

# Acute Myocardial Infarction as Predictor of Mortality in Patients with Premature Coronary Disease

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## Abstract

**Background:** Recent data from various parts of the world have led to the conclusion that more than 80 % of CVD deaths occur in developing countries like Pakistan. This high burden of heart diseases is largely attributed to the industrial and technological progress which is associated with economic and social transformations which have led to life style modification and sedentary life style. This study was planned to ascertain mortality rate of premature coronary artery disease in patients with AMI as it directly affects main workforce of our national economy. **Objective:** To determine rate of mortality in premature coronary artery disease patients with acute myocardial infarction. **Material and methods:** A total of 145 patients having premature coronary artery disease presenting with acute myocardial infarction were included in this descriptive study. This study was conducted in the department of medicine, District Headquarters Hospital, Rajan Pur from June 2017 to September 2017. These patients were followed during current hospitalization to see mortality in these patients and all the findings were noted in the proforma. **Results:** Of these 145 study cases, 96 (66.2%) were male patients and 49 (33.8%) were female patients. Mean age of our study cases was noted to be  $47.67 \pm 7.59$  years. Mean time taken before presentation at hospital was  $113.79 \pm 54.36$  minutes. Diabetes was present in 48 (33.1%) of our study cases, hypertension was present in 58 (40%), smoking in 39 (26.9%), family history of IHD in 67 (46.2%) and obesity in 49 (33.8%) of our study cases. Mortality was noted to be in 19 (13.1%) of our study cases, post MI angina was seen in 36 (24.8%) and cardiogenic shock was noted in 29 (20%). **Conclusion:** Our study results indicate that patients with premature coronary artery disease having acute myocardial infarction (AMI) have high frequency of adverse clinical outcomes. Positive family history, hypertension, obesity and diabetes were major risk factors noted in our study.

**Keywords:** Premature coronary artery disease, mortality, acute myocardial infarction.

## Introduction

Ischemic heart disease (IHD) is one of the major causes of morbidity and mortality world wide<sup>1-5</sup>. The prevalence of Myocardial infarction (MI) is more in the middle income world; and it is well known that males are more commonly affected than females<sup>6, 7</sup>. Myocardial ischemia caused by atherosclerotic CAD usually manifests itself in terms of acute myocardial infarction (AMI) and unstable angina<sup>8</sup>. In emergency department admissions, acute myocardial infarction is more dangerous and commonly encountered life threatening illness<sup>9, 10</sup>. Due to the rapid advancements in recent life saving technologies and use of sophisticated equipments/procedures, death rates have dropped down over 30 % in previous 2 decades. However these mortality rates are reported to be still high, emphasizing the need for more effort in this area which will target early presentation to the emergency care setting followed by proper management<sup>11</sup>. In our country, due to high prevalence of hypertension, smoking and increasing trends in obesity have led to the increase in cardiovascular risk factors<sup>12</sup>. Coronary artery disease which manifests itself at younger ages may lead to adverse consequences for the sufferers, their families and whole society as it hits patients in ages of 35 – 65 years which comprises of workforce of the nation. Moreover, CAD are observed in Asian patients who are 10 years younger than their western counterparts. The mean age for first presentation of acute myocardial infarction in Indians is 53 years<sup>13</sup>. In young patients with premature coronary artery disease cardiogenic shock has been reported to be 12 %<sup>14</sup>. Khan et al<sup>15</sup> reported mortality 11.8 % with premature coronary artery disease while post MI angina was 10.46 %<sup>15</sup>.

Prevention of deaths particularly in young people becomes nation's moral responsibility. This study has been proposed to document mortality rate of premature coronary artery disease in patients of AMI as there was no such study conducted in our population. The results of this study generated baseline database of our local population and findings were compared with that of already existing literature from different countries. Decreasing morbidities and mortalities in this age group are beneficial for national economies.

