Factors associated with pre-hospital delay among patients with Acute Myocardial Infarction attending Assiut University Hospital

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Abstract

Delay in seeking medical care following symptoms onset in patients with acute myocardial infarction lead to increased morbidity and mortality. **Aim:** to identify the factors associated with pre-hospital delay among patients with AMI. **Subjects and methods:** the study was conducted in the coronary care unit in the internal medicine department & emergency department. **Study design:** descriptive correlation design was utilized in this study. The subjects of this study consisted of 100 patients who were admitted in the mentioned settings. T**ools:** Tool one: Structured Interview questionnaire sheet, Tool two: The Modified Response to Symptoms Questionnaire (MRSQ).**Results:** the majority of the studied patients were male (83%), (84%) were married, (44%) illiterate, (47%) their age (≥ 60 years), (44%) unemployed. **Conclusions:** a highly statistical significant relation was found between distance, mode of transportation, nature of pain and prehospital delay. The study findings also concluded that significant relation exists between levels of anxiety, ability to control symptoms, seriousness of symptoms and prehospital delay. Significant relation was also present between symptoms attribution to the heart, indigestion and pre hospital delay. **Recommendations:** utilizing the mass media and health classes in different health agencies to increase awareness of people about the disease .

Key words: Acute myocardial infarction, prehospital delay & Ischemic heart disease.

Introduction

Cardiovascular disease (CVD) is one of the major health issues of our time. The prevalence of CVD is increasing, both in industrialized and in developing countries, and causes suffering and a decreased quality of life for millions of people worldwide. CVD can have multiple etiologies, but the main underlying cause is atherosclerosis, which causes blood clot formation and obstructs vital arteries **(Toss, 2011)**. Coronary heart disease (CHD) is the leading cause of death worldwide. Acute coronary syndrome (ACS) refers to acute myocardial ischemia caused by atherosclerotic coronary artery disease and includes myocardial infarction (MI) and unstable angina **(Mitchell & Lawrence, 2011)**.

Globally, CHD is the leading cause of death. World health organization (WHO) projected in 2005 that CHD accounts for 7.6 million deaths world wide, equivalent to 13.2 % of all deaths. Over 80% of these deaths have occurred in people living in low and middle- income countries **(Sarrafzadegan et al., 2009)**.

Acute myocardial infarction (AMI) is a major cause of morbidity and mortality worldwide **(Wong et al., 2012)**.This disease not only results in mortality, but in ability and production reduction in individuals **(Jafari et al., 2011)**. More than 3 million people each year are estimated to have an acute ST-elevation myocardial infarction (STEMI), with more than 4 million having a non-ST-elevation myocardial infarction (NSTEMI) **(kumolosasi et al., 2013)**.

A heart attack is the damage and death of heart muscle from the sudden blockage of a coronary artery by a blood clot. Coronary arteries are blood vessels that supply the heart muscle with blood and oxygen. Blockage of a coronary artery deprives the heart muscle of blood and oxygen, causing injury to the heart muscle. Which causes chest pain and chest pressure sensation **(Kulick, 2013)**.

Typically, but not in all cases, AMI begins suddenly, with sharp, severe chest pain that some times radiates to the left arm, shoulder, and the back. Other symptoms of MI include panic, restlessness, and confusion; a sense of impending death; ashen, cold, and clammy skin; dispense; cyanosis; rapid, thready, and irregular pulse; drop in blood pressure and in body temperature .Nausea and vomiting may be present, and person is often in shock **(Rosdahl & Kowalski, 2012)**.

Complications of AMI include: Ischemic complications including (angina, reinfarction, infarct extension), mechanical including (heart failure, cardiogenic shock, mitral valve dysfunction, aneurysms & cardiac rupture), thrombosis and embolic including (central nervous system or peripheral embolisation), inflammatory including

(pericarditis), and psychosocial complications including depression**(Tidy,2010)**.

Individuals who experience the signs and symptoms of ACS often delay seeking treatment **(Dracup et al., 2009)**. A delay of even only a few hours can have a significant impact on patient survival with a 30-minute delay reducing average life expectancy by one year **(Jankowski et al., 2011)**. It is well known that the rapid identification and treatment of patients with AMI, either by thrombolytic therapy or primary angioplasty, reduces mortality and morbidity and improves cardiac function **(Vavouranakis et al., 2010)**. Early recognition leading to rapid hospitalization and appropriate treatment of patients with suspected AMI and unstable angina **(Fuster et al., 2005)**.

Treatment-seeking delay within the context of cardiac illness remains a persistent clinical issue and represents a major unresolved public health problem **(Turris,2009)**.Pre-hospital delay in response to possible heart attack symptoms is an international problem **(Finn et al., 2007)**.

