Assessment of Factors Associated with Prehospital Delay of Patients with Acute Myocardial Infarction

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المستخلص

الهدف: لتقييم العوامل المصاحبة لتأخر مراجعة المرضى المصابين باحتشاء العضلة القلبيّة الحادّ للمستشفى.

المنهجيـة: أجريت دراسة وصفية في مستشفى الكندي التعليمي، مستشفى ابن النفيس لأمراض القلب والشرايين التاجيـة التعليمي، مستشفى بغداد التعليمي، مستشفى اليرموك التعليمي ومستشفى الكاظمية التعليمي للمُدّة من الثاني من شهر شباط لعام ٢٠٠٩ ولغاية الثلاثين من شهر تشرين الأول ٢٠٠٩. اختيرت عينة عشوائية تتكون من ١٦٠مريضاً مصاباً باحتشاء العضلة القلبية الحادّ ومن الذينأُ دخلوا إلى وحدة الرعاية التاجية بالتتابع واحدً بعد الآخر. تمّ بناء استمارة استبيانية لغرض الدراسة تتكون من أربعة أجزاء ١. استمارة البيانات الديموغرافية ٢. وقت تأخر المرضى السابق لدخول المستشفى والذي تمّ قياسه من لحظة إحساس المريض بألم الصدر وحتى وصوله إلى وحدة الرعاية التاجية ٣. استمارة البيانات السريرية ٤. استمارةالبيانات المشتملة على العوامل المصاحبة لتأخر المرضى المطوّل السابق لدخول المستشفى للمرضى المصابين باحتشاء العضلة القلبية الحادّ جُمِعَت بيانات الدراسة باستعمال طريقة المقابلة الشخصية وسجلات المرضى.

النتائج: تشير نتائج الدراسة إلى أنّ أقل نسبة من المرضى المصابين باحتشاء العضلة القلبية قد وصلوا إلى المستشفى بواسطة سيارة الإسعاف (٣؛ ١.٩%) في حين أنّ (١٥٧؛ ٩٨%) من المرضى وصلوا إلى المستشفى بواسطة نقل خاصـة. استنتجت الدراسة بأنّ النسبة العالية من المرضى العراقيين لا يتصلون بالإسعاف بعد حدوثأعراض احتشاء العضلة القلبية الحادّ والذي يصاحبه ارتفاع في مقطع ST-.

التوصيات: توصي الدراسة بضرورة تثقيف المواطنين على ضرورة الاتصال بالإسعاف وهي ليست وسيلة نقل فقط، بل هي وسيلة للتشخيص والعلاج المبكر.

Abstract

Objective(s): to assess the factors which are associated with the prolonged prehospital delay of patients with acute myocardial infarction.

Methodology: A descriptive study was conducted at the Coronary Care unit (CCU) in Al-Yarmok Teaching Hospital, Ibn AL-Nafis Hospital for Cardiovascular Diseases, AL-Kadumia Teaching Hospital, Baghdad Teaching Hospital, and AL-Kindy Teaching Hospital during the period of the study from February 2nd, 2009 to October 30th, 2009. A random sample of (160) patient who were admitted to the hospitals were selected one by one. A questionnaire was constructed for the purpose of the study, which is comprised of four parts that include (1) sociodemographic data; (2) prehospital delay time was measured as the time which passed from the moment when the patient feels the first symptoms "chest pain" until his arrival to the Coronary Care Unit (CCU) (3) clinical data; (4) factors associated with the prolonged prehospital delay. The data were collected by the application of the questionnaire, the interview technique, observation and the patients' sheets.

Results: The study findings indicated that the low percentage of the patients with myocardial infarction used an ambulance (3; 1.9%) and the remaining (157; 98%) arrived at hospitals by self-transport. It is concluded that a large proportion of Iraqi patients did not call for an ambulance after the onset of ST–Elevation Myocardial Infarction (STEMI) symptoms.

Recommendations: The study recommends that the public should be educated that an ambulance is not merely a transportation modality, but also a means of providing early diagnosis and treatment.

