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FREQUENCY AND FACTORS RESPONSIBLE FOR DELAYED ARRIVAL OF MYOCARDIAL INFARCTION (STEMI) PATIENTS TO HOSPITAL

Muhammad Ismail[1], Khalid Iqbal Bhatti[2], Tariq Ashraf[3]

[1-3] Department of Cardiology, Shaheed Mohtarma Benazir Bhutto Medical College, Liyari, Karachi - Pakistan

Address for Correspondence:

Tariq Ashraf,
Department of Cardiology, Shaheed Mohtarma Benazir Bhutto Medical College, Liyari, Karachi - Pakistan

Emails: drtariq_ashraf@gmail.com

Contribution

MI, KIB did literature review and research design and also finalized the manuscript. TA helped in collection and analysis of data. MI helped in final draft. All authors contributed significantly to the submitted manuscript.

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ABSTRACT

Objective: To determine frequency and factors leading to delayed arrival of patients of AMI to a tertiary care hospital.

Methodology: A cross-sectional study was conducted at National Institute of Cardiovascular Disease, Karachi from December 2011 to June 2012. Patients of STEMI who were admitted in NICVD were interviewed within 72 hours of admission that included demographic and clinical data.

Results: A total of 200 patients with acute myocardial infarction (AMI) were included in this study. Out of them 149(74.5%) were male and 51(25.5) were female. The average age of the patients was 54.29±12.28 years. The average time taken from the onset of symptom to arrival at hospital was 5:48±6:24 h:min. Similarly, average distance traveled was 12.53±7.89 km. Frequency of delayed arrival (>1hours) of patients was observed in 142(71%) cases while 58(29%) patients arrived within 1 hours (not delay). Most of the patients used public transport to arrive at hospital whereas only 21.5% patients used ambulance.

Conclusion: The factors found responsible for delay in arrival at hospital were illiteracy, low income, long distance from hospital, hypertension and use of public transport.

Key Words: STEMI, Delayed Factors, Pre-Hospital Delay

INTRODUCTION

Acute myocardial infarction is significant public health problem in industrialized countries and rising epidemic in developing countries.[1,2] The South Asian countries of Pakistan, Bangladesh, India, Nepal and Sri Lanka account for about a quarter of the world's population and contribute the high burden of coronary artery disease (CAD) and now the leading cause of death in the Indo-Pakistan subcontinent.[3-5]

In the last decades, overall morbidity and mortality from AMI have declined due to developments in in-hospital treatment of MI (early use of reperfusion with thrombolytic agents, primary percutaneous coronary intervention). However, delay between the time of onset of symptoms and the patient's arrival at the hospital is still a major problem contributing to morbidity and mortality.[6] Outcomes of patients presenting with acute myocardial infarction (AMI) are highly dependent on the prompt administration of reperfusion therapy, like thrombolysis or primary percutaneous coronary intervention.[7,8] In addition, the "time-dependent" impact of fibrinolytic therapy has been demonstrated consistently and provides incontrovertible support for increased patient survival, decreased infarct size, and improved left ventricular performance with early successful reperfusion.[9] Moreover reperfusion strategies in AMI are time dependent and are most beneficial if applied within two hours from the onset of symptoms.[10] Institution of definitive treatment for AMI should begin within1 hour of symptom onset. Survival rates are improved by up to 50% if reperfusion is achieved within 1 hour of symptom onset and by 23% if it is achieved within 3 hours of symptom onset. In one trial, delaying treatment by 30 minutes reduced average life expectancy by 1 year.[1] However, in many countries prehospital delay on the part of the patient remains a substantial problem with almost half presenting more than 4 hours after symptom onset.[11,12] The delay between the time of onset of symptoms and the time at which the patient comes under medical attention is a major determinant of prognosis in acute MI.[13]

The rationale of this study was to highlight the factors and to determine frequency responsible for prehospital delay in patients of AMI in our local setup and to devise policies to address these delaying factors so as to decrease the morbidity and mortality associated with thestudies.

METHODOLOGY

A six months, cross-sectional study was conducted at National Institute of Cardiovascular Disease (NICVD), Karachi. All patients of >20 years of age of either gender visiting emergency department complaining of chest pain and later diagnosed with acute myocardial infarction with no previous history of cardiac disease were included in this study.

The patients who fulfilled the inclusion criteria and exclusion criteria and seen by service providers in emergency room of national institute of cardiovascular diseases and admitted in ward were selected and informed consent was taken. Information collected through a performa from patient and/ or attendant within 72 hours of admission that included demographic and clinical data. Demographic data including name, age, sex, marital status, address was recorded.