Pre-hospital delay is defined as the time interval from the development of acute symptoms suggestive of AMI to arrival to the hospital's emergency department and consists of the following two components: decision time or patient delay: the period between the awareness of symptoms and the decision to seek treatment and transportation time or transportation delay: the period between initiation of travel to the emergency room and emergency department arrival **(Nguyen, 2010)**.

Significance of the study

Acute myocardial infarction is a clinical condition for which delay in seeking care can have significant and adverse consequences on patients' outcomes. Morbidity and mortality can significantly reduce if individuals receive treatment shortly after the onset of symptoms. Pre-hospital delay is a prominent cause of increasing early and also late mortality in acute myocardial infarction. A pre-hospital delay may increase cardiac damage and diminish survival chance of individuals **(Momeni et al., 2012)**, so this study helped to understand factors associated with pre-hospital delay among patients with AMI in Assiut university hospital.

Aim of the Study

The aim of this study is to identify the factors associated with pre-hospital delay among patients with AMI in Assiut University Hospital.

Research question

What are the factors associated with pre-hospital delay among patients with Acute Myocardial Infarction in Assiut university hospital?

Subjects and Methods

Research design: Descriptive correlation research design was used to conduct this study.

Setting: The study was conducted in the coronary care unit in the internal medicine department & emergency department in Assiut University hospital.

Study Subjects

The study included 100 patients who were admitted in the mentioned settings.

Tools of the Study

Two tools for collecting data were used in this study.

Tool (I): Structured interview questionnaire sheet

It was developed by the researcher based on extensive literature review. It include two parts:

Part (I): Personal characteristics of the studied patients such as patients' age, sex, distance from hospital, mode of transportation to hospital, marital status, employment, and level of education.

Part (II): Characteristic of AMI. It was used to collect data regarding the date and the time through which patient decided to leave to come to the hospital , time and date of arrival to the hospital , admission blood pressure & pulse , symptoms experienced during AMI such as (discomfort/ pain in the chest, the back, one or both arms , the stomach, jaw , the neck , one or both legs , cold sweat, headache, dyspnea, vertigo, fainting, and nausea, classification of MI based on ECG(STEMI, NSTEMI),AMI location as identified on ECG such as (anterior, posterior, and inferior) .

Tool (II): The Modified Response to Symptoms Questionnaire (MRSQ)

The RSQ was originally developed by Burnett, Blumental, Mark, Leimberger, and Califf (1995) to identify factors related to treatment seeking delay (TSD) and AMI and was later modified to include additional cognitive, emotional, and social factors which have been identified as gaps in previous research (**Moser et al., 2006)**. The modifications of the MRSQ resulted in a total of 21 questions with two question types: a forced multiple-choice response set and a five-point Likert scale to measure participants' responses to the AMI symptoms. The MRSQ does not yield a total score.

Also, the questionnaire included questions regarding: the severity of patient's signs and symptoms (pain) on a scale of 0 to 10 and his or her knowledge about the use of thrombolytic drugs to treat AMI.

Scoring system

Patient with total prehospital delay:

- ≤ 2hrs (Not delayed).
- >2hrs (Delayed).

Pain severity was measured by using numerical pain rating scale, in which the researcher asked the patients about pain which he/she experienced during the onset of AMI by using (0-10) numerical pain rating scale in which (0) mean no pain, (1-3) mean mild pain, (4- 6) mean moderate pain, and (7- 10) mean severe pain.

Methods of data collection

1- Reviewing of current and past, local and international related literature in the various aspects of the problem (factors associated with pre-hospital delay among patients with acute myocardial infarction) using books, articles, periodicals magazines and internet.
2- An official permission was obtained from the head of the internal medicine department & emergency department at Assiut University hospital.
3- A pilot study was conducted on 10% (10) patients to test the clarity and applicability of the tool. According the modification was done.
4- Confidentiality of the data was asserted. Explanation of the aim and methodology of the study was explained to patients by the researcher. The right to refuse to participate in the study was emphasized to the patients.
5- The researcher collected the needed data from patients by applying **tool (I & II)**. The study was carried out at morning and after noon shifts.
6- The researcher starts to collect data from patients on the 1st and 4 th day of diagnosis using the pre-constructed tools.
7- Questionnaire sheet was designed to identify the factors associated with prehospital delay among AMI patients were filled in and completed by the researcher as follows:
   - Structured Interview questionnaire sheet was filled through reviewing patient's medical records and patient's interviewing. This sheet was fulfilled during (5-15 mins).
   - MRSQ was filled through reviewing patient's medical records and patient's interviewing. This sheet was fulfilled during (15 mins - 1hr).
8- Prehospital delay time was measured by asking patient about the time he/she first notice his/her symptoms and by reviewing patient's medical record (Time & date of arrival to the ED).
9- Sampling was started and completed within 6 months, from August 2013 to June 2014.

