Clinical Characteristics and Angiographic Profile of Acute Coronary Syndrome Patients in a Tertiary Hospital of Bangladesh

Mohsin Ahmed[1], Khandaker Abu Rubaiyat[2], Mohammed Abaye Deen Saleh[3], Abdul Wadud Chowdhury[4], C. M Khudrate-E-Khuda[5], Kazi Abul Fazal Ferdous[6], Nahid Hasan[7], Abu Taher Mohammad Mahfuzul Hoque[8], Kazi Nazrul Islam[5], Md. Gaffar Amin[8]

Abstract

Aims: Coronary artery disease is a devastating disease precisely because an otherwise healthy person in the prime of life may die or become disabled without warning. The objectives were to study the clinical profile, risk factors prevalence, angiographic distribution and severity of coronary artery stenosis in acute coronary syndrome (ACS) patients admitted in Cardiology Department of Dhaka Medical College Hospital, Dhaka. **Materials and Methods:** A total of 800 patients of ACS were analyzed for various risk factors, angiographic patterns and severity of coronary artery disease at DMCH, Dhaka, Bangladesh. **Results:** Mean age of presentation was 51.27±8.80 years. Majority were male 628 (78.5%) and rest were females (21.5%). Most patients had ST elevated myocardial infarction (STEMI) 509 (63.6%) followed by non-STEMI (NSTEMI) 207 (25.9%) and Unstable Angina (UA) 84 (10.5%). **Risk factors:** smoking was present in 388 (48.5%), hypertension in 289 (36.13%), diabetes in 235 (29.38%), dyslipidaemia in 169 (21.13%) and obesity in 356 (44.5%) patients. Single-vessel disease was present in 30.32% patients, Double-vessel disease was present in 23.23% patients and Triple vessel disease was present in 27.15% patients. **Conclusion:** STEMI was the most common presentation. ACS occurred earlier in comparison to Western population. Smoking was most prevalent risk factor. Diabetic patients had more multivessel disease.

Key words: Acute Coronary Syndrome, Angiogram, Bangladesh.

Introduction:

Coronary artery disease is a global health problem reaching an epidemic in both developed and developing countries and is the leading cause of mortality and morbidity worldwide[1,2]. In 1990 coronary artery disease accounted for 28% of world's 50.4 million deaths and 9.7% of the 1.4 billion lost disability adjusted life years. By 2020 the world's population will grow to 7.8 billion and 32% of all deaths will be caused by coronary artery[3]. The South Asian countries have among the highest incidence of coronary artery disease globally[4]. Estimates from the global burden of disease study suggests that by the year 2020, this part of the world will have more individuals with atherosclerotic coronary artery disease than in any other region[4, 5]. Data related to different aspects of CAD in Bangladesh are inadequate but it is highly prevalent in Bangladesh[6]. While the death rates related to CAD have been declining for the past three decades in the west, these rates are rising in

1. Associate Professor, Department of Cardiology, Dhaka Medical College, Dhaka, Bangladesh.
2. MD, Final Part Student, Dhaka Medical College, Dhaka, Bangladesh.
3. Junior Consultant (Cardiology), District Hospital, Gaibandha, Bangladesh.
4. Professor, Department of Cardiology, Dhaka Medical College, Dhaka, Bangladesh.
5. Junior Consultant (Cardiology), Dhaka Medical College, Dhaka, Bangladesh.
6. Indoor Medical Officer (Cardiology), Dhaka Medical College Hospital, Dhaka, Bangladesh.
7. D Card Student, Dhaka Medical College, Dhaka, Bangladesh.
8. Assistant Professor, Department of Cardiology, Dhaka Medical College, Dhaka, Bangladesh.