Keywords: **Acute myocardial infarction; Prehospital delay**

Introduction

The prehospital delay remains one of the main causes of the reduced benefit of reperfusion therapy for the patients with an Acute Myocardial Infarction (AMI) [1]. It is important to identify how long and why the patients delay in seeking treatment after their symptoms appear and the factors that are associated with this delay [2]. Therefore several studies [3-6] have investigated how (AMI) patients think and act during symptom presentation. Another research [7] has found that the target phase of delay is the time taken by individuals to interpret their symptoms as cardiac in origin and decide to seek medical help. Rosenfeld et al. (2005) states that the course of the symptoms and the responses that make up that complex time span may be more useful in understanding the phenomenon of delay in seeking treatment [8]. Reducing the time between the onset of the symptoms and entry into the health care system is an important clinical and research priority [9]. An effort has been made to reduce the time between the onset of symptoms and the initiation of reperfusion therapy [10]. The time is an important variable because of its relationship to morbidity and mortality associated with myocardial infarction [11]. Bouma et al. (1999) stated that doctors and nurses played minimal roles in providing information about the symptoms of myocardial infarction, compared with knowledge gained from television, reading and friends. Populations support the assumption that individuals who are prepared for certain signs and symptoms will delay less in seeking care than individuals who have no such preparation [12]. The objective of our study was to assess factors associated with prolonged prehospital delay such as symptoms, thought and environmental factors.

Methodology

A descriptive design was conducted throughout the period from February, 2nd 2009 to October, 30th, 2009 at the CCU in Al-Yarmok Teaching Hospital, Ibn Al-Nafis Teaching Hospital for Cardiovascular Disease, Al-Kadumia Teaching Hospital, Baghdad Teaching Hospital, Al-Kindy Teaching Hospital to inspect duration of prehospital delay and its components and causes in the patients suffering from AMI.

A purposive sample of (160) patients were selected from the CCU. Those who met the criteria for selection were:

1. Patients who were (24) years old and older. 2- Patients free from mental disorders. 3- Patients who were able to speak Arabic or English. 4- patients who had hemodynamic stability. 5- patients who had no history of advanced malignancy or other debilitating disease. 6- Diagnosis of AMI was based on typical chest pain for at least 30 minutes; not relieved by rest or use of nitrate; ST-elevation of 0.2 mV or more in at least two contiguous electrocardiogram leads and a confirmatory, elevation in cardiac markers. 7- Patients who agree to participate in the study. 8- No educational levels were defined. The questionnaire consisted of (4) parts; part-I: sociodemographic data which is concerned with the collection of sociodemographic data obtained from the patients' chart or from the patients by interview; part-II: prehospitalization delay time. The prehospital delay time was measured as the time which extends from the moment when the patient feels the first symptoms "chest pain" until his arrival at the CCU unite. It includes the three phases of decision delay, transportation delay and hospital delay; part-III: clinical data which is concerned with the collection of clinical data; part-IV: factors associated with the prolonged prehospital delay which is concerned with factors associated with the prolonged prehospital delay that consisted of (3) dimensions: 1. Mode of transportation; 2. Reasons for not choosing an ambulance; 3. Reasons for hesitation to go hospital. Each item is measured on two level likert rating scale (No, and Yes) for the purpose of the descriptive statistical analysis. The rating scores of the items are zero for (No) and 1 for (Yes). The data were collected by the application of the questionnaire, interview technique and hospital records. Each interview took approximately (25-30) minutes. Validity of the questionnaire was determined through the use of a panel of (32) expert.

The data were analyzed through the application of descriptive statistical approach that includes frequency, percentage, arithmetic mean (X), mean of scores, standard deviation (SD), and the inferential statistical approach that includes chi-square test; 2. Contingency coefficient (C.C). Results were determined as highly significant at (P<0.01) significant at (P<0.05) and non-significant at (P>0.05).

Results:

Table 1. Distribution of the patients according to prehospital delay time (by hours) and sociodemographic characteristics

Sociodemographic Characteristics			Prehospital Delay time (hours)			Total	C.S. P-value
			≤6 (Hours.)	**>6-12 (Hours)**	**>12 (Hours.)**		
Sex	**Male**	Count	45	28	52	125	C.C. = 0.107 P = 0.398
		% of Total	36%	22.4%	41.6%	100%	
	Female	Count	12	5	18	35	
		% of Total	34.3%	14.3%	51.4%	100%	
	Total	Count	57	33	70	160	
		% of Total	35.6%	20.6%	43.8%	100%	
Age Group	**25-34**	Count	**3**	1	1	5	C.C. = 0.250 P = 0.387
		% of Total	**60%**	20%	20%	100%	
	35-44	Count	6	3	3	12	
		% of Total	50%	25%	25%	100%	
	45-54	Count	25	10	17	52	
		% of Total	48.1%	19.2%	32.7%	100 %	
	55-64	Count	15	9	22	46	
		% of Total	32.6%	19.6%	47.8%	100%	
	65-74	Count	8	10	27		
		% of Total	17.8%	22.2%	60%	100%	
	Total	Count	57	33	70	160	
		% of Total	35.6%	20.6%	43.8%	100%	

