SEX-STRATIFIED CHARACTERISTICS OF SUSPECTED MYOCARDIAL INFARCTION IN YOUNG PATIENTS ATTENDED BY EMS

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INTRODUCTION

Increased age is a risk factor for acute myocardial infarction (MI). However, in recent years, there has been an increase in young adults presenting with MI, particularly young females.[1] Young females have been shown to have worse outcomes after experiencing MI.[2] Additionally, though individuals experiencing MI may greatly benefit from using Emergency Medical Services (EMS), prior studies have found younger individuals less likely to call EMS when experiencing cardiac symptoms.[3] There is limited information on characteristics of these younger individuals and how they differ between sexes.

OBJECTIVES

The purpose of this study is to describe sex-stratified characteristics and patient demographics of young suspected MI patients attended by EMS.

METHODS

- We analyzed 9-1-1 calls using the 2022-23 ImageTrend Collaborate Dataset.
- Inclusion criteria: patients aged 35-54 with a suspected MI based on a primary or secondary impression of MI (ICD-10 codes I21) or ECG interpretation of ST elevation MI (STEMI)
- Exclusion criteria: patient had cardiac arrest documented or sex not documented
- Descriptive statistics were calculated for age, race/ethnicity, urbanicity, dispatch reasons, minutes between symptom onset to EMS activation, time on scene, symptoms, ECG usage, and patient disposition.
- Chi-square or Wilcoxon rank-sum tests were used for proportion comparisons.

References:

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TABLE 1. Characteristics of Suspected Myocardial Infarction in Young Patients Attended by EMS

Characteristic[+]	*Total (n=8,012)*	*Females (n=2,343)*	*Males (n=5,669)*
Age (median ± IQR)	48 ± 9	48 ± 9	48 ± 9
Race/Ethnicity			
Non-Hispanic White	4,176 (52.1)	1,260 (53.8)	2,916 (51.4)
Non-Hispanic Black	1,215 (15.2)	337 (14.4)	878 (15.5)
Hispanic	792 (9.9)	245 (10.5)	547 (9.6)
Other/Multiple Races	654 (8.2)	190 (8.1)	464 (8.2)
Missing	1,175 (14.7)	311 (13.3)	864 (15.2)
Urbanicity			
Metro Area	6,619 (82.6)	1,953 (83.4)	4,666 (82.3)
Non-Metro Area	707 (8.8)	201 (8.6)	506 (8.9)
Rural	502 (6.3)	136 (5.8)	366 (6.5)
Missing	184 (2.3)	53 (2.3)	131 (2.3)
Top 3 Dispatch Reasons			
Chest Pain (Non-Traumatic)*	4,243 (52.9)	1,293 (55.2)	2,950 (52.0)
Heart Problems/AICD	599 (7.5)	163 (7.0)	436 (7.7)
Breathing Problem	595 (7.4)	190 (8.1)	405 (7.1)
Minutes Between Symptom Onset to EMS Activation (median ± IQR)[b]*	36.9 ± 121.7	40.0 ± 163.9	34.8 ± 106.2
Missing/excluded	3,208 (40.0)	1,041 (44.4)	2,166 (38.2)
Time on scene (median ± IQR)[b]*	14.4 ± 8.3	15.5 ± 8.3	14.0 ± 8.3
Missing/excluded	317 (4.0)	127 (5.4)	190 (3.4)
Top 3 Symptoms[c]			
Chest pain	5,815 (72.6)	1,714 (73.2)	4,101 (72.3)
Shortness of breath	934 (11.7)	257 (11.0)	677 (11.9)
Nausea/vomiting*	622 (7.8)	228 (9.7)	394 (7.0)
ECG performed - Yes	6,733 (84.0)	1,744 (74.4)	4,989 (88.0)
STEMI Identified on ECG[d]	2,237 (33.2)	582 (33.4)	1,655 (33.2)
Patient Disposition*			
Transported	7,806 (97.4)	2,256 (96.3)	5,550 (97.9)
Not Transported	204 (2.5)	87 (3.7)	117 (2.1)

*Significant p-value: p<0.05
*Values are displayed n (%) unless otherwise specified
[a]Individuals with <0 or ≥1440 minutes (24 hours) between incident onset and EMS activation are excluded
[b]Individuals with<0 or ≥ 90 minutes on scene are excluded
[c]Individuals may have more than one symptom
[d]Percentage of patients who had an ECG performed

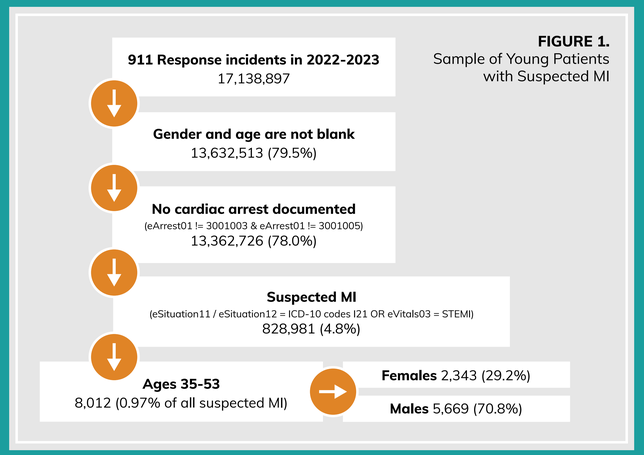

FIGURE 1. Sample of Young Patients with Suspected MI

RESULTS

- Final sample of 2,343 (29.2%) females and 5,669 (70.8%) males.
- The median age of both groups was 48.
- The majority of both groups were non-Hispanic White (53.8% and 51.4%) and from a metro area (83.4% and 82.3%).
- Top 3 dispatch reasons: chest pain (non-traumatic), heart problems/AICD, and breathing problem
- Top 3 symptoms: chest pain, nausea/vomiting, shortness of breath
- A higher proportion of females experienced chest pain and nausea/vomiting compared to males.
- 74.4% and 88.0% of females and males had an ECG performed; of these individuals, 33.4% and 33.2% had a STEMI identified.
- Females had significantly longer time between symptom onset and EMS activation (40.0 vs 34.8 minutes), a significantly longer time on-scene (15.5 vs 14.0 minutes), and a significantly lower proportion of transports (96.3% vs. 97.9%).

LIMITATIONS

- We used primary/secondary impression and ECG interpretation to define "suspected" MI, which may not capture all true MI cases.
- Symptom documentation may be incomplete.

CONCLUSION

Young females and males had significant differences in time between symptom onset to EMS activation, time on-scene, and patient disposition. This suggests the need for additional studies and future interventions to promote wider and prompter use of EMS when young females experience possible MI symptoms. Females also had fewer ECGs performed compared to males. Despite this difference, the same percentage of males and females had a STEMI identified through the ECG, suggesting that wider use of ECGs on females experiencing possible MI symptoms may lead to more prompt care and ultimately improved health outcomes for this vulnerable group.