Data was analyzed on SPSS version 10.0. Descriptive statistics generated for mean and standard deviations for age, time taken, distance and time of onset of symptoms. Chi-Square tests were used to determine the difference between the two groups (arrival after 1 hour and before 1 hour) for factors leading to delayed arrival. A value of p<0.05 was considered statistically significant.

Frequency and percentage was computed for categorical variables like delayed arrival (>1 hours), gender, income, diabetes mellitus, hypertension, coronary artery disease, type of AMI and type of transport used.

RESULTS

A total of 200 patients with acute myocardial infarction (AMI) were included in this study. The average age of the patients was 54.29±12.28 years (95%CI: 52.88 to 56.30). Histogram of age distribution is presented in figure 1. The average time taken from the onset of symptom to arrival at hospital was 5:48±6:24 hr:min (95%CI: 4:45 to 6:45). Minimum time taken was 15 min and maximum time of arrival from the onset of symptoms to arrival was observed 24 hours. Similarly, average distance was 12.53±7.89 km (95%CI: 11.43 to 13.63) as shown in Table 1. Out of 200 AMI patients, 149(74.5%) were male and 51(25.5%) were female. Regarding marital status, 185(92%) were married and only 15(8%) were unmarried. Most of the patients were illiterate and less educated that is 77.7% as presented in Figure 2.

Anterior wall MI was the commonest type that was observed in 118(59%) cases followed by inferior wall MI 71(35.5%), posterior wall MI was seen in 7(3.5%) case and lateral wall MI was observed in 4(2%) cases as presented in Figure 3.

Frequency of delayed arrival (>1hour) of patients was observed in 142(71%) cases while 58(29%) patients were arrived within 1 hours (not delay). Out of 142 delayed arrival AMI patients, 48.6% (69/142) were arrived at hospital within above 1 hours to 5 hours after onset of symptoms, 23.2% (33/142) were arrived within 10 hours, 8.5% (12/142) between >10 hours to 15 hours and 19.7% (28/142) arrived at hospital between >15 hours to 24 hours as presented in Table 2.
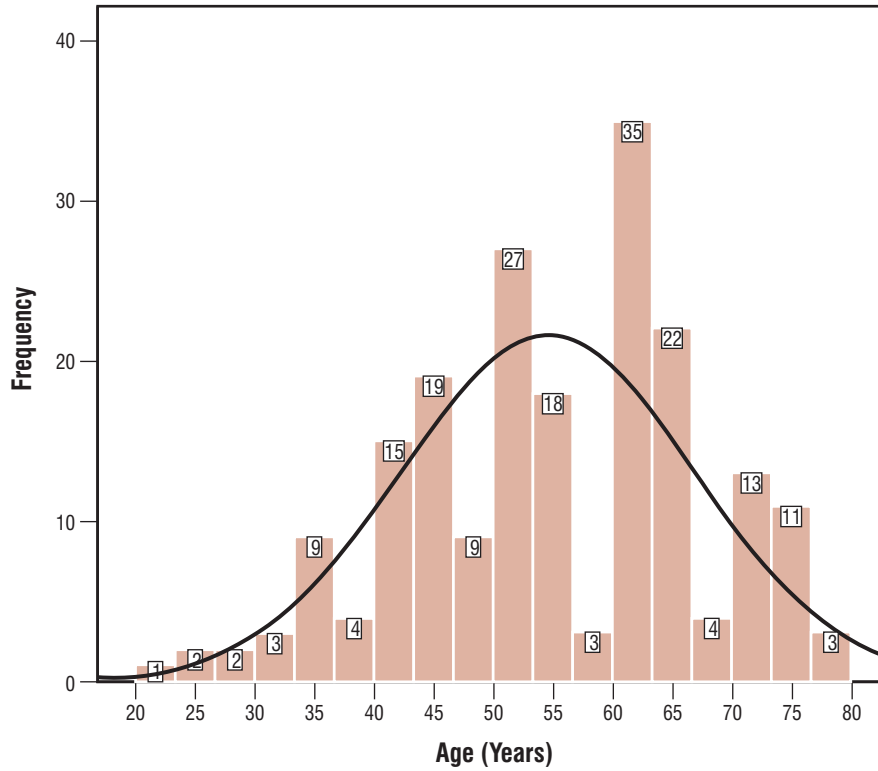
Figure 1: Histogram of Age Distribution (n=200)