C.C=contingency coefficient; C.S=comparative significance; ID=international Dinar; P-value= level of probability; %=percentage;

This table shows that the highest percentage of female patients (18:51.4%) delayed >12 hours. While, the lowest percentage of male patients (45; 36%) delayed ≤ 6 hours. In relation to age group, (table 1) also shows that the highest percentage of age (27; 60%) were within the age group (65-74) years; they delayed >12 hours and the lowest percentage of age (3; 60%) were within the age group (25-34) years; they delayed ≤ 6 hours.

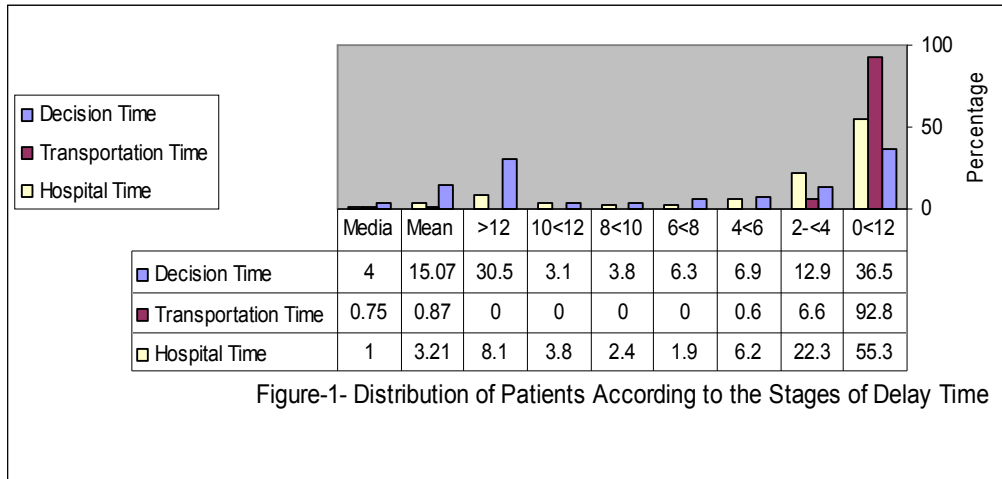|	Media	Mean	>12	10<12	8<10	6<8	4<6	2-<4	0<12
Decision Time	4	15.07	30.5	3.1	3.8	6.3	6.9	12.9	36.5
Transportation Time	0.75	0.87	0	0	0	0	0.6	6.6	92.8
Hospital Time	1	3.21	8.1	3.8	2.4	1.9	6.2	22.3	55.3

