

## Factors impact upon prehospital time delay in patients with acute ischemic chest pain

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### Abstract

Time delay in seeking the medical help in patients with acute coronary syndrome worsens the prognosis and increase mortality rate from this condition, this study aims to identify the status and causes of time delay in patients with acute ischemic chest pain in seeking medical help who attend coronary care unit (CCU) in AL-Hussein teaching hospital in Kerbala. A total of 129 patients admitted to the CCU over five months period in 2012 complaining of acute chest pain, their mean age was  $56.8 \pm 11.8$  years, and 67.5 % of the patients were male. The mean time between the onset of symptoms and treatment was  $13.5 \pm 22.7$  hours. About 50% of them arrived to the hospital after more than 2 hours of the onset of chest pain. Time delay was more in old people, women, widows, patients with low educational standards, and patients with none ST elevation acute myocardial infarction. Patients who arrive after 2 hours, 59% of them claimed that they were not aware of the seriousness of the condition and 25% of them thought that the pain was transient. In conclusion, nearly half of patients arrived to the hospital after the golden hour, 84% of them were not aware of the seriousness of the condition, this indicates the need to decrease time delay mostly by public health educational program should be intensified to improve the awareness of people to the seriousness of chest pain.

**Keywords:** Chest pain; Time delay; Acute coronary syndrome; CCU; Kerbala

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## Introduction

Ischemic Heart Disease (IHD) is the Disease, Injuries, and Risk Factors leading cause of death worldwide (GBD) study [1]. One half to two thirds according to the Global Burden of of all deaths from myocardial infarction

(MI) occur before the patient reaches the hospital [2].

A significant percentage of these deaths are due to ventricular fibrillation following myocardial infarction.

Patients with acute MI are at high risk of ventricular fibrillation immediately after the onset of chest pain of acute myocardial infarction, and that the risk steadily declines with time [2, 3]. In patients with acute myocardial infarction treated with thrombolysis, longer times to treatment are associated with increasingly worse clinical outcome [4]. Many people having a heart attack delay calling emergency professional help. As a result they either cannot receive the best treatments at all, or do not benefit as fully as they might and this is an important risk factor for poor outcome [3, 5]. It follows that public health benefits could be achieved by effective campaigns to reduce the time-lag and these benefits might include a reduction in health inequality [6]. There is some evidence that the delay is distributed unevenly across the population with, for example, women delaying longer than men and the same for

old patients, rural populations, patients with low incomes, lower educational standards and nonsmokers [7-12]. The aim of this study was to identify current state and causes of time delay in patients with acute chest pain in seeking medical help in Al-Hussein Teaching Hospital in Kerbala.

## Patients and Method

This study was conducted in coronary care unit (CCU) in Imam Hussein teaching hospital for a period of 5 month (from February 1, to June 30, 2012). The data were collected according to data sheet designed for this purpose, including age, gender, marital state, residence, occupation, education level, time arrival to CCU, way of referral (emergency unit, private clinic, health center,---), duration of chest pain in hours (hrs), cause of delay of arrival to CCU, smoking history, hypertension, diabetes mellitus, family history of IHD, weight, height, body mass index (BMI), diagnosis of condition (STEMI, Non STEMI, unstable

angina), cardiac markers, use of thrombolytic therapy, and ECG. Approval on study conduction was taken from the research ethical committee in Kerbala Health Directorate.

Statistical analysis were analyzed using statistical package for social science version 16 (SPSS 16) program and they were expressed as means, standard deviation (SD) and percentage, Student's t- test or Anova test were used to assess the significant difference between means. P value considered significant if it was less than 0.05.