## Material and methods

A total of 145 patients having premature coronary artery disease presenting with acute myocardial infarction were included in this descriptive study. This study was conducted in the department of medicine, District Headquarters Hospital, Rajan Pur from June 2017 to September 2017. These patients were followed during current hospitalization to see mortality in these patients and all the findings were noted in the proforma. Patients of either sex having ages for males (25 – 55 years) and for female patients (25-65 years) with acute myocardial infarction were included. AMI was defined as “patients presenting with retrosternal pain having ECG evidence of persistent ST segment elevation of > 2mm in more than 2 contiguous chest leads followed by T wave inversion”. Patients having previous history of infarction, patients having chronic renal failure and liver cirrhosis, Patients with advanced heart failure, patients with history of coronary artery bypass surgery were excluded from our study. All patients were given thrombolytic therapy (Injection Streptokinase 1.5 million units over one hour) and each patient was monitored through serial ECGs and echocardiography till discharge from the hospital to see mortality and data was entered in SPSS-18. Descriptive statistics were applied to calculate mean and standard deviation for the age of the patients and time taken before presentation. Frequencies and percentage were tabulated for the categorical variables like age groups, gender, mortality, family history of IHD, diabetes, smoking and hypertension. Confounders like age, diabetes, time taken before presentation to hospital, smoking, family history of IHD, Hypertension and gender were controlled by stratification of data.

## Results

Of these 145 study cases, 96 (66.2%) were male patients and 49 (33.8%) were female patients. Mean age of our study cases was noted to be  $47.67 \pm 7.59$  years. Mean time taken before presentation at hospital was  $113.79 \pm 54.36$  minutes (with minimum time taken before presentation was 45 minutes while maximum time taken before presentation was 240 minutes) and 77 (53.1%) consumed more than 90 minutes to reach the hospital. Diabetes was present in 48 (33.1%) of our study cases, hypertension was present in 58 (40%), smoking in 39 (26.9%), family history of IHD in 67 (46.2%) and obesity in 49 (33.8%) of our study cases. Mortality was noted to be in 19 (13.1%) of our study cases.

**Table No. 1**  
**Stratification of mortality with regards to effect modifiers. (n=145)**

Effect Modifiers		Mortality		P – value
		Yes	No	
Gender	Male (n=96)	10	86	0.200
	Female (n=49)	09	40	
Age groups (In Years)	25 – 45 (n=77)	09	68	0.629
	> 45 (n=68)	10	58	
Time taken before presentation (In minutes)	< 90 (n=68)	04	64	0.008
	> 90 (n=77)	15	62	
Diabetes	Yes (n=48)	18	30	0.000
	No (n=97)	01	96	
Hypertension	Yes (n=58)	09	49	0.616
	No (n=87)	10	77	
Smoking	Yes (n=39)	00	39	0.002
	No (n=106)	19	87	
Family History of IHD	Yes (n=67)	00	67	0.000
	No (n=78)	19	59	
Obesity	Yes (n=49)	15	34	0.000
	No (n=96)	04	92	

## Discussion

Recent data from various parts of the world have led to the conclusion that more than 80 % of CVD deaths occur in developing countries like Pakistan. This high burden of heart diseases is largely attributed to the industrial and technological progress which is associated with economic and social transformations which have lead to life style modification and sedentary life style<sup>16</sup>. This study was planned to ascertain mortality rate of premature coronary artery disease in patients with AMI as it directly affects main workforce of our national economy. Our study included a total 145 premature coronary artery disease having acute myocardial infarction meeting inclusion and exclusion criteria were included in this study. Different studies have associated premature coronary artery disease to be more frequent in men than that of women<sup>17</sup>. Similarly our study results have shown that 96 (66.2%) were male patients and 49 (33.8%) were female patients. Khan et al<sup>15</sup> reported women in 1994 were 27 % which increased to 39 % in 2004. Ahmed et al<sup>17</sup> also reported male gender predominance with 88 %.

Qadri et al<sup>18</sup> reported 70 % male patients. Another study from Bangladesh by Karim et al<sup>19</sup> reported 68 % male gender predominance which is close to our study results.

Mean age of our study cases was noted to be  $47.67 \pm 7.59$  years (range; 35 – 63 years). Mean age of the male patients was  $45.77 \pm 5.98$  years while that of female patients was  $51.39 \pm 8.99$  years ( $p = 0.000$ ). Khan et al<sup>15</sup> reported mean age to 49.70 in 1994 which dropped to the 47.38 years, similar to our results. Similar findings have also been documented by Karim et al<sup>19</sup> from Bangladesh.

Time taken before presentation to the hospital plays a key role in the management of patients with myocardial infarction, however this practice is neglected in our society and people tend to present late which adds up to the complications and adverse clinical outcomes. Mean time taken before presentation at hospital was  $113.79 \pm 54.36$  minutes (with minimum time taken before presentation was 45 minutes while maximum time taken before presentation was 240 minutes) and 77 (53.1%) consumed more than 90 minutes to reach the hospital.

