

## Risk Factors in Reduction of Myocardial Infarction: Study in a Tertiary Care Hospital

Md. Golam Hossain<sup>1\*</sup>, Amirul Islam Talukdar<sup>2</sup>, Abdullah Al-Mahmud<sup>3</sup>, Abu Zahid<sup>3</sup>, Anirban Mallik<sup>4</sup>, Rifat Mahmud Nur<sup>4</sup>, Khalid Hasan<sup>4</sup>

<sup>1</sup>Associate Professor, Head of Department, Department of Cardiology, Prime Medical College Hospital, Rangpur, Bangladesh

<sup>2</sup>Resident Physician, Department of Cardiology, Prime Medical College Hospital, Rangpur, Bangladesh

<sup>3</sup>Assistant Professor, Department of Cardiology, Rangpur Medical College Hospital, Rangpur, Bangladesh

<sup>4</sup>Indoor Medical Officer, Department of Cardiology, Prime Medical College Hospital, Rangpur, Bangladesh

DOI: [10.36348/sjbr.2023.v08i09.001](https://doi.org/10.36348/sjbr.2023.v08i09.001)

Received: 15.09.2022 | Accepted: 29.10.2022 | Published: 09.09.2023

\*Corresponding author: Dr. Md. Golam Hossain

Associate Professor, Head of Department, Department of Cardiology, Prime Medical College Hospital, Rangpur, Bangladesh

### Abstract

**Introduction:** A myocardial infarction (MI) commonly known as a heart attack is a serious health condition for people. The frequency of MI is eight to nine times greater in men and women who are mostly 55 to 64 years old. Almost 18.6 million people died of MI in 2019 and early 2020. The study aims to determine the role of risk factors in the reduction of MI. **Methods:** A retrospective study was carried out at the department of cardiology, Prime Medical College Hospital, Rangpur, Bangladesh during the period of January 2021 to December 2021. A total of 50 patients were enrolled in this study following the inclusive criteria. Verbal permission was taken before recruiting the study population. Completed data forms were reviewed, edited, and processed for computer data entry. The data analysis was performed using Statistical Package for the Social Sciences (SPSS) Version 25.0. **Result:** Among the study group (N=50), the mean age of the patients was 55.12±SD, most of the patients (33,66%) age was between forty-one to sixty years, and around one-fourth of the patients' (12,24%) age ranged from sixty-one to eighty years. In the case of risk factors, an unpaired t- test was obtained. Hypertension was present in eighteen patients (18, 36%) and their mean age was 58.2 years, the relationship between age with hypertension was not significant. Type 2 diabetes was present in nine patients (9, 18%) and their mean age was 55.0 years the relationship between age with type 2 diabetes was not significant. Smoking was present in fifteen patients (15, 30%) and the relationship between age with smoking was not significant. **Conclusion:** Bangladesh is twofold-troubled with communicable and non-communicable diseases. Both men and women had a severe threat factor of MI. Besides, an intensifying incidence of lifestyle-related risk factors, tied with the ageing population results in a higher proportion of MI both men and women.

**Keywords:** Myocardial infarction, coronary artery, aged people, etc.

Copyright © 2023 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

## INTRODUCTION

A myocardial infarction (MI) commonly known as a heart attack is an extremely dangerous and life-threatening condition that occurs when blood flow stops or diminishes to the coronary artery of the heart, initiating impairment of the heart muscle. The lack of blood flow can occur when the blockage is present in one or more of the heart's arteries [1]. The majority of myocardial infarctions are caused by underlying coronary artery disease. Myocardial cell death and necrosis can occur as a result of coronary artery occlusion [2]. Inherited and acquired both types of risk factors are associated with MI, such as people with