## Results

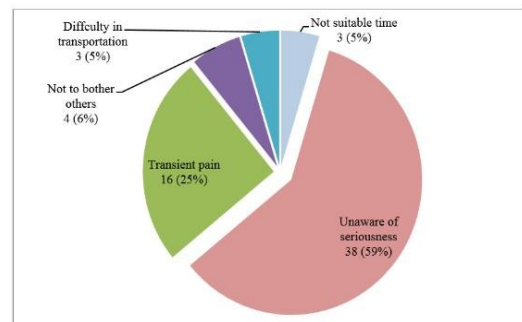
Total number of patients studied was 129 adults, the number of males was 87 (67.5%) and females were 42 (32.5%), their age ranged between 23-92 years with a mean of  $56.8 \pm 11.8$  years. Time delay ranges from 1-96 hrs with a mean of  $13.5 \pm 22.7$  hrs, 50.4% (65) of the patients arrive within 2 hrs. Details of socio-demographic characteristics of patients are shown in table 1, while main causes of delay for more than 2 hrs are shown in

figure 1. As observed in table 1; time delay was longer in older age groups in comparison with younger age groups but statistically was not significant; also there was no significant difference in regards to residence, occupation, educational level and smoking history, but there was significant difference between mean duration of arrival to CCU in regards to gender were males have shorter duration; and for marital status where married had shorter duration. Urban population had shorter time delay than rural population but statistically was not significant. Married patients had shorter time delay than single and widows and it was statistically significant, while there was no divorced among patients. Concerning the occupation idle, workers, and employee had shorter time delay than retired and housewives but statistically was not significant. Patients with higher educational standards had shorter time delay than illiterate and patients with low educational level but statistically were not significant. Smokers had shorter time delay than nonsmokers but statistically was not significant (table 1). Concerning source of referral though there was a difference but statistically it was not

significant (Table 2). Emergency transport system was used by 36 patients while 52 patients used their private cars and 41 patients hired a taxi or other method for transport. Patients who used the emergency transport system and those who used their private cars had shorter time delay but statistically was not significant (table 2). Fifty seven patients (44.2%) were hypertensive, 47 (36.4%) were diabetics, 56 (43.4%) had history of ischemic heart disease, and 10 (7.8%) had family history of IHD before the age of 50, while their mean BMI was  $27.49 \pm 4.4 \text{ kg/m}^2$  ranging from 18.67-41.62  $\text{kg/m}^2$ . Concerning the presenting symptom patients with genuine ischemic chest pain had shorter time delay than those who present with atypical

Variable	Number (N)	Mean duration\ hrs.	SD	P value	
Age Group\ years	≤ 39	9	6.11	7.57	0.384
	40-49	22	11.82	19.31	
	50-59	36	9.86	17.67	
	60-69	43	15.81	26.35	
	≥ 70	19	20.42	29.46	
Gender	Male	87	9.83	18.12	0.008
	Female	42	21.02	28.96	
Residence	Urban	96	12.51	22.27	0.414
	Rural	33	16.59	24.49	
Marital Status	Married	120	11.42	20.08	0.000
	Single	4	31.00	28.91	
	Widow	5	48.60	44.09	
Occupation	Employed	16	11.69	15.65	0.266
	Free work	29	7.03	13.58	
	Housewife	31	18.29	28.23	
	Idle, Retired, Elderly	53	14.72	24.56	
Educational Standard	Illiterate-read & write	43	17.79	28.47	0.135
	Primary	40	8.55	14.74	
	Secondary	35	16.46	24.40	
	Higher	11	5.00	7.42	
Smoking	Negative	81	14.76	23.69	0.404
	Positive	48	11.29	21.08	

**Table 1.**  
 The relation between Prehospital duration and socio-demographic characteristics of patients.



**Figure 1.**  
 Main causes of patient's delay for more than 2 hrs

Patients with STEM had shorter time delay and statistically was significant (table 3). Regarding time of arrival to hospital

112(87%) of patients arrive within wakening hours, while only 17(13%) arrive at sleeping hours, those who presented at sleeping hrs had shorter Prehospital duration but with no statistical significant difference. The most prevalent hour of arrival was 10 A.M. were 19 patients presented.