Statistical analysis of data

The collected data were coded then transformed into coding sheets. The results were checked. Then, the data were entered into Statistical Packing for Social Science (SPSS) version (16) using personal computer. Output drafts were checked against the revised coded data for typing and spelling mistakes. Finally, analysis and interpretation of data were conducted. The following statistical measures were used: descriptive statistics including frequency, distribution, mean, and standard deviation were used to describe different characteristics. Also, Chi – square test was used to compare qualitative variables between groups. P-value considered statistically significant when $P<0.05$.

Results

Table (1): Sociodemographic characteristics of the studied patients :(n=100)

Item	No. (n= 100)	%
Age:		
< 50 years	18	18.0
50 - < 60 years	35	35.0
≥ 60 years	47	47.0
Mean ± SD (Range)	56.54 ± 8.58 (28 – 65)	
Sex:		
Male	83	83.0
Female	17	17.0
Residence		
Rural	72	72.0
Urban	28	28.0
Marital status		
Single	4	4.0
Married	84	84.0
Widowed	12	12.0
Level of education		
Illiterate	44	44.0
Read & write	14	14.0
Basic education	25	25.0
University	17	17.0
Occupation		
Employee	27	27.0
Unemployed	44	44.0
Retired	12	12.0
Housewife	17	17.0
Distance to hospital		
< 35 Km	61	61.0
≥ 35 Km	39	39.0
Mode of transportation		
Ambulance	13	13.0
Taxi	64	64.0
Private care	23	23.0

Table (2): Clinical characteristics of the studied patients :(n=100)

Items	No. (n= 100)	%
Risk factors		
Previous myocardial infarction	12	12.0
Balloon dilatation (PCI)	9	9.0
Hypertension	42	42.0
Diabetes	43	43.0
Heart failure	1	1.0
Family history of heart disease	8	8.0
Smoke	60	60.0
Ischemic heart disease (IHD)	34	34.0

Items	No. (n= 100)	%
Symptoms		
Discomfort/ pressure/ pain in the chest	93	93.0
Discomfort/ pain in the stomach	19	19.0
Discomfort/ pain in jaws	11	11.0
Discomfort/ pain in one or both legs	4	4.0
Headache	17	17.0
Vertigo	33	33.0
Fainting	2	2.0
Vomiting	27	27.0
Discomfort/ pain in the back	41	41.0
Discomfort/ pain(arm)	69	69.0
Discomfort/ pain in the neck	13	13.0
Cold sweat	66	66.0
Dyspnea	64	64.0
Nausea	51	51.0
Pain severity		
No pain	7	7.0
Mild	3	3.0
Moderate	31	31.0
Severe	59	59.0
Nature of pain: (no=93)		
Continuous	28	30.1
Intermittent	65	69.9

Table (3): Initial symptom experience among the studied patients: (no=100)

Items	No	%
Patient's immediate response to symptoms		
Wished or prayed that they would go away	11	11.0
Tried to relax	14	14.0
Pretended nothing was wrong	4	4.0
Told someone	12	12.0
Tried not to think about my symptoms	6	6.0
Took medication	21	21.0
Called doctor	0	0.0
Tried self-help remedy	12	12.0
Told someone who was nearby	3	3.0
Called the emergency system	0	0.0
Transported self or had someone transport him to the hospital	12	12.0
Drove to the doctor's office or clinic	5	5.0
Response of witnesses		
Said or did nothing	2	2.0
Told me not to worry	10	10.0
Tried to comfort patient	33	33.0
Suggested I rest and take medicine	24	24.0
Suggested I get medical help	16	16.0
Called the emergency system to get help for me	0	0.0
Took him to the hospital	8	8.0
Got upset	4	4.0
Never told anyone about my symptoms	3	3.0

Items	No	%
Symptoms attribution		
Heart	35	35.0
Indigestion or stomach problems	24	24.0
Muscle pain	9	9.0
Fatigue	18	18.0
Flu or flu-like illness	6	6.0
Dental problem	0	0.0
Breathing problem	8	8.0

Table (4): Frequency distribution of reasons for delay among the studied patients: (n=76)

Reasons for delay	Not at all		Mildly		Moderately		Very		Extremely	
	No	%	No	%	No	%	No	%	No	%
Symptoms would go away	6	7.9	1	1.3	2	2.6	25	32.9	42	55.3
Embarrassed to get help	68	89.5	4	5.3	1	1.3	2	2.6	1	1.3
Feared what might happen	60	78.9	9	11.8	2	2.6	4	5.3	1	1.3
Symptoms came and went	12	15.8	0	0.0	3	3.9	38	50.0	23	30.3
Not recognizing symptoms as heart	20	26.3	0	0.0	2	2.6	29	38.2	25	32.9
Not wanting to trouble any one	65	85.5	3	3.9	2	2.6	3	3.9	3	3.9
Didn't know symptoms of heart attack	11	14.5	0	0.0	6	7.9	34	44.7	25	32.9
Didn't realize importance of symptoms	10	13.2	1	1.3	3	3.9	41	53.9	21	27.6

