

Analyze the Rate of Late Arrival in Patients with Acute Myocardial Infarction and the Factors That Cause it

NAVEED YAQOUB¹, IQTIDAR UD DIN², MUHAMMAD SHAHID³, YASIR MANSOOR⁴, MUJEEBULLAH TAREEN⁵, FAHAD KHALID⁶

¹Associate Professor of Cardiology, Rawal Institute of Health Sciences, Islamabad

²Associate Professor of Cardiology, Nowshera Medical College, Nowshera, KPK

³Associate Professor of Cardiology, Head of Department, , DHQ/Teaching Hospital, Gujranwala Medical College, Gujranwala

⁴Healthcare Administrator, Health Services Academy Islamabad, Department of Public Health

⁵Professor of cardiology, Bolan Medical College, & Head of Cardiology Deptt; Sandeman, Provincial Hospital, Quetta

⁶MBBS,FCPS (Cardiology), Registrar, Department of Cardiology, FGPC Hospital, Islamabad

Corresponding author: Iqtidar Ud Din, Email: iqi_kmc@yahoo.com

ABSTRACT

Objective: Explore the causes of patients' delayed hospital visits after presenting with acute myocardial infarction to better understand this issue.

Study Design: Cross-sectional

Place & Duration: Department of Cardiology, Rawal Institute of Health Sciences, Islamabad during the period from February, 2022 to July, 2022.

Methods: Seventy patients of both sexes were enrolled in this study, all of whom had been diagnosed with acute myocardial infarction. Ages of patients ranged from 18 to 65. A patient's age, sex, place of residence, level of education, and socioeconomic position were meticulously noted. It was recorded how often people were running late. Reasons for the late arrival were calculated.

Results: There were a total of 70 patients, 48 (70%) of whom were male and 22 (30%) female. Patients between the ages of 41 and 50 made up the largest age group, followed by those between the ages of 51 and 65. It was found that 42 patients (62.9%) arrived more than 2 hours after their symptoms had begun. The use of public transportation was the leading cause of arrival delays (51.4%), followed by large distance (more than 20 km) (38.5%) and the lack of an attendant (38.5%).

Conclusion: We found that a significant proportion of patients with acute myocardial infarction had a delayed arrival. The most common causes of late arrival at the hospital were the use of public transportation, travel distance, lack of education, and low socioeconomic level.

Keywords: Delayed arrival, Risk factors, Acute myocardial infarction,

INTRODUCTION

There is a substantial fatality risk associated with acute myocardial infarction. Time to successful therapy is a critical component, along with illness severity, number of affected vessels, etc., in determining the outcome of AMI patients' hearts and lives. The success of reperfusion treatment hinges on whether or not it is initiated soon enough after the onset of symptoms. Patients suffering from acute myocardial infarction are encouraged by guidelines to have as little time as possible between the onset of symptoms and the start of reperfusion. Delay in beginning reperfusion treatment for acute myocardial infarction (AMI) can be broken down into pre-hospital and in-hospital phases, according to some research. The duration of time between the beginning of symptoms and admission to the hospital is known as the pre-hospital delay. Door-to-treatment, or in-hospital delay, is the amount of time that passes between when a patient arrives at a medical facility and when reperfusion therapy actually begins. There are two distinct components to the pre-hospital delay: the patient delay (PD) time and the transportation delay (TD) time. Patient delay refers to the time it takes for a person to go from the beginning of symptoms to the decision to seek professional healthcare, while transportation delay refers to the time it takes for that person to get from their home to the hospital. There is a significant gap between the time it takes to go to the hospital and the time it takes to determine whether or not to

start reperfusion treatment once you get there. [3] This pre-hospital delay is driven mostly by the patient's own decisions and is substantially longer than the latter. Reperfusion therapy will not be as effective as it may be if the time between when the patient arrives at the hospital and when treatment begins is not shortened. Nonetheless, there has been no change in the patient delay time that accounts for 75% of the overall pre-hospital delay time[4] during the previous decade. [6]

