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Research Article

HOW INFORMED ARE THE SAUDI PUBLIC ABOUT THE NEED TO CALL EMERGENCY MEDICAL SERVICES FOLLOWING THE ONSET OF ACUTE MYOCARDIAL INFARCTION

Abdullah Abdulrahman Albassam¹, Khalid Abdulaziz Aldihan¹, Abdulmalik Yousef Alnasyan¹, Abdulaziz Gassam Alotaibi¹, Abdullah Eid Abdulaal¹, Omar Majed Alobaid¹, Ihab Suliman².

¹ College of Medicine, King Saud Bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia.

² Cardiac Centre, King Abdulaziz Medical City, Riyadh, Saudi Arabia.

Abstract:

Objective: To assess the factors that are associated with patients delay to call EMS when MI onset occur.

Methods: A cross-sectional community-based survey was conducted in Riyadh, Saudi Arabia between May and July 2018 to recognize the factors that held most important regarding the correct time and response to the onset of MI. The questionnaire was distributed directly to the participants in Riyadh public facilities i.e. shopping malls and public parks. Participants response to EMS at the onset AMI was the primary outcome and outcome was divided into on-time (daytime) and off-time (nights and holidays).

Results: This study involved 395 Saudi participants. The mean age of the participants was 33.19±14.16. Diabetes and hypertension affected 13.5% and 11.5% of the participants, respectively. In off-time male participants were more likely to call EMS compare to female participants (42.2% vs 23.4%, p = 0.000). Participants with history of AMI, stroke or both and participants with no history of them didn't show any significant differences both in on-time or off-time. Muscular pain was the common reason why participants chose to wait both on-time (76.1%) and off-time (76.2%).

Conclusion: There is lack of awareness of the importance of early response to EMS. More awareness campaigns should be encouraged to avoid serious complications.

Keywords: Response to EMS, AMI, Patient Delay, Saudi Arabia.

Corresponding author:

Abdullah Abdulrahman Albassam,
College Of Medicine,
King Saud Bin Abdulaziz University for Health Sciences,
Riyadh, Saudi Arabia.
E-Mail: Albassam009@gmail.com

QR code



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INTRODUCTION:

Coronary artery diseases (CAD) have been link with severe morbidity and mortality. In addition, CAD have been recognized as the leading cause of death worldwide. Globally, World Health Organization estimated that myocardial infraction (MI) responsible for 7.3 million deaths annually.[1] The annual incidence of MI in the United States is around 1.5 million cases. [2]

Annually, significant number of MI morbidities and mortalities occur due to late recognition of MI symptoms. The early response and immediate intervention to the onset of MI symptoms can have dramatic impact on the prognosis. Unfortunately, people who experience the symptoms of MI, may not value the importance of early detection and immediate action, which lead them to permeant loss of myocardial function. [3-5]

MI patients experiences three phases. The first phase, which is from the onset of the symptoms until deciding to seek medical help or calling emergency medical services (EMS). Second phase is the transportation time which is from deciding to seek medical help to first medical encounter. The last phase is from admission till the start of treatment. [6] To decrease pre-hospital delay patients' needs to recognize symptoms early and immediate calling EMS. [7,8]

Many studies have emphasized on post-MI outcomes and survival. These studies have focused on patients care outcomes during hospitalization and post-hospitalization without considering per-hospital status. [3,9] Therefore, our objective was to assess the factors that are associated with patients delay to EMS when MI onset occur. We conducted a community-based survey to recognize the factors that held most important regarding the correct time and response to the onset of MI.

METHODS:

This is a cross-sectional community-based survey that was conducted in Riyadh, Saudi Arabia from the period between May and July 2018 to recognize the factors that held most important regarding the correct time and response to the onset of MI. Ethical approval was obtained by the Institutional Review Board, King Abdullah International Medical Research Center, Riyadh, Saudi Arabia. The study inclusion criteria were, Saudi citizen aged between 18 and 65 years since this group age represent the majority of the population and this age group can make appropriate emergency call.

