Factors Associated with the Time form Myocardial Infarction Onset to Hospital Arrival in Southeastern Iran

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Authors' contributions

This work was carried out in collaboration between all authors. Author LS designed, data collection and article writing. Author AR did cooperation in implementing of the project and data analysis. Author SS was coordinator of the project. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Background: Myocardial infarction (MI), is a fatal cardiovascular condition which results in various outcomes, considering time of treatment form symptoms onset. Despite of high importance of first hour after MI onset, a considerable proportion of patients arrive at hospital with delay. To assessing determinants of hospital arrival time in MI patients in southeastern Iran.
Methods: A cross-sectional study was conducted. A validated and reliable questionnaire was designed and used for data collection. Patients with a confirmed diagnosis of acute myocardial infarction were interviewed after informed consent.
Results: A total of 175 patients participated in this study. The most of them were male (76.6%, n=134). Median time to hospital arrival was 130 minutes. Its min and max were 15 and 1500 minutes, respectively. The most common reasons for delayed hospital arrival, were waiting for spontaneous recovery 45.70%, and then the distance to the hospital 35.40%.

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Conclusion: Lack of MI patients' awareness of importance of times to hospital arrival could be the best underling reason for the delayed hospital arrival. Mass education about the symptoms of MI and importance of prompt care seeking may be effective intervention to reduce MI deaths and complications.

Keywords: Hospital arrival time; myocardial infarction; delay; Iran.

1. INTRODUCTION

One of the fatal cardiovascular diseases is myocardial infarction (MI) [1]. The most of patients who experience signs and symptoms of MI, often seeking treatment with delay [2] and some of them don't have any care seeking activity up to 2 hours [3]. It results in higher fatality rates [4]. Rapid medical intervention, is a key element for successful MI treatment [5] which improves clinical outcomes [6]. Immediate medical intervention leads to quick and stable coronary reperfusion and by this way, prevents from serious myocardial injury and MI induced death [7,8].

Percutaneous Coronary Intervention (PCI) is the most effective treatment of acute myocardial infarction (AMI) [9]. Effective time for primary PCI is 90 minutes from AMI onset [10]. Thrombolytic therapy reduces mortality and morbidity of heart attack patients [11]. Prehospital thrombolysis can reduce delay [12]. Therefore, delay more than one hour, reduces the treatment efficacy, greatly [8], so that a 30 minutes delay results in loss of an average of one year of life [13]. Call to the emergency medical services, immediately after symptoms onset could significantly reduce the length of hospitalization [3]. Early detection of myocardial infarction symptoms, facilitate timely decision making on treatment interventions [9].

Previous studies have shown that delayed hospital arrival in female patients is more than males [14] and the most part of time from symptoms to hospital arrival have been spent at symptoms onset scene such as home or work place [15]. According to this, around 50%of MI patients seeking medical cares over 2 hours from symptoms onset, while more than 25% of them have six hours or more delay [16].

In Iran, the most of patients have more than 6 hours delayed hospital arrival with an average time of 344 minutes [17], which is considerably longer than reported from in United States [3]. On the other hands, AMI is one of the common cause of death in Iran. Despite of several studies from Iran, no one have been from southeastern region. Accordingly, this study designed and conducted to assess factors are associated with delayed hospital arrival of AMI patients in Rafsanjan district.

2. METHODS

A cross-sectional study was conducted in a referral educational hospital affiliated by Rafsanjan University of Medical Sciences. First time AMI patients, who admitted to the cardiac care unit of Imam Ali hospital from 21 June 2014 to 19 January 2015, who were able to verbally communicate in Farsi were eligible to participate in the study.

An interview form was designed based on literature review [3,5,18-21]. Its content validity assessed by repeated expert opinion. Expert opinions were discussed in an expert team including cardiologists, experienced clinical nurses and intensive care nursing academic staffs and based on several corrections were made. Reliability was determined using Cronbach's alpha and the alpha coefficient was obtained .92.

Interview form consisted of three parts, patients' socio- demographic characteristics, expected factors related to the hospital arrival time and patients' co-morbidities were measured in part one to three, respectively. Socio- demographic characteristics were included age, gender, marital status (married / single), number of family members, educational degree, occupation, economic status (well, moderate, weak), medical insurance, residence place (urban / rural), distance to hospital (in kilometers). Expected factors related to delayed hospital arrival were included of expectation of spontaneous recovery, ignored symptoms, self-medication, concerns about treatment costs. In part three, history of diabetes, hypertension, hyperlipidemia, cerebrovascular accidents, and chronic obstructive pulmonary disease was asked.