All patients with ischemic symptoms less than 12 hours old and persistent ST-segment elevation for STEMI, as recommended by all updated recommendations from the world's cardiology societies [7]. NSTEMI also promotes an early invasive strategy. In low and medium income countries (LMIC), where treatment delays [8] due to lack of coordination across institutions, access to interventional cardiology facilities, and catheterization labs have led to worse outcomes [9], the 12 hour window for STEMI is of particular importance. Longer intervals between the onset of symptoms and the beginning of therapy were shown to be linked with many parameters in individuals with AMI. Several reports [10] found that long delays in pre-hospital care were caused by residents' location in rural locations, the difficulty of getting to hospitals, and the limited availability of transportation. Recent research conducted in Pakistan by Mujtaba and colleagues found that over 20% of AMI patients presented to the hospital after 6 hours had passed since the onset of symptoms, with the median pre-

hospital time being 120 minutes (interquartile range: 229). Female patients and those between 41 and 65 years old were disproportionately affected by the delay. Misinterpretation, incorrect diagnosis, lack of transportation, and insufficient funds all contribute to patients arriving at the hospital later than necessary, with misdiagnosis standing out as a major factor of delay (p 0.05). Patients' inability to pay for cardiac reperfusion therapies and the absence of a national insurance plan in many LMICs result in delays in care or no care at all [11]. This is especially problematic in the early phase of total ischemic time, when patients' financial resources are the most important factor in determining whether or not they will make FMC. Delay attributable to the patient depends on the patient's cognitive capacity and overall clinical understanding of warning signs of myocardial infarction (MI) [12]. Delay attributable to the patient is defined as the time it takes the patient to decide to call EMS after the onset of consistent acute symptoms.

The current study sought to investigate the incidence of late arrival and related variables of late arrival in patients with acute myocardial infarction.

METHODS

This cross-sectional study was conducted at Department of Cardiology, Rawal Institute of Health Sciences, Islamabad during the period from February, 2022 to July, 2022. Acute myocardial infarction was present in a total of 70 cases, including both male and female patients. Patients' ages ranged anywhere from the middle of their teens to the middle of their seventies. After receiving the patients' consent, a comprehensive demographics questionnaire was presented to them to fill out. This questionnaire inquired about the patients' ages, genders, places of residence, levels of education, and annual household incomes. Patients who had already undergone coronary artery bypass grafting, myocardial infarction patients, and anyone who refused to participate because of this were all ineligible to take part in the study.

The times patients arrived at the hospital were recorded in relation to when their symptoms first appeared. Patients were considered to have arrived late at the hospital if they came more than two hours after the time that was anticipated for their arrival. An investigation was conducted to determine the reasons for the delays in arrival, which included the forms of transportation utilized, the distance travelled, the degree of education obtained, the household income, the availability of an attendant, and so on.

For the purpose of analyzing all of the data, SPSS 20.0 was utilized. A tally was performed on the results of the calculations involving the mean and the standard deviation. Calculations of counts and percentages were carried out. The information was organized into tables for storage.

RESULTS

There were a total of 70 patients, 48 (70%) of whom were male and 22 (30%) female. Patients between the ages of 41 and 50 made up the largest age group, followed by those between the ages of 51 and 65. There were 43 (61.4%) cases had rural residency and 27 (38.6%) cases

had urban. Majority of the patients were illiterate and had poor socio-economic status. Average time from onset of symptoms and 7.12+10.50 hours to time taken to arrival was 6.5+7.20 hours. (Table 1)

Table 1: The demographic information of each and every patient

Variables	Frequency	Percentage
Gender		
Male	48	70
Female	22	30
Age (years)		
18 - 30	5	7.1
31 to 40	17	24.3
41 to 50	28	40
> 50	20	28.6
Place of Living		
Rural	43	61.4
Urban	27	38.6
Socio-economic status		
Poor	46	65.7
Middle/high	24	34.3
Literacy		
Yes	30	42.9
No	40	57.1
Time Taken to arrive (hrs)		
	6.5+7.20	
Onset of symptoms (Time) (hrs)		
	7.12+10.50	