Table (5): Frequency distribution of emotional and cognitive response among the studied patients :(no=100)

Items	Not at all		Mildly		Moderately		Very		Extremely	
	No.	%	No.	%	No.	%	No.	%	No.	%
Emotional response										
Level of anxiety	43	43.0	16	16.0	5	5.0	23	23.0	13	13.0
Ability to control symptoms	40	40.0	13	13.0	20	20.0	20	20.0	7	7.0
Cognitive response										
Seriousness of symptoms	37	37.0	19	19.0	4	4.0	25	25.0	15	15.0

Table (6): Relationship between sociodemographic characteristics of the studied patients and prehospital delay: (no=100)

Items	Early arrival (≤2hrs) (n= 18)		Late arrival (>2hrs) (n= 82)		P-value
	No.	%	No.	%	
Age					
< 50 years	3	16.7	15	83.3	0.641
50 - < 60 years	8	22.9	27	77.1	
≥ 60 years	7	14.9	40	85.1	
Sex					
Male	17	20.5	66	79.5	0.153
Female	1	5.9	16	94.1	
Residence					
Rural	9	12.5	63	87.5	0.022*
Urban	9	32.1	19	67.9	

Items	Early arrival (≤2hrs) (n= 18)		Late arrival (>2hrs) (n= 82)		P-value
	No.	%	No.	%	
Marital status					
Single	0	0.0	4	100.0	0.382
Married	17	20.2	67	79.8	
Widowed	1	8.3	11	91.7	
Level of education					
Illiterate	6	13.6	38	86.4	0.073
Read & write	1	7.1	13	92.9	
Basic education	4	16	21	84.0	
University	7	41.2	10	58.8	
Distance to hospital					
< 35 Km	18	29.5	43	70.5	0.001**
≥ 35 Km	0	0.0	39	100.0	
Mode of transportation					
Ambulance	0	0.0	13	100.0	0.001**
Taxi	8	12.5	56	87.5	
Private car	10	43.5	13	56.5	

Not significant at P>0.05 **significant at P<0.05* *** Highly statistical significant at P≤0.01*

Table (7): Relationship between clinical characteristics of the studied patients and prehospital delay :(n=100)

Items	Early arrival (≤2hrs) (n= 18)		Late arrival (>2hrs)(n= 82)		P-value
	No.	%	No.	%	
Symptoms					
Discomfort/ pressure/ pain in the chest	15	83.3	78	95.1	0.665
Discomfort/ pain in the stomach	0	0.0	19	23.2	0.020*
Discomfort/ pain in jaws	3	16.7	8	9.8	0.412
Discomfort/ pain in one or both legs	0	0.0	4	4.9	0.770
Headache	1	5.6	16	19.5	0.296
Vertigo	6	33.3	27	32.9	0.974
Fainting	0	0.0	2	2.4	1.000
Vomiting	1	5.6	26	31.7	0.037*
Discomfort/ pain in the back	6	33.3	35	42.7	0.465
Discomfort/ pain in one or both arms	9	50.0	60	73.2	0.114
Discomfort/ pain in the neck	2	11.1	11	13.4	0.792
Cold sweat	13	72.2	53	64.6	0.538
Respiratory distress	11	61.1	53	64.6	0.778
Nausea	7	38.9	44	53.7	0.256
Risk factors					
Previous myocardial infarction	3	16.7	9	11.0	0.448
Balloon dilatation (PCI)	2	11.1	7	8.5	0.663
Hypertension	6	33.3	36	43.9	0.411
Diabetes	7	38.9	36	43.9	0.697
Heart failure	1	5.6	0	0.0	0.180
Family history of heart disease	5	27.8	3	3.7	.004**
Smoke	14	77.8	46	56.1	0.089
Ischemic heart disease (IHD)	7	38.9	27	32.9	0.629
Pain severity					
Mild	0	0.0	3	100.0	0.126
Moderate	2	6.5	29	93.5	
Severe	15	25.4	44	74.6	
No pain	1	14.3	6	85.7	

Not significant at P>0.05 **significant at P<0.05* *** Highly statistical significant at P≤0.01*

Table (8): Relationship between initial symptom experience and prehospital delay (no=100).