Address of Correspondence: Dr. Mohsin Ahmed, Associate Professor, Dept. of Cardiology, Dhaka Medical College Hospital, Dhaka, Bangladesh. Mobile: +88 01613393186, Email: mohsinsohel07@gmail.com

Bangladesh. In the last three decades, the prevalence of CAD has increased from 1.1% to about 7.5% in urban population of Delhi, India and from 2.1% to 3.7% in the rural population[7]. In Asian Indians, CAD tends to occur at a younger age with more extensive angiographic involvement[8] contributed by genetic, metabolic, conventional and nonconventional risk factors[9,10]. The objectives of this retrospective study were to study the clinical profile, prevalence of risk factors and distribution of coronary artery stenosis in acute coronary syndrome (ACS) patients admitted in Cardiology Department of Dhaka Medical College Hospital, Dhaka.

Materials and Methods:

Eight hundred patients presented to Cardiology Department of Dhaka Medical College Hospital with first episode of ACS were analyzed. The clinical presentations of patient were categorized as unstable angina (UA), non-ST elevated myocardial infarction (NSTEMI) and STEMI according to American College of Cardiology/American Heart Association (ACC/AHA) definitions and treated as per ACC/AHA recommendations[11,12]. Patients with concomitant valvular heart disease or cardiomyopathy were excluded from this study.

The following data were included for analysis: Age, gender, CAD risk factor profile, current cigarette/ bidi smoking history; dyslipidemia defined as the presence of any of the following: patients on lipid lowering drugs or total cholesterol >240 mg/dl, triglycerides (TG) >150 mg/dl, low-density lipoprotein >130 mg/dl, and high-density lipoproteins (HDL) <50 mg/dl for female and <40 mg/dl for male; diabetes mellitus with symptoms of diabetes and plasma glucose concentration e"200 mg/dl (11.1 mmol/L) or fasting blood sugar e"126 mg/ dl (7.0 mmol/L) or 2-hours post-prandial glucose e"200 mg/ dl (11.1 mmol/L); hypertension (systolic blood pressure e"140 and/or diastolic e"90 mmHg and/or on anti hypertensive treatment); family history of CAD (first degree relatives before the age of 55 years in men and 65 years in women); obesity defined using the body mass index (BMI) with a value >25.

Clinical manifestations, left ventricular ejection fraction, hematologic indices, coronary angiographic findings and treatment strategy were reported. Selective coronary angiogram was done using standard technique. Expert opinion on coronary angiography was taken by two cardiologists. Significant CAD was defined as a diameter stenosis >70% in each major epicardial artery. Normal vessels were defined as the complete absence of any disease in the left main coronary artery (LMCA), left anterior descending (LAD), right coronary artery (RCA), and left

circumflex (LCX) as well as in their main branches (diagonal, obtuse marginal, ramus intermedius, posterior descending artery, and posterolateral branch). Patients were classified as having single-vessel disease (SVD), double-vessel disease (DVD) or triple vessel disease (TVD) accordingly.

Statistical analysis

The results were reported as mean ± standard deviation for the quantitative variables and percentages for the categorical variables. The groups were compared using the Student's t-test for the continuous variables and the Chi-square test for the dichotomous variables. $P < 0.05$ were considered as statistically significant. All the statistical analyses were carried out via Statistical Package for Social Sciences version 20 (SPSS, IL, Chicago Inc., USA).

Results:

Among 800 ACS patients majority were male 628 (78.5%) and 172 (21.5%) were female. The mean age of presentation was 51.27±8.80 years. Most common presentation in ACS was STEMI with 509 (63.6%) patients followed by NSTEMI 207 (25.9%) and UA 84 (10.5%). Baseline characteristics are mentioned in Table 1.

Table-I
Baseline characteristics of the study population (N = 800)

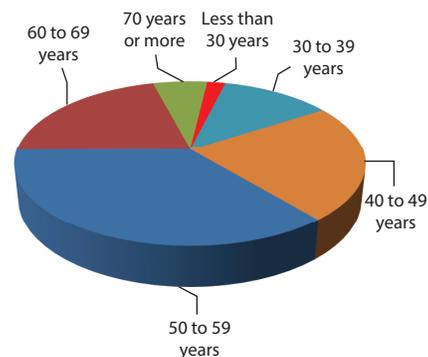| Variables	Minimum	Maximum	Mean
Age	16	88	51.27
Waist Circumference	45	172	90.36
Hip Circumference	40	185	106.82
FBS (mmol/l)	2.1	21	7.12
HbA1C	4.8	14	6.74
Total Cholesterol (mg/dl) (%)	78	400	177.69
LDL (mg/dl)	56	270	112.99
HDL (mg/dl)	18	71	37.40
TG (mg/dl)	83	1125	190.49
S creatinine (mg/dl)	0.38	2.30	1.60
ESR (mm in 1st hour)	7	85	26.55
Echocardiography (%)	22	78	53.29

