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Original Research Article

Socio-Demographic Characteristics of Myocardial Infarction Patients

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Abstract: ***Background*:** Platelets play a crucial role in linking inflammation and thrombosis, in the pathogenesis of cardiovascular disorders such as acute Myocardial Infarction (MI). This study aimed to find out the socio-demographic characteristics of the study population. ***Methods:*** This prospective observational cross-sectional study was conducted at the Department of Cardiology, Shaheed Ziaur Rahman Medical College, for a period of 6 months following the date of acceptance of research protocol. Following informed written consent, total 100 subjects were enrolled in this study and categorized into case and control group; cases were 1st time diagnosed patients (Myocardial Infarction) with STEMI by 12-lead electrocardiogram and controls were patients without history of coronary artery diseases confirmed by electrocardiogram with apparently healthy status. Data were analyzed by the SPSS 24. ***Results:*** Mean age of case and control was 55.54± 7.05 and 53.88± 7.95 year respectively (p-value >0.05). Highest percentage of patients from each group was belonged to 51 – 60 years (66% and 62% respectively). Besides, both case and control groups had male predominance (78% and 72% respectively, p value >0.05). Patients with STEMI had significantly higher prevalence of HTN (82% vs 28%), DM (78% vs 26%), Dyslipidaemia (54% vs 10%) and history of smoking (58% vs 38%) compared to controls as p value <0.05. ***Conclusion:*** Males were more affected by acute MI and anterior STEMI (66%) was the most frequent site among cases. However, further studies are needed to establish the findings.

Keywords: Acute MI, ECG, STEMI.

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Introduction

Coronary artery disease (CAD) is recognized as the leading cause of mortality and morbidity worldwide.[1] Sudden occlusion of the coronary artery by a thrombus is the underlying mechanism of myocardial infarction, among which ST elevation myocardial infarction 2 (STEMI) is particularly significant.[2] STEMI is defined as an event where transmural myocardial ischemia leads to myocardial injury or necrosis, primarily caused by the formation of a thrombus at the site of a ruptured atheromatous plaque.[3] Plaque rupture and subsequent thrombus formation are complex pathophysiological processes influenced by several classical CAD risk factors, including diabetes, smoking, and hypertension, all of which play critical roles in the development of STEMI.[4] According to the World Health Organization, cardiovascular diseases account for 31% of all global deaths, affecting approximately one in three people, with a slightly higher mortality risk in males (22%) compared to females (15%).[5] CAD is the most common cause of death in both developed and developing nations, with a prevalence rate of 7.5% in the urban population of India and a similarly high burden in the United States.[6] In Bangladesh, CAD accounts for nearly 30% of non-communicable disease-related deaths, which translates to an estimated 171,780 deaths annually.[5] Risk factors for

myocardial infarction are broadly classified as non-modifiable and modifiable.[7-13]

Non-modifiable risk factors include sex, age, family history, and even male pattern baldness, whereas modifiable risk factors encompass smoking, dyslipidemia, diabetes mellitus, hypertension, obesity, sedentary lifestyle, poor oral hygiene, and the presence of peripheral vascular disease. Additionally, elevated homocysteine levels contribute to increased cardiovascular risk. Other less common but important causes of myocardial infarction include trauma, vasculitis, cocaine or other drug use, coronary artery anomalies, coronary embolism, aortic dissection, hyperthyroidism, and anemia. Among patients with acute myocardial infarction, about 70% of fatal events result from atherosclerotic plaque occlusion, underscoring the central role of atherosclerosis in disease pathogenesis. Preventive strategies therefore focus primarily on mitigating risk factors for atherosclerotic disease. Remarkably, modifiable risk factors account for 90% of myocardial infarction cases in men 3 and 94% in women, demonstrating the importance of lifestyle and clinical management in reducing incidence.[14] The diagnosis of STEMI relies on a triad of clinical presentation, biochemical markers of acute ischemic injury, and electrocardiographic findings. In addition to conventional diagnostic methods, platelet parameters—such as mean platelet volume (MPV), platelet distribution width (PDW), and platelet large cell ratio (PLCR)—have emerged as potentially useful markers for early detection of myocardial infarction. These parameters reflect platelet activation, a key factor in thrombus formation, and can serve as simple, reliable, and economical tools, especially when other biochemical markers are unavailable. Their clinical application may extend to functioning as adjunctive rule-out tests, assisting emergency physicians in early risk prediction and management of patients suspected of STEMI. Overall, evaluating platelet indices alongside traditional markers enhances diagnostic accuracy, aids in timely therapeutic decisions, and may ultimately improve patient outcomes in STEMI.