Table 1: Demographic Variables of Study Population (n=200)

Variables	Mean ± SD	95%CI	Median(IQR)	Max - Min
Age (Years)	54.59±12.28	52.88 to 56.30	55(20)	80 – 22
Family Member	7.61±3.27	7.15 to 8.07	7(5)	20 – 0
Time of onset of symptoms (h:min)	6:39±3:53	6:07 to 7:12	7:0(7:45)	12:45 – 1:00
Time taken(h:min)	5:48±6:24	4:45 to 6:45	2:3(7:30)	24:00 – 0:15
Distance (km)	12.53±7.89	11.43 to 13.63	10(8)	35 - 1

Figure 2: Education Status of the Patients (n=200)
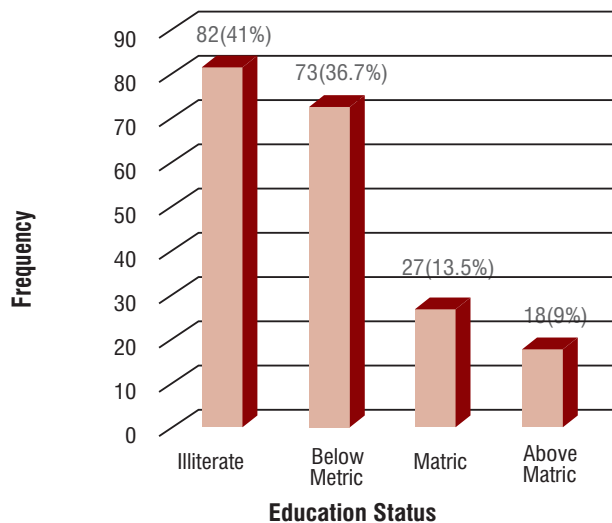
Twenty (10%) patients arrived hospital by bike or local bus, 19% came by personal car, and 10.5% by rickshaw, 31.9% by taxi and 21.5% arrived by ambulance as presented in Table 3.

Hypertension was the most common factor that was observed in 33% cases followed by diabetes mellitus (19%) and coronary artery disease was also considered delay because that was found in 12% cases (Table 4).

Age of the patients was not significant between groups (54.34 ± 12.98 vs. 55.21 ± 10.47; $p = 0.65$). Average distance was significantly high in those cases who arrived after 1 hours (delay) than those who arrived before 1 hours (13.63 ± 8.44 vs. 9.83 ± 5.55; $p = 0.002$) as presented in Table 5. Proportion of gender and marital status were also not significant between groups.

Below matric, income less than 10,000, type of transport and hypertension were the significant leading factors to delayed arrival of patients as presented in Table 6.
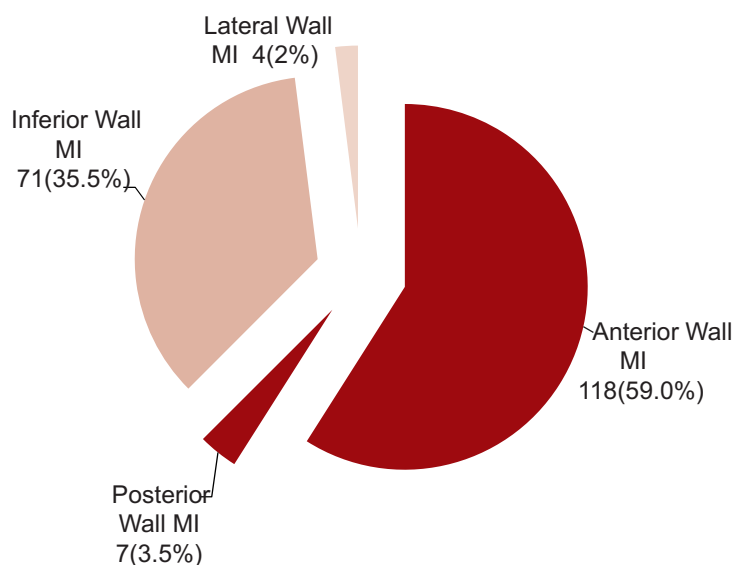
Figure 3: Type of Acute Myocardial Infarction (n=200)

Lateral Wall MI 4(2%)

Inferior Wall MI 71(35.5%)

Anterior Wall MI 118(59.0%)

Posterior Wall MI 7(3.5%)

Table 2: Delayed Arrival of Patients At Hospital With Respect To Time (n=142)