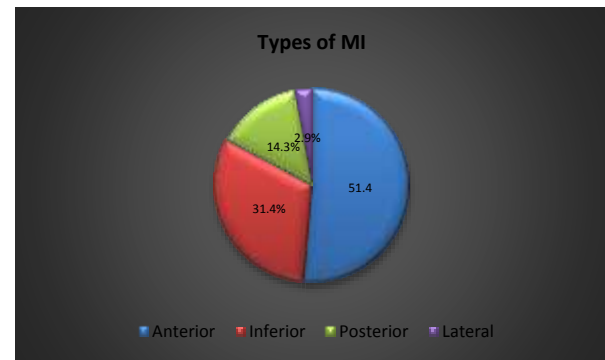


Figure-1: MI with Types

36 patients had anterior wall myocardial infarction, 22 patients had inferior wall MI, 10 patients had posterior wall MI and 2 had lateral wall MI. (Figure-1)

It was found that 42 patients (62.9%) arrived more than 2 hours after their symptoms had begun. (Figure 2)

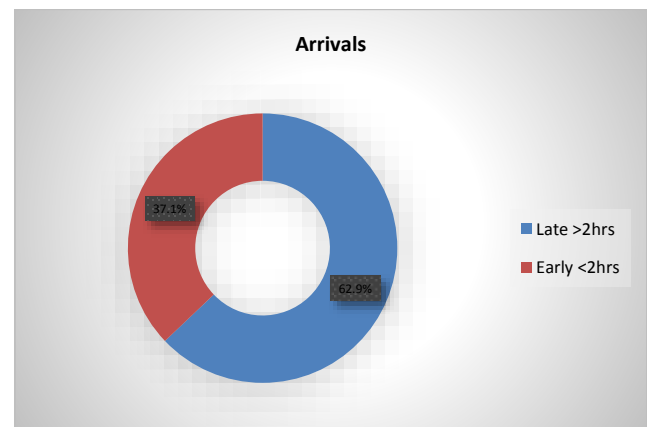


Figure-2: Statistical distribution of patient arrival times

The use of public transportation was the leading cause of arrival delays (51.4%), followed by large distance (more than 20 km) (38.5%) and the lack of an attendant (38.5%). (Table-2)

Table 2: Factors associated to delayed arrival

Variable	Delayed (42)	Early (28)
Use of Transport		
Public	25	11
Ambulance	12	10
Own vehicle	5	7
Distance		
>20 km	20	8
<20 km	22	20
Attendant absence		
Yes	18	10
No	24	18

DISCUSSION

Late arrival from onset of symptoms to hospital is the major cause of increasing morbidity and mortality rate in acute myocardial patients [13], and ST elevation myocardial infarction is one of the leading causes of mortality and morbidity worldwide.

The purpose of this study was to analyse the incidence and risk factors of delayed arrival in STEMI patients. Seventy people who have suffered from an AMI were involved in this research. Seventy percent of patients were male while only thirty percent were female, and the average age ranged from 36 to 65. These findings were consistent with those of other research [14,15] that found men to make up 60% to 80% of patients. There were 43 (61.4%) cases had rural residency and 27 (38.6%) cases had urban. Majority of the patients were illiterate and had poor socio-economic status. Average time from onset of symptoms and 7.12+10.50 hours to time taken to arrival was 6.5+7.20 hours [16].

It was found that 42 patients (62.9%) arrived more than 2 hours after their symptoms had begun. According to one study [17], 71% of patients who went to the hospital did so more than an hour after their symptoms began.