inherited hypertension, low levels of HDL cholesterol, high levels of LDL cholesterol, high levels of triglycerides, people with type 1 and type 2 diabetes, stress, and a habit of smoking etc. [3]. The frequency of MI is eight to nine times higher in men and women who are mostly 55 to 64 years old, and a few patients more than 40 years old are affected by MI [4]. MI is often considered a disease of the elder generation. However, more than 15,000 deaths each year among women under the age of 55 years in the United States [5]. Additionally, young women with acute myocardial infarction have excess mortality compared with similarly aged men [6]. The symptoms of MI include chest pain, shortness of

breath, sweating, nausea, vomiting, abnormal heart beating, anxiety, fatigue, stress, depression and other factors [7]. According to WHO, heart disease accounts for 15.16 percent of all deaths in Bangladesh [8]. In 2019, nearly 18.6 million people died from MI. This represents a 17.1% increase over the last decade. In 2019, there were approximately 523.2 million cases of cardiovascular disease worldwide, a 26.6 percent increase over 2010 [9]. There are three main ways to avoid a heart attack. Eat a healthy and balanced diet, stop smoking, and try to maintain a healthy blood pressure [10]. MI has a high mortality rate, with the majority of deaths occurring prior to hospitalization. At least 5 to 10% of survivors die within the first 12 months of the MI, and nearly half require hospitalization. The overall prognosis is determined by the extent of muscle damage.. Better results are seen in patients who underwent early perfusion- thrombolytic therapy within half an hour of arrival. Furthermore, results might turn out good if the ejection fraction was preserved and the patient started aspirin, beta-blockers, and ACE inhibitors [11, 12]. American Heart Month takes place every February to increase attentiveness to cardiovascular health. Heart disease is alone accountable for one in every four death universally and is the foremost cause of death [13, 14]. In recent years, Bangladesh has experienced a rapid epidemiological transition from communicable to non-communicable diseases. Coronary heart disease (CHD) with MI as its main manifestation is a main cause of death in Bangladesh [15]. The study intends to find out the risk factors in the reduction of MI.

## METHODS

A retrospective study was carried out at the department of cardiology, Prime Medical College Hospital, Rangpur, Bangladesh during the period of January 2021 to December 2021. A total of 50 patients (N=50) were enrolled in this study following the inclusive criteria. After taking a careful history, and enough clinical examinations, evidence was taken for confirmation. All observations were noted in the clinical data sheet. Verbal consent was taken before recruiting the study population. Ethical clearance was taken from the Ethical hospital. The information was kept confidential only to be used for the study purpose.

### Inclusion Criteria

- Patients with unclear complaints.
- Patients with complaints of chest pain, short breathlessness or habit of smoking.

### Exclusion Criteria

- Patients with chronic diseases.
- Patients who showed unwillingness to participate in the study.

## Data Analysis

The study coordinators performed random checks to verify data collection processes. Completed data forms were reviewed, edited, and processed for computer data entry. Frequencies, percentages, and cross-tabulations were used for descriptive analysis. The data analysis was performed using Statistical Package for the Social Sciences (SPSS) Version 25.0. The significance level of 0.05 was considered for all tests.

## RESULTS

Among the study group (N=50), the mean age of the patients was 55.12±SD, most of the patients (33,66%) age was between forty-one to sixty years, and around one-fourth of the patients' (12,24%) age ranged from sixty-one to eighty years [Table 1]. The male and female ratio was 7.2:1 and the majority of the male (44,88%) had a myocardial infarction (MI) and only five females (6,12%) had MI [Table 2]. Of the total males (n=44), around three-fifths of the patients' (31, 70.5%) ages ranged from forty-one to sixty years and about one-fifth (9, 20.5%) of the patients' ages ranged from sixty-one to eighty years old. Of six female patients (n=6), four patients' ages were in between sixty-one to eighty years [Table 3]. Among fifty patients, eighteen patients (18,36%) had hypertension, nine patients (9, 18%) had type-2 diabetes and twelve patients (15, 30%) had habits of smoking [Table 4]. In the case of risk factors, an unpaired t-test was obtained. Hypertension was present in fifteen patients (18, 32%) and their mean age was 58.2 years, the relationship between age with hypertension was not significant. Type 2 diabetes was present in nine patients (9, 18%) and their mean age was 55.0 years the relationship between age with type 2 diabetes was not significant. Smoking was present in fifteen patients (15, 30%) and the relationship between age with smoking was not significant [Table 5].