The diagnosis of AMI was based on clinical symptoms, electrocardiographic changes (Q-wave or ST elevation) and increase enzyme levels, twice the normal level [6]. The hospital arrival time has been defined as interval between

the onsets of first symptom of AMI to arrival at the hospital. In order to increase the accuracy of data participants were interviewed 48 hours after admission or when their status was stable.

Data was analyzed using SPSS software (Version 16). Descriptive statistics were estimated and chi- square test was used to analysis association of co-morbidities with hospital arrival time.

2.1 Ethical Considerations

The participants were invited to participate in the study. Study aims and procedures were introduced to participants and verbal [22] or written informed consent was taken. This study was approved by the ethical committee of Rafsanjan university of medical sciences (approval code: 1394.181). This study was conforms to the principles outlined in the Helsinki declaration.

3. RESULTS

A total of 175 AMI patients participated in this study. Male and female participants were 76.6 and 23.4%**.** Mean age of them was 59.30 years. The percentage of middle aged (46-65 years old), illiterate and married participants was 53.1, 47.7 and 87.4, respectively. Majority of participants reported a moderate economic status (56%). 97.1% of patients had an insurance (Table 1).

Median, min and max of distance from hospital estimated as 17, one and 200 kilometers (KM), respectively. More than 60% of participants reported a less than 20 KM distance (Table 1).

49.1% (n=86) of participants reported less than 120 and only 5.1% (n=9) have more than 720 minutes of hospital arrival time. The min, max and median of hospital arrival time were 15, 1500 and 130 minutes, respectively (Table 2).

Table 1. Participants characteristics

Individual characteristics		Frequency	Percentage
Age group (years)	29-45	27	15.40
	46-65	93	53.10
	66-90	55	31.40
Gender	Male	134	76.60
	Female	41	23.40
Marital status	Single	22	12.60
	Married	153	87.40
No. of family members	1	15	8.60
	2-4	100	57.10
	5>	55	34.30
Educational level	Illiterate	83	47.70
	Elementary	35	20.00
	Secondary	38	21.70
	Academic	19	10.90
Occupation	Self-employment	33	18.90
	Employee	23	13.10
	Retired	54	30.90
	Housewife	34	19.40
	Worker	9	5.10
	Farmer	22	12.60
Economic status	Well	19	10.90
	Moderate	98	56.00
	Weak	58	33.10
Insurance	Yes	170	97.10
	No	5	2.90
Residence place	Urban	106	60.60
	Rural	69	39.40
Distance to hospital (km)	<20	105	60.00
	>20	70	40.00

Table 2. Frequency distribution of hospital arrival time after acute myocardial infarction in Rafsanjan

		Frequency	Percentage
Hospital arrival time (minute)	>120	86	49.10
	121-360	62	35.40
	361-720	18	10.30
	>720	9	5.10
	Overall	175	100
Min=15		**Max= 1500**	
Median=130			

The most common causes of delayed hospital arrival were waiting for spontaneous recovery (45.70%), the distance from the hospital (35.40%), going to the office or clinic (32%) and lack of awareness of the symptoms of AMI (27.40%) (Table 3).

Table 3. Factors related to delayed hospital arrival after acute myocardial infarction (AMI) in Rafsanjan

Reason	Number	Percentage
Spontaneous recovery expected	80	45.70
Distance to the hospital	62	35.40
Going to office or clinic	56	32.00
Only the onset of symptoms	51	29.10
Attributing the symptoms to other causes	49	28.00
Lack of awareness the symptoms of AMI	48	27.40
Ignoring of symptoms	41	23.40
Having similar pain and relieve spontaneously	33	18.90
Self-medication	31	17.70
The unavailability of vehicle	21	12.00
Began tackle symptoms	21	12.00
History of heart disease	13	7.40
Fear the name of Cardiac care unite	12	6.90
Worry about disturbing others	8	4.60
Fear of hospitals environment	8	4.60
Family without attention to the patient	7	4.00
Fear of hospitalization	4	2.30
Concerns about treatment costs	3	1.70

Hypertension and diabetes were the most common comorbidities with 39.4% and 32.6% prevalence, respectively. More than 40% of participants reported a history of smoking (Table 4).