Methods

This prospective observational cross-sectional study was conducted in the Department of Cardiology, Shaheed Ziaur Rahman Medical College Hospital, Bogura, Bangladesh, over a six-month period (May 2020 to November 2020) following protocol approval. A total of 100 participants were included through purposive convenient sampling, comprising 50 cases with ST elevation myocardial infarction (STEMI) and 50 age- and sex-matched healthy controls. Inclusion criteria for cases were patients >18 years, of either sex, with first-time myocardial infarction diagnosed as STEMI by 12-lead ECG, and who provided informed written consent, while controls were healthy individuals >18 years, of either sex, with no history of coronary artery disease and informed consent.

Results

This prospective observational cross-sectional study was performed in the Department of Cardiology, Shaheed Ziaur Rahman Medical College, with the aim to find out the socio- demographic characteristics of the study population. After careful history taking, examination and appropriate investigations fulfilling inclusion and exclusion criteria, total 100 subjects were enrolled in this study through purposive sampling. Study participants were categorized into case and control group. Cases were 1st time diagnosed patients (Myocardial Infarction) with STEMI by 12-lead electrocardiogram and controls were patients without history of coronary artery diseases confirmed by electrocardiogram with apparently healthy status. Details of the study result are described below.

Table 1: Age distribution of case (N=50) and Control (N=50)

Age (in years)	Case n (%)	Control n (%)	P-value
Age group			
<40	2 (4)	4 (8)	0.737*
41-50	6 (12)	8 (16)	
51-60	33 (66)	31 (62)	
>60	9 (18)	7 (14)	
Mean±SD	55.54±7.05	53.88± 7.95	0.512**
Range	(38-70)	(36-68)	

Values are expressed as Mean±SD and within parenthesis percentage (%) over column in total.
* Chi-squared Test was performed.
** Non-parametric independent sample Mann Whitney U-test was performed.

There were no significant differences between cases and controls regarding both mean age and age group distribution (p value >0.05). Mean age of case and control was 55.54± 7.05 and 53.88± 7.95 year

respectively. Highest percentage of patients from each group was belonged to 51 – 60 years (66% and 62% respectively).

Table 2: Gender Distribution of Case (N=50) and Control (N=50)

Gender	Case n (%)	Control n (%)	P-value
Male	39 (78)	36 (72)	0.488
Female	11 (22)	14 (28)	

Values are expressed within parenthesis percentage (%) over column in total.
*Chi-squared Test was performed.

Both case and control groups had male predominance (78% and 72% respectively) without significant difference (p value 0.488).

Table 3: Residence Distribution of Case (N=50) and Control (N=50)

Residence	Case n (%)	Control n (%)	p-value
Rural	36 (72)	34 (68)	0.663
Urban	14 (28)	16 (32)	

Values are expressed within parenthesis percentage (%) over column in total.
*Chi-squared Test was performed.
Majority of participants from both case and control groups came from rural residence (72% and 68% respectively) without any significant difference (p value 0.663).