The Saudi population is almost 20 Million based on the Saudi General Authority for Statistics. [10] By considering margin of error of 5% and the confidence level of 95%., The minimal sample size that can represent the Saudi population is 385. A total of 450 survey were distributed and the overall response rate was 88%.

Questionnaire design and outcome measure:

A previously validated questionnaire was used in the study [8] and it was distributed directly to the participants in Riyadh public facilities i.e. shopping malls and public parks. Participants signed an informed consent before answering the questions and the questionnaire included questions about demographic data, health status, history of hypertension, diabetes, acute myocardial infraction (AMI) and stroke. In addition, several questions to assess the participants' response to AMI condition. Participants response to EMS at the onset AMI was the primary outcome. The outcome was divided into on-time (daytime) and off-time (nights and holidays) since previous study indicated that there is difference in response between these periods. [11] Question regarding time to call EMS was asked and followed by questions exploring the reasons behind different response.

Statistical Analysis:

Data were analyzed using SPSS software version 22.0 (Armonk, NY: IBM Corp). Descriptive statistics were used to assess the baseline demographics, participants health status, chronic disease, history of acute myocardial infraction (AMI) and stroke factors and data were presented as frequencies and percentages. Chi-square or Fisher's exact test was used to compare between variables. All tests were considered statistically significant if the *p*-value was less than 0.05. The mean and standard deviation were calculated for participants age only.

RESULTS:

This study involved 395 Saudi participants. The mean age of the participants was 33.19±14.16. Female participants represent the majority of the respondents 56.2%. Most participants did not have nor their relatives any history of AMI or stroke (94.4% and 53.2%, respectively). 65.5% of respondents were healthy and did not suffer of any chronic disease. However, diabetes and hypertension affected 13.5% and 11.5%, of the participants, respectively.

The participants' response to calling EMS on-time and off-time were presented in table 1. Group aged ≥ 40 were more likely to call EMS in off-time compare to the young group (35.6% vs 29.3%) and

age groups did not show any significant difference in both on-time and off-time (p = 0.97 and p = 0.19, respectively) Table 1.

There was a significant difference between gender in both on-time and off-time response. Male participants were more likely to call EMS on-time (39.3%, p = 0.000). Moreover, in off-time, male participants were more likely to call EMS compare to female participants (42.2% vs 23.4%, p = 0.000).

Interestingly, having a history of AMI, stroke or not did not show any significant difference both in on-

time or off-time. However, relatives' history of AMI or stroke showed a significant difference, as those whose relatives' suffer from AMI or both AMI and stroke were more likely to call EMS (42.5% and 55.6%, respectively) (p = 0.000).

Participants suffer from hypertension were more likely to call EMS on-time (47.1%, p = 0.022) and off-time (54.9%, p = 0.004) compare to healthy participant and participants who have other comorbidities. There is no statistical difference in response to EMS between participants who discussed AMI symptoms with their doctor or not (p = 0.41 on-time, p = 0.22 off-time).

Table 1. Participant factors by EMS call or other response in on-time (daytime) or off-time (nights and holidays) hours

		On-time			Off-Time		
		EMS	Other	P value	EMS	Other	P value
Age Group	<40	246(62.3)	73(29.7)	0.97	72(29.3)	174(70.7)	0.19
	≥40	149(37.7)	44(29.5)		53(35.6)	96(64.4)	
	Mean ± SD	33.19±14.16					
Gender	Male	173(43.8)	68(39.3)	0.000*	73(42.2)	100(57.8)	0.000*
	Female	222(56.2)	49(22.1)		52(23.4)	170(76.6)	
Hx of MI or stroke	MI	14(3.5)	4(3.4)	0.95	3(2.40)	11(4.1)	0.64
	Stroke	8(2)	2(1.7)		2(1.60)	6(2.2)	
	None	373(94.4)	111(29.8)		120(32.17)	253(67.8)	
Relatives' Hx of MI or stroke	MI	80(20.2)	34(42.5)	0.000*	36(45)	44(55)	0.000*
	Stroke	69(17.5)	13(18.8)		13(18.8)	56(81.2)	
	Both	36(9.1)	20(55.6)		20(55.6)	16(44.4)	
	None	210(53.2)	50(23.8)		56(26.7)	154(73.3)	
Health State**	Healthy	291(65.5)	82(28.2)	0.022*	85(29.2)	206(70.79)	0.004*
	HTN	51(11.5)	24(47.1)		28(54.9)	23(45.10)	
	Dyslipidemia	36(8.1)	8(22.2)		9(25)	27(75)	
	DM	60(13.5)	20(33.3)		22(36.7)	38(63.3)	
	Other	6(1.4)	0(0)		1(16.7)	5(83.3)	

Data are presented as n (%).SD, standard deviation; EMS, emergency medical services; MI, myocardial infarction; Hx, History.