Diabetes was present in 48 (33.1%) of our study cases. Ahmed et al<sup>17</sup> reported 31 % diabetes in AMI patients with premature CAD, close to our results. Qadri et al<sup>18</sup> reported 29.5 % diabetes, close to our results. Karim et al<sup>19</sup> reported bit high rate of diabetes to be 46 % while Ertelt et al<sup>20</sup> reported 17.5 % diabetes.

Hypertension was present in 58 (40%) while Ahmed et al<sup>104</sup> reported 35 % hypertension in premature CAD patients having AMI. Qadri et al<sup>18</sup> reported 45 % hypertension in patients with CAD while a study conducted by Noeman et al<sup>21</sup> also reported 51 % hypertension supporting our findings. Karim et al<sup>19</sup> reported very high frequency of hypertension to be 76 % which is quite high than our study results.

Smoking is a major risk factor in the development of CHD among young people and different studies have related smoking with premature coronary artery disease, smoking was positive in 39 (26.9%) our study cases. Ahmed et al<sup>17</sup> reported quite high proportion of smoking to be 79 % which is much higher than our study results. The reason for this difference may be due to small sample size of their study ( $n=52$ ) as well as very high proportion on male gender (i.e. 87%) because in our study all smokers were male patients. Qadri et al<sup>18</sup> reported 49 % smoking which is again higher proportion of smoking.

Family history positive for IHD in first degree relatives has been traditionally associated risk factor which increases their chances for future coronary artery disease. Family history of IHD in 67 (46.2%) while Ahmed et al<sup>17</sup> reported 17 % which is quite lower, again may be due to their small sample size of only 52. Qadri et al<sup>18</sup> reported 32 % positive family history which is close to our findings. Karim et al<sup>19</sup> 34 % positive family history which is similar to our study results.

obesity in 49 (33.8%) of our study cases while a study conducted by Noeman et al<sup>21</sup> reported 35 % obesity in patients with premature coronary artery disease which is close to our findings. Karim et al<sup>19</sup> reported 44 % obesity which is similar to that of our study results.

Mortality was noted to be in 19 (13.1%) of our study cases. A study conducted by Khan et al<sup>8</sup> reported mortality in 1994 was 10.65 % which increased to 11.8 % in 2004, these results are similar to that of our study results. Karim et al<sup>106</sup> reported 12 % mortality which is close to our study results.

## Conclusion

Our study results indicate that patients with premature coronary artery disease having acute myocardial infarction (AMI) have high rates of mortality. Positive family history, hypertension, obesity and diabetes were major risk factors noted in our study. Life style modification and early screening of the cases with positive family history in first degree relatives can help prevent heart diseases in our population as it hits main workforce and has negative impact on national productivity. Mortality was significantly associated with late presentation at hospital.

## References

1. Finegold JA, Asaria P, Francis DP. Mortality from ischaemic heart disease by country, region, and age: Statistics from World Health Organisation and United Nations. *Int J Cardiol.* 2013;168(2): 934–45.
2. Nowbar AN, Howard JP, Finegold JA, Asaria P, Francis DP. 2014 global geographic analysis of mortality from ischaemic heart disease by country, age and income: statistics from World Health Organisation and United Nations. *Int J Cardiol.* 2014;174(2):293-8.
3. Furman MI<sup>1</sup>, Dauerman HL, Goldberg RJ, Yarzebski J, Lessard D, Gore JM. Twenty-two year (1975 to 1997) trends in the incidence, in-hospital and long-term case fatality rates from initial Q-wave and non-Q-wave myocardial infarction: a multi-hospital, community-wide perspective. *J Am Coll Cardiol* 2001;37:1571-80.
4. Rogers WJ<sup>1</sup>, Frederick PD, Stoehr E, Canto JG, Ornato JP, Gibson CM, et al. Trends in presenting characteristics and hospital mortality among patients with ST elevation and non-ST elevation myocardial infarction in the National Registry of Myocardial Infarction from 1990 to 2006. *Am Heart J* 2008;156:1026-34.