Initial symptoms experience	Early arrival (≤2hrs) (n= 18)		Late arrival (>2hrs) (n= 82)		P-value
	No.	%	No.	%	
Patient's immediate response to symptoms:					
Wished or prayed that they would go away	0	0.0	11	100.0	0.218
Tried to relax	2	14.3	12	85.7	0.988
Pretended nothing was wrong	0	0.0	4	100.0	0.770
Told someone	3	25.0	9	75.0	0.785
Tried not to think about my symptoms	0	0.0	6	100.0	0.525
Took medication	0	0.0	21	100.0	0.036*
Tried self-help remedy	0	0.0	12	100.0	0.184
Told someone who was nearby	0	0.0	3	100.0	0.951
Transported self or had someone transport to the hospital	10	83.3	2	16.7	0.001**
Drove to the doctor's office or clinic	3	60.0	2	40.0	0.056
Response of witnesses					
Said or did nothing	0	0.0	2	100.0	0.503
Told me not to worry	0	0.0	10	100.0	0.259
Tried to comfort me	2	6.1	31	93.9	0.029*
Suggested I rest and take medicine	2	8.3	22	91.7	0.267
Suggested I get medical help	8	50.0	8	50.0	0.001**
Took me to the hospital	6	75.0	2	25.0	0.001**
Got upset	0	0.0	4	100.0	0.770
Never told anyone	0	0.0	3	100.0	0.951
Symptoms attribution					
Heart	13	37.1	22	62.9	0.001**
Indigestion or stomach problems	0	0.0	24	100.0	0.020*
Muscle pain	3	33.3	6	66.7	0.423
Fatigue	2	11.1	16	88.9	0.616
Flu or flu-like illness	0	0.0	6	100.0	0.525
Breathing problem	0	0.0	8	100.0	0.367

Not significant at P>0.05 **significant at P<0.05* *** Highly statistical significant at P≤0*

Table (9): Relationship between emotional, cognitive response & prehospital delay (no=100).

Items	Early arrival (≤2hrs)(n= 18)		Late arrival (>2hrs)(n= 82)		P-value
	No.	%	No.	%	
Emotional response					
1-Level of Anxiety					
Not at all	2	4.7	41	95.3	0.003**
Mildly	1	6.2	15	93.8	0.327
Moderately	1	20.0	4	80.0	0.905
Very	9	39.1	14	60.9	0.007**
Extremely	5	38.5	8	61.5	0.095
2-Ability to control symptoms					
Not at all	16	40.0	24	60.0	0.001**
Mildly	1	7.7	12	92.3	0.516
Moderately	1	5.0	19	95.0	0.172
Very	0	0.0	20	100.0	0.044*
Extremely	0	0.0	7	100.0	0.438

Items	Early arrival (≤2hrs)(n= 18)		Late arrival (>2hrs)(n= 82)		P-value
	No.	%	No.	%	
Cognitive response					
1-Seriousness of symptoms					
Not at all	0	0.0	37	100.0	0.001**
Mildly	2	10.5	17	89.5	0.542
Moderately	0	0.0	4	100.0	0.770
Very	10	40.0	15	60.0	0.003**
Extremely	6	40.0	9	60.0	0.041*

Not significant at P>0.05 **significant at P<0.05* *** Highly statistical significant at P≤0*

Fig (1) Relation between nature of pain and prehospital delay (n=93).

