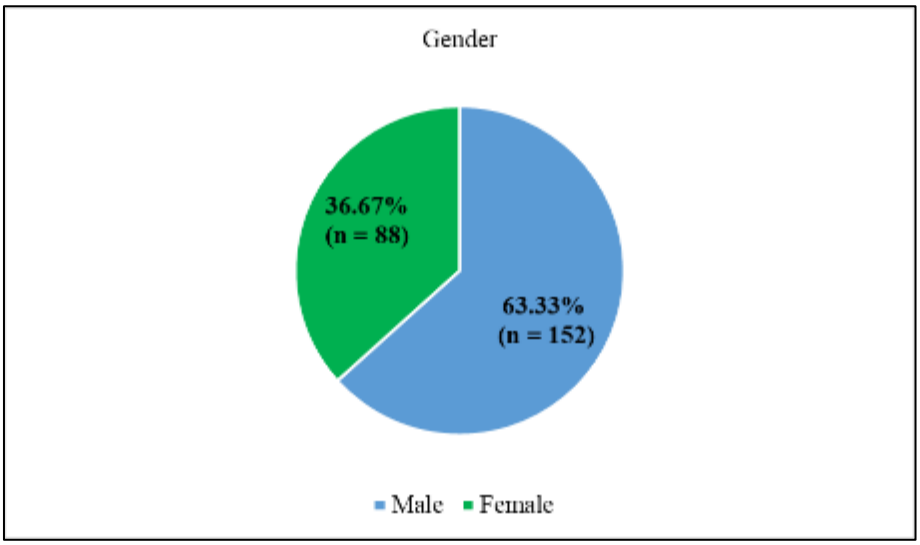


**Figure 1** Distribution of acute coronary syndromes by gender

**Table 1** Distribution of characteristics of acute coronary syndromes and progression by gender

| | **Male** | **Female** | **P** | **OR** | **IC à 95%** |
|---|---|---|---|---|---|
| Mean age | 59,32 ± 12,29 ans | 62,76 ± 10,17 ans | 0,027 | | |
| Presence of chest pain | 75,34% (n = 110) | 73,81% (n = 62) | 0,457 | 1,0 | 0,57 – 2,00 |
| Atypical pain | 39,66% ( n = 46) | 59,7% (n = 40) | 0,006 | 0,4 | 0,23 – 0,82 |
| Angina pain | 56,03% (n = 65) | 32,84% (n = 22) | 0,001 | 2,59 | 1,38 – 4,92 |
| STEMI | 37,5% (n = 57) | 30,68% (n = 27) | 0,177 | 1,35 | 0,77 – 2,39 |
| NSTEMI | 45,39% (n = 69) | 45,45%) (n = 40) | 0,549 | 0,99 | 0,58 - 1,69 |
| Unstable angina | 17,11% | 23,86% | 0,135 | 0,65 | 0,34-1,27 |

| | | | | | |
|---|---|---|---|---|---|
| | (n =26) | (n =21) | | | |
| Death | 8,55%<br>(n = 13) | 2,27%<br>(n = 2) | 0,042 | 4 | 0,99-26,73 |

## 4. Discussions

We found a male predominance among patients admitted for acute coronary syndromes, a result identical to that found by other authors such as Revaiah and colleagues [4]. This male predominance, as in most cardiovascular diseases, could be linked to hormonal and environmental factors, lifestyle, and associated cardiovascular risk factors that differ between men and women, resulting in women being better protected against cardiovascular disease than men [5].

Women with acute coronary syndrome had a higher mean age than men in our study, with a statistically significant difference. Other Chinese, Australian, Canadian, and South Korean studies have also found the same results with a statistically significant difference [6–9]. This later onset of acute coronary syndrome in women (around 60 years of age) compared to men could be explained by the protective effect of oestrogen in women on cardiovascular events before the menopause [10].

Regarding clinical presentation, we found no significant difference between the two sexes in terms of the sensation or perception of chest pain. Dey and colleagues also found the same result [11]. This contrasts with the findings of Canto JG, who reported that the absence of chest pain was more common in women than in men [12]. Regarding the characteristics of the pain experienced, women tended to experience atypical pain, while men mainly experienced anginal pain, with a statistically significant difference in our study. Other authors also found the same result, indicating that women experienced more atypical pain compared to men [13, 14].

In our study, acute coronary syndrome with ST segment elevation was common in men, while women were more likely to present with acute coronary syndrome without ST segment elevation or unstable angina, but the difference was not significant. This gender-based distribution of the type of pathology was also demonstrated in other studies, including that of Hochman JS and colleagues, with a statistically significant difference [15]. As in our study, a male predominance for acute coronary syndrome with persistent ST-segment elevation was also reported by Jneid H and colleagues [16].

Regarding patient outcomes, men had a higher risk of in-hospital death compared to women in our study, with a significant difference. Our result differed from that found by Poon MD S et al, who found that women had poorer in-hospital outcomes compared to men [8]. In another study, there was no significant difference in mortality and morbidity risk between the two sexes. The difference in results could be related to associated comorbidities in patients, which were more common in older women than in men, or identical in other studies, unlike our patients [9].

## 5. Conclusion

Acute coronary syndromes were still frequent causes for hospitalisation in cardiology departments in both developing and developed countries. A difference in the presentation of these conditions was observed between men and women, including Malagasy patients. Knowledge of these differences allows clinicians to pay particular attention to women, who are known to have atypical clinical presentations and poor prognoses, in order to avoid diagnostic errors and delays in treatment.

## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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