Figure-1- Distribution of Patients According to the Stages of Delay Time

This figure indicated that the highest percentage of patients' decision time (36.5%), transportation time (92.8%) and hospital time (55.3) delayed less than 2 hours ,and the mean of decision time (15.07) hours, the mean of transportation time (0.87) and the mean of hospital time (3.21) hours.
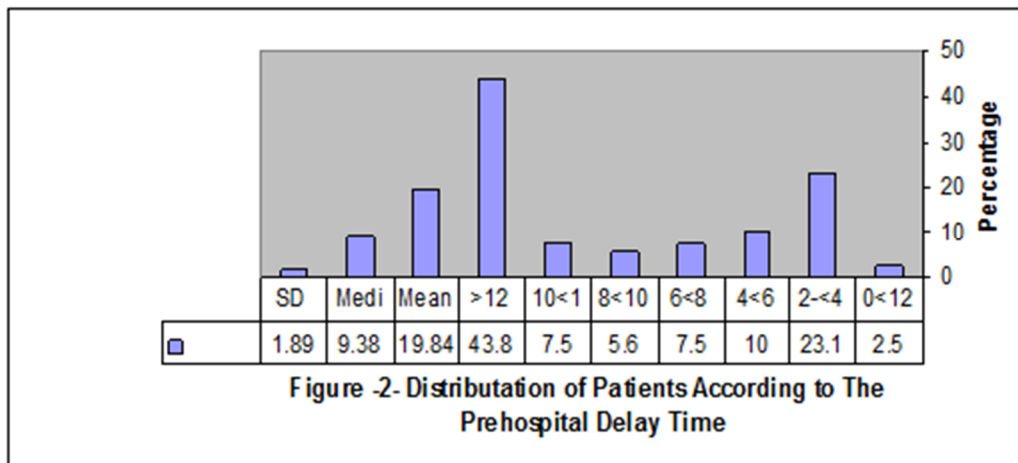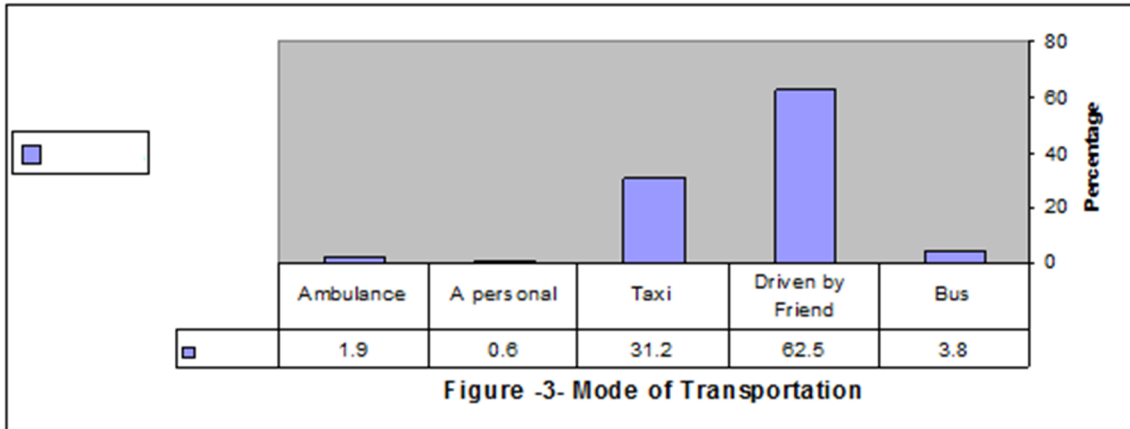

	SD	Medi	Mean	>12	10<1	8<10	6<8	4<6	2-<4	0<12
	1.89	9.38	19.84	43.8	7.5	5.6	7.5	10	23.1	2.5

Figure -2- Distributation of Patients According to The Prehospital Delay Time

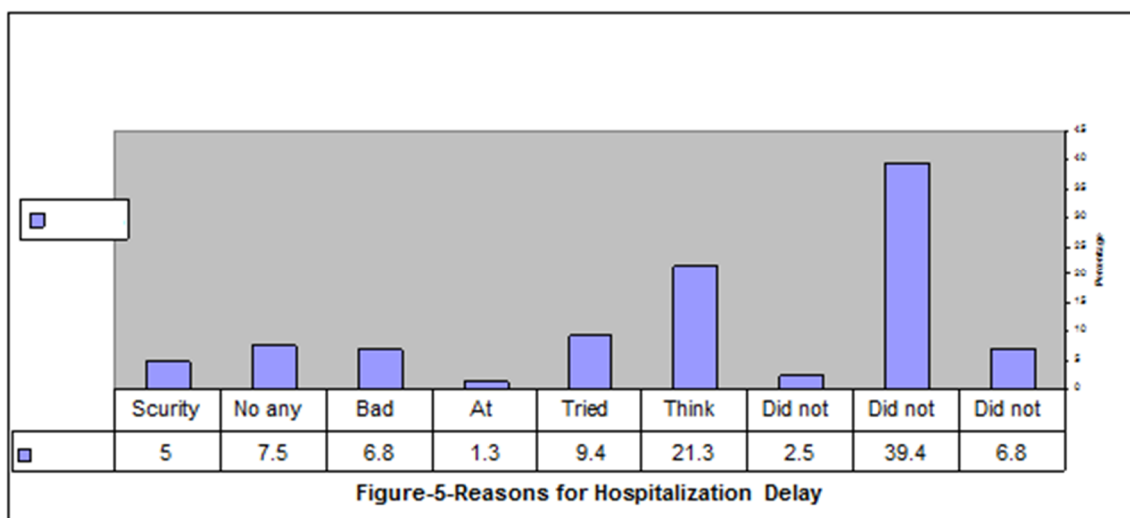This figure indicated that the patients with AMI (43.8%) who arrived to the hospital delayed more than 12 hours.