Variable	N	Mean duration\ hrs	S.D	P value	
Referral	Emergency	81	10.32	20.78	0.166
	Private clinic	39	19.61	25.76	
	Health center	7	18.42	25.03	
	Hospital	2	4.00	4.24	
Transport	Ambulance	36	10.61	20.65	0.09
	Private car	52	10.38	18.30	
	Taxi or others	41	19.05	28.14	

**Table 2.**  
 The relation between prehospital duration with source of referral and transportation.

Variable	N	Mean duration\ hrs	SD	P value	
Presenting symptoms	Typical	114	13.27	22.39	0.783
	Atypical	15	15.00	26.03	
Diagnosis	STEMI	77	8.92	16.74	0.016
	Non-STEMI	6	26.33	35.40	
	Unstable angina	46	19.41	27.65	

**Table 3.**  
 The relation between prehospital duration with presenting symptoms and type of ischemia.

Variable	N	Mean duration\ hrs	SD	P value	
Time of arrival hours	8 A.M to 10 P.M	112	14.50	23.38	0.189
	11 P.M - 7 A.M	17	6.71	16.96	

**Table 4.**

The relation between prehospital duration with time of arrival to hospital

## Discussion

More than 60% of our patients were in the sixth and seventh decade, and nearly half of the patients were 60 years or over. The mean age of them was  $56.8 \pm 11.8$  years which is less than the mean age in other studies conducted by Motalebi et al in Kermanshah in 2012 and by Deborah et al in California where the mean age was more than sixty [5, 13]. Time delay was  $13.5 \pm 22.7$  hrs which comparable to the time in a study conducted in Chicago by Jalal et al in 1993 [12]. Prehospital delay have been reduced significantly over the last 20 years to around 2 hours in USA, Europe, and in Australia[14], and this is attributed to public education [15]. Patients who arrive to the hospital within 2 hours were 65 patients (50.4%), which is called the golden hour ,and this is compatible with a study conducted in Australia by Taylor et al in 2005 [16], but can vary between 22% and 44% according to Cornelia G et al [7]. Time delay was significantly longer for female patients in comparison with male

patients 21 hours versus 9.8 hours, and this is consistent with other studies [5, 9]. There are some indications that the difference has become smaller over the years [17]. Rural population has longer time delay than urban population but statistically was not significant and it is consistent with a study conducted in Greece by Pitsavos et al [9], and it could be related to the more difficult and longer time and distance needed by them to reach the hospital. Regarding the marital status 120 (93%) patients were married. Married patients had shorter time delay and it was statistically significant and this is consistent with other studies [12, 16, 17]. Patients with high educational standards had shorter delay than patients with low educational standards and this is comparable with other studies though it was not significant [9, 17]. Fifty two (40.3%) of our patients used their private car for transport and 39 (30.2%) hired a taxi and only 36 (27.9%) called the emergency transport system (ambulance). The reason for not using the emergency transport system could be that most people do not know how to call it, and also that most our families have private cars and because the patient thought that self-transport would be

faster. In a study conducted by McGinn et al in USA the percentage of patients using the emergency transport system was 44% [17]. Chest pain is the most common symptom of myocardial infarction, with a frequency of 80% to 95% [9]. Patients with the classic sudden, unexpected, and severe chest pain are the most likely to arrive at the hospital in good time. Patients who present with vague and non-specific symptoms are significant predictors of a delay in the patient's presentation [18, 19]. In our study 114 (88%) patients present with chest pain and only 14 patients had atypical presentation which is compatible with other studies [7, 9] but there was no significant difference between the 2 groups in time delay. Patients with STEMI had shorter time delay than patients with none STEMI and it was highly significant, and this is consistent with other studies [14, 20]. Of the 64 patients who arrived to the hospital after more than 2 hours 37 (56.9%) claimed that they were not aware about the seriousness of the chest pain and 18 (27.7%) thought that the pain was transient and this is consistent with other studies [3, 5, 7, 16]. The need for public education is clear in those patients who delay admission

due to misconceptions about the significance of their symptoms or the need to seek medical assistance. In conclusion, about 50% of our patients arrive to the hospital after 2 hours which means we are losing many lives before arriving to the hospital, and there should be an efforts to decrease this time delay mostly by health educational program conducted by the health authorities through primary health care centers, media, NGOs, and the religious speakers to decrease time delay in patients suffering from chest pain.

### Competing interests

Authors declare that we have no competing interests

### Authors Contributions

All authors wrote, read and approved the final manuscript.

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