Delayed Time	Frequency	Percentage
> 1 hours to 5 hours	69	48.6%
> 5 hours to 10 hours	33	23.2%
>10 hours to 15 hours	12	8.5%
>15 hours to 24 hours	28	19.7%

Table 3: Type of Transport Used To Arrive At Hospital by Study Population (n=200)

Type of Transport	Frequency	Percentage
Ambulance	43	21.5%
Taxi	78	39.0%
Rickshaw	21	10.5%
Car	38	19.0%
Bike	17	8.5%
Local Bus	3	1.5%

Table 4: History of Patients Risk Factors in Study Population (n=200)

History of patients	Frequency	Percentage
Diabetes mellitus	38	19%
Hypertension	66	33%
Coronary Artery Disease	24	12%

Table 5: Comparison of Characteristics Between Delayed and Not Delayed Patients (n=200)

Variables	Delayed n=142	Not delayed n=58	p-Values
Age (Years)	54.34±12.98	55.21±10.47	0.65
Time of onset of symptoms (h:mm)	7:14 ± 3:37	5:04 ± 4:11	0.001
Time Taken (h:mm)	7:48±6:36	0:55±1:02	0.0005
Distance (km)	13.63±8.44	9.83±5.55	0.002

Table 6: Comparison of Transport Used Between Delayed and Not Delayed Patients (n=200)

Type of transports	Delayed N=142	Not delayed n=58	P-Values
Ambulance	35(24.6%)	8(13.8%)	0.033
Taxi	49(34.5%)	29(50%)	
Rickshaw	19(13.4%)	2(3.4%)	
Car	23(16.2%)	15(25.9%)	
Bike	13(9.2%)	4(6.9%)	
Local Bus	3(2.1%)	0(0%)	

DISCUSSION

The present study investigated duration of prehospital delay, factors associated with prolonged prehospital delay, and characteristics of 200 patients with ST elevation AMI who sought care in NICVD, Karachi. Less than one-third of patients (29%) arrived within 60 minutes after the onset of symptoms.

The duration between the onset of symptoms and the time at which the patient presents to a medical facility is among the major determinants of prognosis in AMI.[6] The median prehospital delay from symptom onset to hospital arrival ranges from 1.5 to 4 hours in western populations.[6, 11] A median delay of 120 min in the present study is almost in accordance with the relevant data from western populations.

Based on my results, below matric, income less than 10,000, type of transport and average distance and hypertension were associated with a longer prehospital delay, as previously reported in several studies.[1,6,11,15-17] Fukuoka et al revealed no significant difference with respect to hypertension21Moser et al have revealed no differences in prehospital delay depending on social status(low income and low education level)[18]

Ambulance transport is the most effective means of accessing medical help. In my study population, percentage of ambulance utility was only 21% and 51% used public transport. Though the percentage of ambulance utility has increased as compared to that reported in Habib et al in which 11% population utilized ambulance to each the hospital.[19] Percentage of ambulance utility was still low regarding the importance of swift hospital referral. This is the situation in most of the developing countries.

Some studies reported that single, divorced, or widow patients exhibited longer prehospital delays; however, marital status was not associated with prehospital delay in my study.[6,20] The number of children and localization of AMI were not associated with prehospital delay.

Delay time was not significant with respect to age and history of diabetes mellitus. Thus, results of my study is in contrast with those of some previous studies where patients with a history of diabetes and older individuals delayed longer.[11, 14]

Many previous studies conclude that prehospital delay after AMI is significantly longer among women than among men [11, 17] But in my study delay time is not significant with respect to gender.McGinn et al described that the difference has become smaller over the years.[11]

Though one might imagine that patients who have previously sustained a myocardial infarction would arrive at the hospital more quickly in the event of re-infarction, this is by no means necessarily the case. The MITRAplus study and a Swedish study with more than 2000 patients showed no difference in prehospital time between patients with a first infarction and patients with a reinfarction.[21] Same trend of no difference is seen my study.

CONCLUSION

It is concluded that some of the factors were found responsible for delayed arrival. Among them illiteracy, low income, long distance from hospital, hypertension and use of public transport were the leading factors.

The prehospital delay time can be shortened by focusing on public education through media and public events, well equipped hospitals or dispensaries, and with well-trained

doctors and paramedics..

Ambulance services having facilities of ECG, heart rate and rhythm monitors and trained personnel should be available for every two thousand populations so that immediate diagnosis and ambulation to hospital especially a cardiac center can be done

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