**Table 1: Age distribution of the study patients (N=50)**

Age group (years)	N	Percentage (%)
20-40	5	10
41-60	33	66
61-80	12	24
<b>Total</b>	<b>50</b>	<b>100.0</b>
Mean±SD	55.12±10.75	
Median	55.0	

**Table 2: Sex distribution of the study patients (N=50)**

Sex	N	Percentage (%)
Male	44	88
Female	6	12
<b>Total</b>	<b>41</b>	<b>100.0</b>
Male: Female ratio	7.2:1	

**Table 3: Association of age with the sex of MI patients (n=50)**

Age group (years)	Sex		p-value
	Male (n=44) n (%)	Female (n=6) n (%)	
20-40	5(11.4%)	0(0.0%)	0.212 <sup>ns</sup>
41-60	31(70.5%)	2(33.3%)	
61-80	9(20.5%)	4(66.7%)	
<b>Total</b>	<b>44(100.0%)</b>	<b>6(100.0%)</b>	
Mean±SD	54.3±10.8	60.8±9.2	

The p-value obtained by the Unpaired t-test, ns= not significant

**Table 4: Distribution of the study patients by risk factors (N=50)**

Risk factors	N	Percentage (%)
Hypertension	18	36
T2DM	9	18
Smoking	15	30

**Table 5: Relation of age with risk factors (n=50)**

Risk factors		n	Age (years)		p-value
			Mean	SD	
Hypertension	Present	18	58.27	9.74	0.157 <sup>ns</sup>
	Absent	32	53.31	11.06	
T2DM	Present	9	55.00	8.35	0.974 <sup>ns</sup>
	Absent	41	55.15	11.29	
Smoking	Present	35	53.08	10.68	0.442 <sup>ns</sup>
	Absent	29	55.97	10.85	

The p-value obtained by the Unpaired t-test, ns= not significant

## DISCUSSION

Bangladesh is double-burdened with communicable and non-communicable diseases. In the context of socioeconomic transition, communicable diseases are coming under control, whereas non-communicable diseases and their risk factors are increasing. Beta-blockers, glyceryl trinitrate and possibly ACE inhibitors work well to prevent MI. All suspected patients are advised to give aspirin, a powerful drug, with a rapid effect [16, 17]. In this cross-sectional observational study, the majority of the people (33, 66%) were from 41 to 60 years of age, 12 patients belonged from 61 to 80 years of age and the mean age of the patients was 55.12 years. A similar study conducted in the USA found that patients ranged in age from 18 to 55 years old with a mean age of 48 years [6]. In India, the average age at which a person may suffer a MI has now come down from 40 years to 30 years [1]. Another analysis carried out in Bangladesh showed that the age range of the patients is 40 to 100 years and most of the patients were in the range of 50-59 years [18]. Another study demonstrated that age was higher (68 years) in females compared to males (60.7 years) in the case of MI [19]. The current study portrayed that most of the patients (44,88%) were male and only six participants (6,12%) were females. A similar analysis described that the incidence of MI was more common in men than in women [20]. Another study found related outcomes, however, the risk of MI got higher in females with the increase in age [21]. In this present analysis, most of the males (31, 70.5%) affected by MI, were aged from 41 to 60 and the majority of females (4,66.7%) were affected