Patients who arrived late had significantly lower socioeconomic status than those who arrived on time (p=0.038), according to the results of the current study. In seventy percent of cases, patients were late because they lacked the literacy skills necessary to read and navigate hospital systems. These findings corroborated those of earlier studies [18] that found that poverty and a lack of education were major contributors to late arrival.

When comparing patients who were not delayed (16% p=0.025) versus those who were, we found that taking public transportation (51.4%) was the single most significant risk factor for late arrival. Patients Extensive travel over a distance greater than 20 kilometres also contributed significantly to the late arrival. Patients with an absent attendant accounted for 38.4% of those who arrived late, compared to just 8.6% of those who did not. These findings are consistent with those of other studies [19, 20] that have found that travel distances greater than 10 kilometres, illiteracy, the use of public transportation, and the absence of a companion from the onset of symptoms

are the most common risk factors for delayed arrival at the hospital.

Those with more than 10 years of schooling are less likely to wait until they are seriously ill before seeking medical attention, as shown by this study. People with more education tend to have a more thorough understanding of their health, as well as an increased ability to recognise and manage the symptoms of illness. The prevalence of cardiovascular disease is higher among Americans with lower levels of education [21]. Previous research has shown that older generations in Kinmen, and Taiwan more generally, have a lower level of education than younger generations. Additional research is required to determine the causal relationship between hospital arrival delays and the interaction of age and level of education. [22]

CONCLUSION

Myocardial infarction occurs suddenly and is a leading cause of death in the general population. In certain cases, death and morbidity can be reduced with prompt and appropriate treatment. From this study, we infer that a significant proportion of patients suffering from acute myocardial infarction have a delay in arrival to the hospital. The most prevalent causes of late arrival to the hospital were riding public transportation, travelling a long distance, having a poor level of education, having a low income, and not having a companion with them when they first started feeling sick.

REFERENCES

- 1 L.J. Wang, Y. Liu, X.F. Liu, et al. Investigating the factors of affecting the treatment delay of AMI patients Nurs Pract Res, 9 (2012), pp. 8-10
- 2 G. Cui, W.L. Xu, B.H. Li Researching pre-hospital delay time distribution and influence factor of ST segment elevation acute myocardial infarction patients. Contemp Med, 19 (2013), pp. 30-31[in Chinese]
- 3 L. Perkins-Porras, D.I. Whitehead, P.C. Strike, et al. Pre-hospital delay in patients with acute coronary syndrome: factors associated with pre-hospital delay patient decision time and home-to- hospital delay Eur J Cardiovasc Nurs, 8 (2009), pp. 26-33
- 4 T.P. Hirvonen, M.O. Halinen, R.A. Kala, J.T. Olkinuora. Delays in thrombolytic therapy for acute myocardial infarction in Finland. Results of a national thrombolytic therapy delay study. Finnish Hospitals' Thrombolysis Survey Group Eur Heart J, 19 (1998), pp. 885-892
- 5 R.J. Goldberg, F.A. Spencer, K.A.A. Fox, et al. Prehospital delay in patients with acute coronary syndromes (from the global registry of acute Coronary Events [GRACE]) Am J Cardiol, 103 (2009), pp. 598-603
- 6 F.A. Spencer, G. Montalescot, K.A.A. Fox, et al. Delay to reperfusion in patients with acute myocardial infarction presenting to acute care hospitals: an international perspective. Eur Heart J, 31 (2010), pp. 1328-1336
- 7 Kushner FG, Chair V, Ascheim DD, et al. 2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction. J Am Coll Cardiol. 2013;61(4):78-140. PMID:23256914
- 8 Khan MS, Jafary FH, Faruqi AM, et al. High prevalence of lack of knowledge of symptoms of acute myocardial infarction in Pakistan and its contribution to delayed presentation to the hospital. BMC Public Health. 2007 Dec 9;7(1):284. PMID:17922923