Figure -3- Mode of Transportation

	Ambulance	A personal	Taxi	Driven by Friend	Bus
	1.9	0.6	31.2	62.5	3.8

This figure shows that (62.5%) of the patients are driven by friends or relatives as a mode of transportation.

Figure -4- Reasons for not Choosing Ambulance
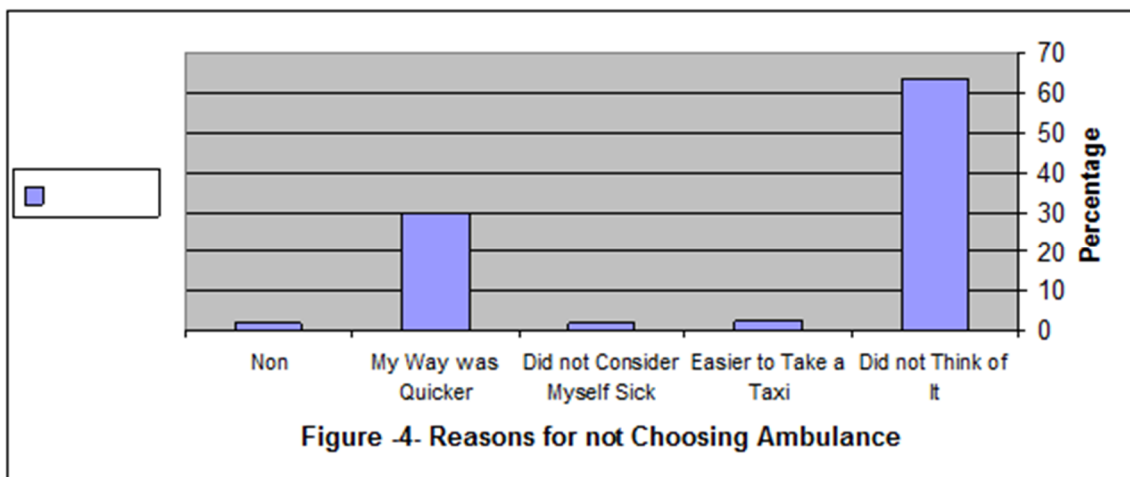
This figure reveals that most of the patients did not think of ambulance (63.7%) and that was the reason for not choosing an ambulance.

Figure-5-Reasons for Hospitalization Delay

	Scurity	No any	Bad	At	Tried	Think	Did not	Did not	Did not
	5	7.5	6.8	1.3	9.4	21.3	2.5	39.4	6.8

This figure indicates that the majority (39.4%) of patients did not believe that pain was serious.

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Discussion

Our study indicated that the decision stage was largest stage (mean15.07hours, median 4 hour), then transportation stage (mean 0.87 hour, median 0.75 hour) and the hospital stage (mean 3.21 hours, median 1 hour)(Figure-1). Gärtner et al., (2008) revealed that the greatest part of the prehospital time –as much as (75%) of it– consists of the patients' own decision time. Alidoosti, (2004) stated that the main temporal components of prehospital delay in the patients with an AMI were the decision time (77%) and transport period (7%). This finding is explained by the decision to seek medical help is a complex interaction of knowledge, experience, beliefs, emotions and context of the event. Our study revealed that a high percentage of patients with acute myocardial infarction(70:43.8%) who arrived to hospital had a delay more than (12) hour while a lower percentage of patients with acute myocardial infarction (4:2.5%) who arrived to hospital had delay less than (2)hours (Figure-1). Dracup and others (2008) reported that only (14%) of the patients arrived within one hour of the onset of symptoms (28.5%) within two hours and (41%) within four hours. However, (54%) arrived at the hospital more than six hours after first experiencing cardiac symptoms. Ying and others (2004) revealed that only (34%) of the patients sought medical care within one hour and a further (36%) of the patients presented to one of the eight hospitals within two hours after the onset. This finding is explained by the patients who delayed seeking treatment because they did not want to disturb others; so they waited until the morning to seek help especially if we know that most symptoms occur between midnight and at .morning and may be due that to low education. Our study revealed that the mean time from onset of symptoms to arrival at CCUs was (19.84), median (9.38) and SD (1.89) hours (Figure 2). Ank (2001) revealed that the mean total delay time for the patients with an AMI was 17.42 (+/-24.03) hours. This finding is explained by the facts that there are complex factors associated with this finding: the security, nature of Iraqi society especially toward females, low public education and nature of the health system that does not depend on Emergency Medical service.