by MI, aged from 61 to 80. Contemporary analyses revealed that young women (<65 years of age) were more likely to be readmitted to the hospital following MI compared to men, more precisely young women have nearly a 2-fold greater threat of 1-month readmission following MI [22]. A study conducted at Royal Victoria Hospital, Belfast described that patients older than 70 accounted for a third to a half of patients with acute MI admitted to the hospital and 80% of deaths occurred due to acute MI in those aged over 65 years, 60% of them in people aged 75 or more [23]. In recent findings, hypertension, type-2 diabetes and smoking were strongly associated with MI. Other findings suggested that younger and middle-aged women aged 25-54 years, who currently smoked had a greater threat of MI in contrast with women aged 55-69 years [24]. A contradictory study suggested that renal failure was the prime risk factor for MI and patients in the end died [18]. A similar study conducted in the United States found that elder citizens were highly associated with functional limitations, heart failure, prior coronary disease and renal insufficiency [25]. Another retrospective study revealed that female patients with MI had the greatest incidence of cardiovascular risk factors, including hypertension and diabetes also resulted in greater subsequent mortality [26]. In Bangladesh, initial integrated cardiovascular care started with the establishment of the National Institute of Cardiovascular Diseases (NICVD) and here percutaneous transluminal coronary angioplasty (PTCA) was done by foreign doctors. In recent years both Government and private sectors have accelerated

primary percutaneous intervention to lessen morbidity by massive MI or heart attack [27].

## CONCLUSION

Both men and women had a severe threat factor burden; however, women were less likely than men to be informed about MI. Despite the rate of MI being lower in women compared to men hypertension, smoking and type 2 diabetes confers a higher risk of MI in women than in men. Moreover, an intensifying occurrence of lifestyle-related risk factors, coupled with the ageing population results in a higher proportion of MI both men and women.

## RECOMMENDATIONS

Cardiovascular health promotion or myocardial infarction should be the part of national media strategy and health education curriculum. The public health approach should target population-wide lifestyle intervention; there is a necessity for setting a screening docket to cover all age groups for early detection and treatment of cases. Healthy lifestyles, balanced diets, avoidance of smoking and increasing physical exercise should be promoted.