Table 4. Frequency of comorbidities in patients with acute myocardial infarction in Rafsanjan

Comorbidity	Yes		No	
	N	%	N	%
Diabetes	57	32.60	118	67.40
Hypertension	69	39.40	106	60.60
cerebrovascular accidents	5	2.90	170	97.1
Hyperlipidemia	54	30.90	121	69.10
History of smoking	71	40.60	104	59.40
Family history of cardiovascular diseases	54	30.90	121	69.10
History of hospitalization	46	26.30	129	73.70
Body mass index>25	73	41.70	102	58.30
Thyroid disorders	1	.60	174	99.40
Chronic obstructive pulmonary disease	3	1.70	172	98.30
Kidney disorders	11	6.30	164	93.70

A total of 121(69%) of participants reported at least one of the listed comorbidities. There was no statically significant relationship between hospital arrival time and comorbidities (P=0.28; Table 5).

Table 5. Relationship between hospital arrival time and at least one comorbidity

Delayed hospital arrival (minutes)	At least one comorbidity	
	Yes	No
>120	63(73.30%)	23(26.70%)
121-360	43(69.40%)	19(36%)
361-720	11(61.10%)	7(38.90%)
<720	4(44.40%)	5(55.60%)
Total	121(69.10%)	54(30.90%)
x^2=3.8	**df=3**	**P=.28**

4. DISCUSSION

Study results showed that hospital arrival time for around half of AMI patients is lower than two hours from symptoms onset, however, median hospital arrival time was 130 minute. Our study revealed also that the most common cause of delayed hospital arrival is expectation for spontaneous recovery (45%).

Although estimated mean hospital arrival time is considerably more than which reported from developed countries [5,23], but high percentage of patients whose arrival time is lower than two hours compared with reported percentage from

various countries [3,20,24] is an encouraging finding.

In agreement with previous reports [4,5], our study showed that hospital arrival for more than half of patients is more than two hours. It means that medical interventions in a notable proportion of patients would be less effective, which may results in higher AMI mortality [10].

Based on the study results, foundation of the most common causes of delayed arrival such as expecptation of spontaneous recovery and unawareness regarding AMI symptoms is unawareness of patients or their family members regarding AMI. Therefore, Unawareness about AMI is the most underlying factor which leads to delayed hospital arrival [24-26].

Delayed hospital arrival is consist of decision, lay consultation and travel times. Therefore, unawareness regarding disease and its symptoms leads to longer time from onset to the end of lay consultation and consequently longer hospital arrival time [27]. Accordingly, improved public awareness regarding AMI may an effective intervention to improve hospital arrival time in this patients [28].

Our findings also revealed that more than 60% of patients have less than 20 kilometer distance from hospital at the time of symptom onset. It means that if they decided, they could arrive to hospital in less than 60 minutes even without calling to the emergency medical service. Delayed decide to visiting hospital is consistent with lower awareness about AMI and lower risk perception [27].

A considerable proportion of self-medication (18%) without any prescription, is another finding in this study which is consistent with other works from Iran [17,25]. Despite of cultural foundation of self-medication in Iranian society, it may be a result of inadequate perceived risk [29].

There was not relationship between hospital arrival time and suffering from comorbidities (P=0.28) and patients with and without comorbidities had similar arrival time. This finding may be interpreted as that previous morbidities have no effect on perceived risks. Despite of non-significant association of suffering from comorbidities and hospital arrival time, which is not consistent with previous reports specially in case of family history of cardiovascular diseases [25], proportion of patients who arrived at

hospital with a considerable delay is meaningfully more in participants who had not reported any comorbidity.

5. STUDY LIMITATIONS

Our study suffers from some limitations. In this study, we have to use convenience sampling design. It may reduces generalizability of study results. On the other hand, small sample size was also a serious limitation of our study. In this study we studied patients who arrive at hospital even with long delay, by this we missed AMI patients who never arrive at hospital. It results in lower generalizability of our study findings.

6. CONCLUSION

More efforts are necessary to reduce delayed hospital arrival in AMI patients in southeastern Iran. In this region, inadequacy of awareness of AMI patients and their family members is the most determinants of hospital arrival time and mass education about AMI and its symptoms may be the most effective intervention to increase timely therapeutic care.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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