Table 4: Presence of Comorbidities in Case (N=50) and Control (N=50)

Comorbidities (multiple response answer)	Case n (%)	Control n (%)	*p*-value
DM	39 (78)	13 (26)	<0.001*
HTN	41 (82)	14 (28)	<0.001*
DM and HTN	31 (62)	6 (12)	<0.001*
Dyslipidaemia	27 (54)	5 (10)	<0.001*
Smoking History	29 (58)	19 (38)	0.045*
Family history of CAD	12 (24)	5 (10)	0.062

Values are expressed within parenthesis percentage (%) over column in total. DM=Diabetes mellitus, HTN=Hypertension, CAD= Coronary Artery Disease.
* Chi-squared Test was performed.

Patients with STEMI had significantly higher prevalence of HTN (82% vs 28%), DM (78% vs 26%), both DM and HTN (62% vs 12%), Dyslipidaemia (54% vs 10%) and history of smoking (58% vs 38%) compared to controls as p value <0.05.

Table 5: Site and Duration of Case (N=50)

Attributes	N (%)
Site of infarction	
Anterior	33 (66)
Inferior	5 (10)
Antero-Lateral	12 (24)
Duration of MI	
≤4 hours	13 (26)
>4 hour	37 (74)

Anterior STEMI (66%) was the most frequent site among cases, followed by antero-lateral (24%) and inferior (10%) STEMI. Besides, majority cases (74%) were admitted after 4 hours of MI.

Discussion

Acute myocardial infarction (AMI) typically develops as a consequence of coronary atherosclerosis and superimposed thrombosis.[1] When an atherosclerotic plaque ruptures or erodes, platelets adhere to the exposed subendothelial region, initiating aggregation and thrombus formation, which can convert a partially occluded artery into complete obstruction. This central role of platelets underscores their importance in acute coronary events. In this context, our study was designed to evaluate the association between platelet volume indices and ST elevation myocardial infarction (STEMI), with a total of 100 subjects enrolled 50 first-time STEMI patients as cases and 50 apparently healthy individuals as controls. The mean age of cases and controls was 55.54 ± 7.05 and 53.88 ± 7.95 years, respectively, with no statistically significant difference ($p > 0.05$). The majority of participants in both 10 groups were between 51 and 60 years (66% of cases and 62% of controls). Male predominance was observed in both groups (78% in cases vs. 72% in controls, $p > 0.05$). These findings align with earlier studies.[1, 6, 7, 15-17] Reddy *et al*. reported a mean age of 59.4 ± 11.9 years in 173 STEMI cases and 55.25 ± 8.5 years in 191 controls, with 74.6% of cases and 67.5% of controls being male.[6] Similarly, a Bangladeshi study by Pervin et al. found that 41.8% of acute coronary syndrome (ACS) patients were between 51–60 years, with an average age of 55 years.[17] These consistent results reaffirm that STEMI is most common in middle-aged to older men, reflecting the impact of non-modifiable risk factors such as age

and sex. Our study also demonstrated that hypertension (82% vs. 28%), diabetes mellitus (78% vs. 26%), dyslipidemia (54% vs. 10%), and smoking history (58% vs. 38%) were significantly more prevalent among STEMI patients compared to controls ($p < 0.05$). These findings are in agreement with prior research, which has consistently identified these modifiable risk factors as major contributors to the development of STEMI.[6, 7, 15, 16] The convergence of results emphasizes the urgent need for preventive strategies focusing on lifestyle modification, early screening, and aggressive management of cardiovascular risk factors. While our findings provide valuable insights, the study had limitations, notably its relatively small sample size and single-center design, which may limit the generalizability of the results. Future research with larger, multicentric cohorts is warranted to validate the observed associations and to further explore the diagnostic value of platelet indices in STEMI.

Conclusion

Our study showed that males were disproportionately affected by acute myocardial infarction, with anterior STEMI being the most frequent site (66%). Platelet indices may serve as promising, cost-effective adjunctive markers in early STEMI detection, but further large-scale studies are necessary to confirm their clinical utility.

Declarations

Ethics approval and consent to participate.

Consent for Publication

All authors have approved this manuscript for publication.

Competing for Interests: The authors declare that they have no competing interests.

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