## REFERENCES

- Bullet, I. T. (2019). Warning signs of a heart attack. *Indian Journal of Clinical Practice*, 30(4), 322-7.
- Ojha, N., & Dhmoon, A. S. (2021). Myocardial infarction. InStatPearls [Internet] 2021 Aug 11. *Stat Pearls Publishing*.
- Johns Hopkins Medicine. Heart Attack. [Available at: <https://www.hopkinsmedicine.org/health/conditions-and-diseases/heart-attack>] [Last Accessed: 31-08-2022].
- Azar, R. R., & Waters, D. D. (2012). Coronary heart disease and myocardial infarction in young men and women. *Up To Date*.
- Creager, M. A. (2016). The crisis of vascular disease and the journey to vascular health: presidential address at the American Heart Association 2015 Scientific Sessions. *Circulation*, 133(24), 2593-8.
- Leifheit-Limson, E. C., D'Onofrio, G., Daneshvar, M., Geda, M., Bueno, H., Spertus, J. A., ... & Lichtman, J. H. (2015). Sex differences in cardiac risk factors, perceived risk, and health care provider discussion of risk and risk modification among young patients with acute myocardial infarction: the VIRGO study. *Journal of the American College of Cardiology*, 66(18), 1949-1957.
- Lu, L., Liu, M., Sun, R., Zheng, Y., & Zhang, P. (2015). Myocardial infarction: symptoms and treatments. *Cell biochemistry and biophysics*, 72(3), 865-867.
- World Health Organization. [Available at: <https://www.worldlifeexpectancy.com/bangladesh-coronary-heart-disease>] [Last Accessed: 31-08-2022].
- Newsroom. Cardiovascular Disease. [Available at: [https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds))] [Last accessed on 01-09-2022]
- NHS. Preventing a Heart Attack. [Available at: <https://www.nhs.uk/conditions/heart-attack/prevention/>] [Last accessed on 01-09-2022]
- Mechanic, O. J., Gavin, M., & Grossman, S. A. (2017). Acute myocardial infarction.
- Reed, G. W., Rossi, J. E., & Cannon, C. P. (2017). Acute myocardial infarction. *The Lancet*, 389(10065), 197-210.
- American Heart Months Toolkits. [Available at: [https://www.cdc.gov/heartdisease/american\\_heart\\_month.htm](https://www.cdc.gov/heartdisease/american_heart_month.htm)] [Last accessed on 01-09-2022]
- Heart Disease Fact. Centres for Disease Control and Prevention. [Available at: <https://www.cdc.gov/heartdisease/facts.htm>] [Last accessed on 01-09-2022]
- Chowdhury, R., Alam, D. S., Fakir, I. I., Adnan, S. D., Naheed, A., Tasmin, I., ... & Di Angelantonio, E. (2015). The Bangladesh risk of acute vascular events (BRAVE) study: objectives and design. *European Journal of Epidemiology*, 30(7), 577-587.
- Li, Y. H., Yeh, H. I., Tsai, C. T., Liu, P. Y., Lin, T. H., Wu, T. C., ... & Chen, J. H. (2012). 2012 Guidelines of the Taiwan Society of Cardiology (TSC) for the management of ST-segment elevation myocardial infarction. *Acta Cardiol Sin*, 28, 63-89.
- Williams, S. (2013). Myocardial infarction. *Drugs in Use: Case Studies for Pharmacists and Prescribers*, 45.
- Ullah, M., Saha, S. K., Rahman, M. T., Karim, M. A., & Ahmed, R. (2020). Cardiovascular Risk Factors in Patients with Acute MI in a Secondary Hospital in Bangladesh. *Cardiovascular Journal*, 12(2), 96-101.
- Iversen, B., Jacobsen, B. K., & Løchen, M. L. (2013). Active and passive smoking and the risk of myocardial infarction in 24,968 men and women during 11 year of follow-up: the Tromsø Study. *European journal of epidemiology*, 28(8), 659-667.
- Millett, E. R., Peters, S. A., & Woodward, M. (2018). Sex differences in risk factors for myocardial infarction: cohort study of UK Biobank participants. *bmj*, 363.
- Kuehnemund, L., Koeppe, J., Feld, J., Wiederhold, A., Illner, J., Makowski, L., ... & Freisinger, E. (2021). Gender differences in acute myocardial infarction—A nationwide German real-life analysis from 2014 to 2017. *Clinical Cardiology*, 44(7), 890-898.
- Dreyer, R. P., Ranasinghe, I., Wang, Y., Dharmarajan, K., Murugiah, K., Nuti, S. V., ... & Krumholz, H. M. (2015). Sex differences in the rate, timing, and principal diagnoses of 30-day readmissions in younger patients with acute myocardial infarction. *Circulation*, 132(3), 158-166.
- McMechan, S. R., & Adgey, A. J. (1998). Age related outcome in acute myocardial infarction: elderly people benefit from thrombolysis and should be included in trials. *BMJ*, 317(7169), 1334-1335.
- Iversen, B., Jacobsen, B. K., & Løchen, M. L. (2013). Active and passive smoking and the risk of myocardial infarction in 24,968 men and women during 11 year of follow-up: the Tromsø Study. *European journal of epidemiology*, 28(8), 659-667.
- Mehta, R. H., Rathore, S. S., Radford, M. J., Wang, Y., Wang, Y., & Krumholz, H. M. (2001). Acute myocardial infarction in the elderly: differences by age. *Journal of the American College of Cardiology*, 38(3), 736-741.
- Kytö, V., Sipilä, J., & Rautava, P. (2014). Gender, age and risk of ST segment elevation myocardial infarction. *European Journal of Clinical Investigation*, 44(10), 902-909.
- Islam, A. M., & Majumder, A. A. S. (2013). Coronary artery disease in Bangladesh: A review. *Indian heart journal*, 65(4), 424-435.