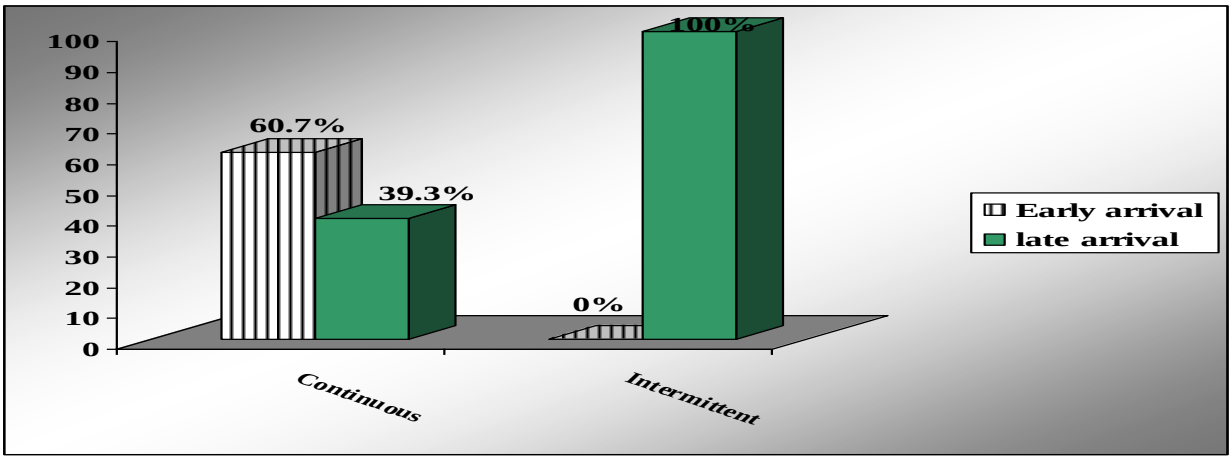

Table (1): Regarding age, it was noticed that the mean age 56.54 ± 8.58 (28 – 65). Concerning gender, the majority of the studied patients (83%) were male .Regarding residence; more than two thirds of them (72%) were from rural area. In relation to marital status, more than three quarters (84%) were married. Concerning educational level, less than half (44%) of them were illiterate. Regarding occupation, more than one third (44%) were unemployed. Concerning distance to hospital more than half (61%) their distances from hospital were < 35 Km. Concerning mode of transportation, this table revealed that more than half of the studied patients (64%) used taxi to come to the hospital & only (13%) used ambulance.

Table (2): Illustrates that, more than half of the studied patients (60%) were smokers, more than on third of them (42%) were hypertensive and only (1%) had heart failure. As regarding symptoms experienced, the majority of the studied patients (93%) had chest pain pressure like followed by pain/discomfort in arm, cold sweat, and dyspnea (69%, 66%, and 64% respectively). Concerning pain severity, less than two third of the studied patients (59%) had severe pain. Regarding nature of pain, more than two third of the studied patients (69.9%) had intermittent pain.

Table (3): Demonstrates that, less than one-quarter of the studied patients (21%) took medication to overcome symptoms, only (12%) of them transported themselves or had someone transport them to the hospital and no one called the emergency system. Regarding response of witnesses present, about one third of witnesses (33%) tried to comfort the patient, less than one third of them (24%) suggested patient to rest & take medication, and no one called the emergency system to get help for the patient. Concerning symptoms attribution, more than one third of the studied patients (35%) attributed their symptoms to the heart & near one quarter of them (24%) attributed their symptoms as indigestion / stomach problems.

Table (4): Illustrates that, more than half of the studied patient (55.3%) stated that wait to see if their symptoms would go away were the reason for their delay (Extremely), half of them (50%) stated that symptoms came and went were the reason of their delay (very) , less than half (44.7%) stated that did not know the symptoms of a heart attack was the reason for their delay(very) and more than one third of them (38.2%) stated that not recognizing symptoms as heart symptoms**.**

Table (5): Clarifies that, less than half of the studied patients (43%) weren't anxious and only (5%) of

them had moderate anxiety. Regarding cognitive response, more than one- third of them (37%) didn't consider their symptoms serious and only (4%) considered their symptoms serious (Moderately).

Table (6): Shows that, non-significant relation was found between patient's age , sex and occurrence of prehospital delay (p= 0.641, 0.153 respectively); While, statistically significant relation was found between residence and prehospital delay (p= 0.022*).Also, non-significant relation was found between marital status, educational level and prehospital delay (p= 0.382, 0.073 respectively); While, highly statistical significant relation was found between distance to hospital, mode of transportation and prehospital delay (p= 0.001** ,0.001** respectively).

Table (7): Mentions that, statistically significant relation was found between discomfort/ pain in the stomach, vomiting and prehospital delay (p= 0.020*and 0.037*respectively). Also, highly statistical significant relation was found between family history of heart disease and prehospital delay (P=004**); while, non-significant relation was found between pain severity and occurrence of prehospital delay (P =0.126).

Table (8): Reveals that, statistically significant relation was found between taking medication, transported self or had someone transport to the hospital and prehospital delay (P= 0.036*, 0.001** respectively). Also, statistical significant relation was found between tried to comfort patient, suggest getting medical help & took patient to the hospital and prehospital delay (P =0.029*, 0.001**, 0.001** respectively). As regard symptoms attribution, significant relation was found between symptoms attribution to the heart, indigestion (stomach problems) and prehospital delay (P=0.001**, 0.020*respectively).

Table (9): Demonstrates that, significant relation is found between levels of anxiety, ability to control symptoms, seriousness of symptoms & prehospital delay (P>0.05).

Fig (1): Reflects that, highly statistical significant relation was found between nature of pain & prehospital delay (P=0.001**).

Discussion

In the present study, findings regarding patients' characteristics revealed that, the majority of the studied patients were male and more than three quarters of them were married. This finding was supported by **Noureddine, (2009)** who reported that more than two thirds were male and the majority was married.

It relation to residence and occupational status more than two thirds were from rural area and near half were unemployed. These results disagreed with **Momeni et al., (2012)** who reported that more than half were from urban area & only (7.4%) were unemployed.

As regard mode of transportation to hospital, more than half of the studied patients came to the hospital by taxi, while only thirteen percent of them came to the hospital by ambulance. This finding may be attributed to that most of people especially who lived in rural area had an idea that ambulance came too late and they don't trust in it.