* Statistically significant value with P < 0.05.

** Multiple answers.

Participants' reasons for not responding to EMS call have been shown in table 2. Muscular pain was the commonest reason participants chose to wait both on-time (76.1%) and off-time (76.2%). Furthermore, waiting till the next day before calling EMS was the most chosen response. Only 19 participants on-time and 18 participants off-time chose to wait for less than hour before calling EMS. Almost 6.4% of the participants did not know how to call EMS. Most participants believed that the symptoms do not require calling EMS, 69.4% on-time and 65.2% off-time.

Table 2. Reasons for not responding EMS call		
	On-time	Off-Time
Waiting and see	117	126
Reason for waiting to call EMS*		
Muscle	89(76.1)	96(76.2)
Long Distance	8(6.8)	8(6.35)
No Person to Consult	8(6.8)	11(8.7)
Afraid	12(10.3)	10(7.9)
Other	0	1(0.8)
Duration of waiting and seeing		
<1 hour	19(16.2)	18(14.3)
1 to < 2 hour	22(18.8)	26(20.6)
2 to < 3 hours	17(14.5)	15(11.9)
3 to < 5 hours	9(7.7)	14(11.1)
5 hours to end of the day	14(12)	9(7.1)
Next Day	36(30.8)	44(34.9)
Reasons for not calling EMS*		
The symptoms do not require it	120(69.4)	107(65.2)
Feel embarrassed calling	7(4.05)	13(7.9)
Unknown how to call	11(6.4)	10(6.1)
Inconvenience for someone	23(13.3)	24(14.6)
Other	12(6.9)	10(6.1)

Data are presented as n (%).

** Multiple answers.

DISCUSSION:

This study aimed to assess the Saudi citizens' knowledge and awareness toward taking the correct action after experiencing AMI symptoms. It is important to recognize the relationship between public knowledge and familiarity regarding AMI symptoms and the decision to act upon them. By establishing this relationship, we can develop an educational intervention that will help the public to act appropriately when AMI symptoms begin. Based on the study result we can conclude that the public awareness is low when it is come to dealing with AMI attack. This low level of awareness can be seen in previous studies. [8,12]

The participants' gender, co-morbidity and relatives' history of AMI were effective factor to call EMS. A recent study conducted by Yonemato et al [8], showed a significant difference between genders in response to EMS on week days only, and there was no statically significant difference between genders in off-time or between participant who have history of AMI or stroke. On the other hand, this study showed a noticeable difference between genders regarding the decision to contact EMS, whereas the male participants were more likely to call the emergency services. Locally, this difference between male and female might be explained as some Saudi

female still prefer and feel more comfortable when they are taking care of by a female health worker, which may lead to delay in treatment. This difference can be also explained by the common mistake of labeling MI as "male disease" or by the women ability to adapt to their illness as suggested in previous systemic review article. [13]

Our results showed similarity to previous studies [8,14], regarding getting advice from a medical doctor which did not show any change in calling of EMS. This study did not demonstrate any significant variances in knowledge between age groups, similar to a study by Whitakera et al. [15]

In general, this study reports a nearly no difference between calling EMS on-time and off-time following experience AMI symptoms, likewise Yonemato et al. study. [8]

In conclusion, we recommend increasing the public knowledge and awareness about the EMS importance through the media including TV, radio, social media. Support should be provided for awareness campaigns in the shopping malls and other public facilities about AMI and other emergency conditions and the need of early response to EMS. Additionally, giving regular lectures for high school and college students about AMI symptoms and how-to response in such a

condition.

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