5. Roger VL<sup>1</sup>, Weston SA, Gerber Y, Killian JM, Dunlay SM, Jaffe AS, et al. Trends in incidence, severity, and outcome of hospitalized myocardial infarction. *Circulation* 2010;121:863-9.
6. Parikh NI<sup>1</sup>, Gona P, Larson MG, Fox CS, Benjamin EJ, Murabito JM, et al. Long-term trends in myocardial infarction incidence and case fatality in the National Heart, Lung, and Blood Institute's Framingham Heart study. *Circulation* 2009;119:1203-10.
7. Ford ES<sup>1</sup>, Ajani UA, Croft JB, Critchley JA, Labarthe DR, Kottke TE, et al. Explaining the decrease in U.S. deaths from coronary disease, 1980-2000. *N Engl J Med* 2007;356:2388-98.
8. Fox CS<sup>1</sup>, Evans JC, Larson MG, Kannel WB, Levy D. Temporal trends in coronary heart disease mortality and sudden cardiac death from 1950 to 1999: the Framingham Heart Study. *Circulation* 2004;110:522-7.
9. Fox CS<sup>1</sup>, Coady S, Sorlie PD, D'Agostino RB Sr, Pencina MJ, Vasani RS, et al. Increasing cardiovascular disease burden due to diabetes mellitus: the Framingham Heart Study. *Circulation* 2007;115:1544-50.
10. Moran AE, Forouzanfar MH, Roth GA, Mensah GA, Ezzati M, Murray CJ, et al. Temporal trends in ischemic heart disease mortality in 21 world regions, 1980 to 2010: the Global Burden of Disease 2010 study. *Circulation*. 2014;129(14):1483-92.
11. Sugunakar C, Narshima NR, Anjanayalu B. A study of serum hypomagnesium levels in acute myocardial infarction. *J Evidence Based Med Healthcare*. 2014;1(10):1306-9.
12. Jaffery MH, Shaikh K, Baloch GH, Shah SZA. Acute myocardial infarction hypomagnesemia in patients. *Professional Med J*. 2014;21(2):258-63.
13. Sharma M, Ganguly NK. Premature Coronary Artery Disease in Indians and its Associated Risk Factors. *Vasc Health Risk Manag*. 2005;1(3):217-25.
14. Loon JE, de Maat MPM, Deckers JW, Domburg RT, Leebeek FWG. Prognostic markers in young patients with premature coronary heart disease. *Arteriosclerosis*. 2012;22(1):213-7.
15. Khan MA, Hassan M, Hafizullah M. Coronary artery disease, is it more frequently affecting younger age group and women? *Pak Heart J*. 2006;39:17-21.
16. Prabhakaran D, Singh K. Premature coronary heart disease risk factors & reducing the CHD burden in India. *Indian J Med Res*. 2011;134(1):8-9.
17. Ahmad I, Shafique Q. Myocardial Infarction under age 40: Risk factors and Coronary Arteriographic findings  
*Ann King Edward Med Uni*. 2003;9(4):262-5.
18. Qadri SK, Iqbal T, Babar HAK, Tanveer ZH, Ahmad A. Frequency of major risk factors for coronary heart disease in patients of Southern Punjab. *J Sheikh Zayed Med Coll* 2011;2(3):211-3.
19. Karim MA<sup>1</sup>, Majumder AA<sup>2</sup>, Islam KQ<sup>3</sup>, Alam MB<sup>4</sup>, Paul ML<sup>5</sup>, Islam MS<sup>6</sup>, et al. Risk factors and in-hospital outcome of acute ST segment elevation myocardial infarction in young Bangladeshi adults. *BMC Cardiovasc Disord*. 2015 Jul 22;15:73. doi: 10.1186/s12872-015-0069-2.
20. Ertelt K<sup>1</sup>, Génèreux P<sup>2</sup>, Mintz GS<sup>1</sup>, Brener SJ<sup>3</sup>, Kirtane AJ<sup>4</sup>, McAndrew TC<sup>1</sup>, et al. Clinical profile and impact of family history of premature coronary artery disease on clinical outcomes of patients undergoing primary percutaneous coronary intervention for ST-elevation myocardial infarction: analysis from the HORIZONS-AMI Trial. *Cardiovasc Revasc Med*. 2014 Nov-Dec;15(8):375-80.
21. Noeman A, Azhar M. Coronary artery disease in young: faulty life style or heredofamilial or both  
*Ann King Edward Med Uni* 2007;13(2):162-4.