Regarding to the sex of the patients, the result of this study reported that the majority of them were males (125:78.1%). While, fewer females (35; 21.9%) were sustaining the acute myocardial infarction (Table 1). This fact is supported by Sari and others (2008) who stated that from (439) patients with AMI, there were (351) male (80%), and (88) female (20%). According to Ying and others (2004) who studied (102) patients with AMI, (78) were male patients (76.5%) and (24) were female patients (23.5%). Our study revealed that the female who suspected acute myocardial infarction were more likely than male to delay time. Statistically, there were no significant differences between men and women in prehospital delay time (Table 1). This finding is supported by Blohm and others (2008) and Dracup and Moser (1997) who revealed that in the prehospital delay, the independent predictor of a prolonged delay in patients with AMI was the female sex. According to their age, the results of this study report that the mean age of (160) patient with AMI were (56.85) and SD (11.33)(Table -1-).This fact is supported by Norgaz and others (2005) who stated that the mean age was (56.7±11.6) years with ST-elevation AMI. This finding was explained by pathophysiology: the athero-sclerosis and heart disease tend to develop gradually over the course of one's life. Although we may know a few people in young ages, most of the serious consequences of heart diseases are evident in old ages. Our study revealed that the highest percentage of prehospital delay (27; 60%) who delayed more than 12 hour was associated with the advanced age (65-74) years old (Table 1). Blohm and others (2008) and Ting and others (2008) revealed that the age of the older patients with AMI was associated with longer delays in seeking treatment. The researcher believes that this finding could be due to older people having limited access to medical

care, especially when they live alone or need help for motion. Furthermore, elderly people may not recognize the symptoms of AMI or appreciate their severity, because they have multiple chronic disease and low education. Our study revealed that (3:1.9%) of the patients used ambulance as transportation. While, the highest self-transportation mean (100; 62.5%) was driven by a friend or relative and (50(31.2%) used taxi as a mean of transportation (Figure 3). Hong-bing and others (2009) found that in the self-transport group, the most common modes of transport were taxi (*n*=180; 45.0%) private car (*n*=152; 38.0%) and (*n*=68; 17%) used other means. Alidoosti (2004) indicated that only (n=71; 18.9%) of the patients were transferred to hospital by ambulance. While, the private vehicle (49.1%) was the commonest means of transport. Our study revealed that the most frequent reason for not choosing an ambulance (n=102; 63.7%) was that the patients did not think of ambulance use (Figure 4).

Johansson (2006) indicated that the most frequent reason for not choosing an ambulance was that patients did not perceive the symptoms to be serious enough to merit a drastic action like calling the emergency number (43%). The second most common reason for not choosing an ambulance was that the patients did not think about Emergency Medical service being an option (38%). Whereas, (26%) thought it was unnecessary to call an ambulance. Conclusion from the study**,** it was noted that the onset of symptoms at night causes more prolonged delay in hospital arrival because transport means and medical helps are beyond reach at that times. Our study indicates that among the 160 patient (n=70; 43.8%) waited more than (12) hour before coming to CCU in hospital, (n=57; 35.6%) arrived within less than 6 hours. The main reason for not calling ambulance is that the patients thought the Symptoms were not sever enough, did not think of calling ambulance and that self. This study also indicated that the association between older patient age

and delay has been noted in the patients with acute myocardial infarction.

Recommendations

Based on the results and conclusions of the present study; the researcher recommends that education programs should be developed and implemented focusing on the AMI symptoms and the importance of early presentation, aiming to reduce prehospital delays, and targeting; especially the patients with coronary artery diseases and the general community at large; future research is necessary if we are to understand more about which specific factors predict the individual components of delay so as to target interventions effectively; and public should be educated that an ambulance is not merely a transportation modality but also a means of providing early diagnosis and treatment.

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