Concerning risk factors for AMI; results revealed that, most frequent risk factors were smoking; followed by diabetes, hypertension & history of ischemic heart disease (34%). This finding was supported by **Abduelkarem et al., (2012)** who reported that smoking; diabetes, hypertension and history of CHD were the most common cardiovascular risk factors in the sample studied.

Regarding symptoms experienced during AMI, the study revealed that the majority of the studied patients had chest pain pressure like; follow by pain/discomfort in arm, cold sweat and dyspnea. This finding was supported by **Hafeez, (2010)** who reported that majority of the patients presented with typical chest pain. In addition **MacInnes, (2006)** who reported that chest pain was the most common symptom experienced.

Concerning patient's immediate response to symptoms, the study showed that, less than one-quarter of the studied patients took medication (antacid, nitro, and acetaminophen) to relief symptoms and no one called the emergency system. This finding may be attributed to the nature that most of the studied patients attributed their symptoms to conditions other than MI they considered it indigestion or cold and patients with IHD take nitroglycerin to overcome the attack. The patients not considered them selves as being risk factors for MI and they have no knowledge about the disease. On the other side no one called emergency because they considered it as a condition that will go away.

The results of the present study showed that, more than one third of the studied patients attributed their symptoms to the heart symptoms, while the rest of them attribute their symptoms to conditions other than the heart. This results supported by **Moser et al., (2005)** who reported that thirty five percent attributed their symptoms to the heart.

Concerning reasons for delay; the study revealed that, more than half of the studied patient stated that wait to see if their symptoms would go away was the reason for their delay (Extremely) followed by symptoms came and went (very) , did not know the

symptoms of a heart attack(very) and not recognizing symptoms as heart symptoms. This finding may be attributed to the nature that most of the studied patients have no knowledge about the disease and this may be supported by more than one third of them were illiterate and near one quarter were read and write.

As regard emotional response, the study revealed that less than half of the studied patients weren't anxious while more than one-third of them were not able to control their symptoms. Also, the study showed that, as regard seriousness of symptoms, more than one third of the studied patients weren't consider their symptoms to be serious.

In relation to patients' age, gender and prehospital delay, study findings showed that, statistically non significant relation was found between patients' age, gender and prehospital delay. This finding disagrees with **Taghaddosi, (2010)** who reported that women had more delay than men & delay increase with patients' age. our result supported by **Noureddine et al., (2006)** who reported that women delayed more than men , but the difference did not reach statistical significance.

As regard the relation between marital status and pre hospital delay, the study has found statistically non significant relation. This result disagrees with **Franco et al., (2008)** who reported that marital status influenced the delay in seeking for emergency services.

As regard relation between level of education and prehospital delay, the study has found non significantly relation .This result supported by **Banks and Dracup, (2006**) who reported that level of education was not a predictor of prolonged prehospital delay. This result disagree with **Park et al., (2012)**who reported that low level of education was significantly associated with prehospital delay & **Noureddine et al., 2006** who reported that higher education predicted longer delays .

This study has showed significant relation between living in rural area and prehospital delay. This result supported by **Ängerud et al., (2013**) who reported that living in a town or rural areas were factors associated with pre-hospital delay times ≥ 2h and **Vavouranakis et al., (2010)** who reported that those living in rural areas experienced a longer delay in reaching hospital once they sought assistance. Also, **Dianati et al., (2010)** reported that living in urban area was accompanied by more pre-hospital delay.

As regard the relation between distance to hospital and pre hospital we hare bean found highly statistically significant relation .This result supported by **Ali et al., (2011)** who reported that long distance from emergency coronary care was factor associated with delay in 7.6% of the study population.

According to mode of transportation and prehospital delay the current study results revealed, highly statistically significant relation between mode of transportation and occurrence of prehospital delay. Results revealed that all patients who use ambulance to come to hospital experienced pre hospital delay >2hrs while who use private car experience prehospital delay ≤ 2hrs. This result may attribute to the nature that no one of the studied patients use ambulance directly, but first they went to the nearest hospital which referred them to Assuit University Hospital by ambulance.

In addition patients who use private car didn't delay because when they felt sick, the car was available and they went immediately so there's no time to wait until the taxi or other transportation came .This result supported by **O'Donnell, (2006)** who reported that patients who drove themselves by car to hospital had shorter median prehospital times than those arriving by any other admission mode This result disagree with **Kerr et al., (2006**) who reported that participants who called for an ambulance had a shorter interval between symptom onset and presentation to hospital than those who did not (non-ambulance participants), and **Dianati et al., (2010**) who reported that referring to the hospital by one's own care instead of using ambulance were accompanied by more prehospital delay. Also, **Park et al., (2012**) who reported that the use of private transport were significantly associated with prehospital delay.