- 9 Moran AE, Tzong KY, Forouzanfar MH, et al. Variations in Ischemic Heart Disease Burden by Age, Country, and Income: The Global Burden of Diseases, Injuries, and Risk Factors 2010 Study. *Glob Heart*. 2014 Mar 1;9(1):91–9. pmid:24977114
- 10 Kakou-Guikahue M., N'Guetta R., Anzouan-Kacou J. B., et al. Optimizing the management of acute coronary syndromes in sub-Saharan Africa: A statement from the AFRICARDIO 2015 Consensus Team. *Arch Cardiovasc Dis*. 2016 Jun 1;109(6–7):376–83. pmid:27020513
- 11 Xavier D., Pais P., Devereaux P. J., et al. Treatment and outcomes of acute coronary syndromes in India (CREATE): a prospective analysis of registry data. *Lancet (London, England)*. 2008;371(9622):1435–42. pmid:18440425
- 12 S. C. Lim, A. Rahman, and N. M. Yaacob, "Pre-hospital factors influencing time of arrival at emergency departments for patients with acute st-elevation myocardial infarction," *Malaysian Journal of Medical Sciences*, vol. 26, no. 1, pp. 87–98, 2019.
- 13 Rafi, A., Sayeed, Z., Sultana, P. et al. Pre-hospital delay in patients with myocardial infarction: an observational study in a tertiary care hospital of northern Bangladesh. *BMC Health Serv Res* 20, 633 (2020)
- 14 Yuyun MF, Sliwa K, Kengne AP, et al. Cardiovascular Diseases in Sub-Saharan Africa Compared to High-Income Countries: An Epidemiological Perspective. *Glob Heart*. 2020 Feb 12;15(1):15. pmid:32489788
- 15 Seligman B, Vedanthan R, Fuster V. Acute coronary syndromes in low- and middle-income countries: Moving forward. *Int J Cardiol*. 2016 Aug 1;217 Suppl:S10–2. pmid:27381860
- 16 Doddipalli S. R., Rajasekhar D., Vanajakshamma V., & Sreedhar Naik K. Determinants of total ischemic time in primary percutaneous coronary interventions: A prospective analysis. *Indian Heart J*. 2018 May 7;70 Suppl 3:S275–9. pmid:30595273
- 17 Osayi Lawani, Nicholas Gorman, Fiona Gorman, Jiries Ganim, Stefano Sdringola-Maranga, "Correlates of Delayed Initial Contact to Emergency Services among Patients with Suspected ST-Elevation Myocardial Infarction", *Cardiology Research and Practice*, vol. 2021, Article ID 8483817, 9 pages, 2021.
- 18 Huang YH, How CK, Ho CS. Factors Affecting Delayed Hospital Arrival of Patients with Acute Myocardial Infarction in Kinmen. *Int J Environ Res Public Health*. 2022 Jan 25;19(3):1323.
- 19 Moser D.K., McKinley S., Dracup K., Chung M.L. Gender differences in reasons patients delay in seeking treatment for acute myocardial infarction symptoms. *Patient Educ. Couns*. 2005;56:45–54.
- 20 Dracup K., Moser D.K., McKinley S., Ball C., Yamasaki K., Kim C.J., Doering L.V., Caldwell M.A. An international perspective on the time to treatment for acute myocardial infarction. *J. Nurs. Scholarsh*. 2003;35:317–323.
- 21 Steptoe A., Marmot M. Socioeconomic status and coronary heart disease: A psychobiological perspective. *Popul. Dev. Rev*. 2004;30:133–150
- 22 Wenchi Guan, Arjun K Venkatesh, Xueke Bai, Si Xuan, Jing Li, Xi Li, Haibo Zhang, Xin Zheng, Frederick A Masoudi, John A Spertus, Harlan M Krumholz, Lixin Jiang, Time to hospital arrival among patients with acute myocardial infarction in China: a report from China PEACE prospective study, *European Heart Journal - Quality of Care and Clinical Outcomes*, Volume 5, Issue 1, January 2019, Pages 63–71,