According to risk factors and prehospital delay the current study results revealed that, there was no significant relation between all risk factors, except family history of heart disease. This result may attribute to history of CAD in family members could increase the awareness of patients about symptoms of CAD. In the same line, a study by **Farshidi et al., (2013)** who reported that patients with a family history of CAD had significantly less delay in arriving to hospital. In contrast **Herlitz et al., (2010)** reported that a history of angina pectoris, AMI, heart failure, PCI or coronary surgery was associated with a long delay and **Perkins-Porras et al., (2009)** who reported that patients who had suffered a previous MI were more likely to have a short total pre-hospital delay.

As regard the relation between symptoms and pre hospital delay statistically significant relation has been found between discomfort / pain in the stomach, vomiting and occurrence of prehospital delay while there's no significant relation was found between chest pain and prehospital delay .This finding may be attributed to the nature that most patients who experience vomiting and discomfort/pain in the stomach took indigestion medication as they

attributed it as stomach problems or go to the nearest hospital in which physician wrongly diagnosed them as stomach problems and gave them medication to subside vomiting. This finding agrees with **Herlitz et al., (2010)** who reported that there was no association found between chest pain or chest discomfort and delay.

This study showed that no significant relation between pain severity and prehospital delay .This result disagreed with **Lesneski, (2010)** who reported that having a high pain scale was a predictor of short treatment delay.

As regard the relation between nature of pain and prehospital delay the study has found highly statistically significant relation. The present study revealed that patient who had intermittent pain delayed >2hrs while those who had continuous pain delayed ≤ 2hrs.This may explained by that those patients may wait to see whether their pain will go away or not.

In the present study, as regard the relation between patient's immediate response to symptoms & prehospital delay the study has found statistically significant relation. The study revealed that patients who took medication to overcome symptoms (relieve pain, indigestion or vomiting) delayed > 2hrs while patients who transported self or had someone transport to the hospital delayed ≤2hrs. This result supported by **Thuresson et al., (2007**) who reported that taking medication to relieve pain resulted in the long prehospital delay.

As regard relation between response of witnesses and occurrence of prehospital delay the study has found statistically significant relation. The study revealed that trying to comfort the patient was associated with delay > 2hrs while getting medical help and took patient to the hospital were associated with delay ≤2hrs. These results supported by **Noureddine et al, (2006)** who reported that participants who were advised by witnesses to rest or not to worry delayed longer than those who were immediately referred to ambulance service or taken to the hospital.

This study showed that, statistically significant relation the study has found between symptoms attribution and prehospital delay. The results revealed that patients who attributed their symptoms to the heart delayed ≤2hrs while those who attributed their symptoms to indigestion (stomach problems) delayed>2hrs.This result supported by **Kirchberger et al., (2012)** who reported persons who correctly attributed their symptoms to the heart had a 1.59-fold likelihood to have a delay time<2 h, compared with persons with symptom misinterpretation.

As regard the relation between emotional responses and prehospital delay the study has found significant relation. Also , the study has revealed that patients who were not anxious delayed >2hrs while those who had high level of anxiety delayed ≤ 2hrs and patients who were unable to control their symptoms delayed ≤2hrs while those who were more able to control symptoms delayed >2hrs . This results supported by **Noureddine et al., (2006**) who reported that patients who felt anxious about their symptoms delayed less than patients who did not experience anxiety about them. Also ,this results supported by **Lesneski, (2010)** who reported that having more ability to control symptoms was predictor of long treatment delay in arrival to the emergency department after cardiac symptoms onset.

As regard relation between seriousness of symptoms and prehospital delay highly significant relation has been found. Also, the study has revealed that patients who thought that the symptoms were not serious delayed >2hrs while those who thought that the symptoms were highly serious delayed ≤2hrs. This result supported by **Momeni et al, (2012)** who reported that perceiving symptoms to not be so serious was factor influencing pre-hospital delay > 2 hours. Also, **Bunde & Martin, (2006)** reported that perceptions of symptom seriousness predicted more rapid care seeking behavior.

Conclusion

A highly statistically significant relation was found between distance, mode of transportation, nature of pain and prehospital delay. The study findings also concluded that significant relation exists between levels of anxiety, ability to control symptoms, seriousness of symptoms and prehospital delay. Significant relation was also present between symptoms attribution to the heart, indigestion (stomach problems) and prehospital delay.

Recommendations

1- Utilizing the mass media (radio and television) and health classes in different health agencies to increases awareness of people about the disease, its signs and symptoms and the importance of seeking health care.

2-Improve health service in rural area.

3- Improve ambulance services.

Future studies (researches)

1-Studies should be done to identify causes of in hospital delay for reperfusion treatment.

2-Studies should be done to identify why most patients who referred from other hospital did not receive treatment in those hospital.

3-Replication of the current study on larger probability sample is recommended to achieve generalized ability.

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