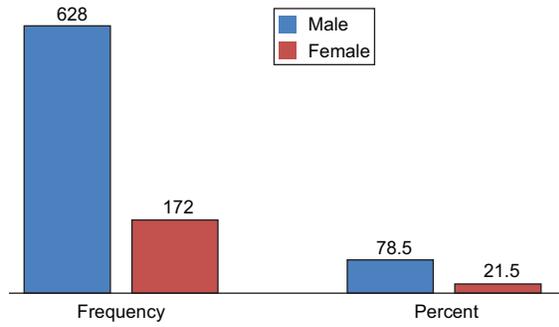**Fig.-1:** *Age distribution of the study population (N= 800)*

Fig.-2: *Distribution of study population according to sex (N=800)*
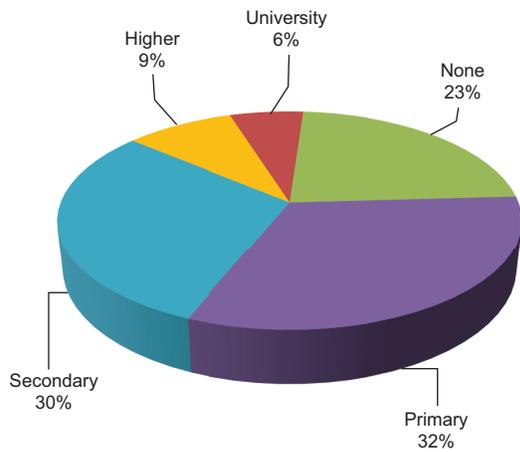

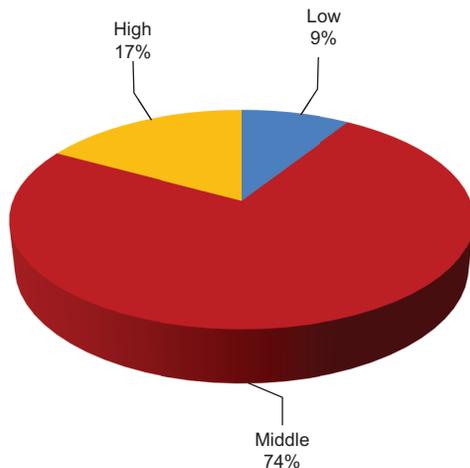**Fig.-3:** *Distribution of study population according to educational status*

Fig.-4: *Distribution of study population according to level of income (N=800)*

Risk factors analysis

A total of 235/800 (29.38%) patients were diabetic and 289/800 (36.13%) patients were hypertensive. Smoking and tobacco users were 388/800 (48.50%) patients. Active smoking in our study was noticed only in male patients. Women were rather betel nut/tobacco leaf chewers. Dyslipidemia was present in 169/800 (21.13%) patients. Obesity in 356/800 (44.5%) patients and family history of CAD was significant in 25/800 (3.13%) patients. (Table 2)

Table-II
Distribution of study population according to clinical risk factors

Clinical Risk Factor	Frequency	Percent
Ischemic Heart Disease	255	31.85
Family History of CAD	25	3.13
Obesity	356	44.5
Diabetes	235	29.38
Hypertension	289	36.13
Previous PTCA	21	2.62
Smoking & tobacco use	388	48.5
Previous CABG	12	1.54
OCP	36	4.46
Dyslipidemia	169	21.13
Menopause	32	4.00
Alcohol	5	0.62

Angiographic profile

SVD was seen in 30.32% patients, DVD in 23.23% patients, TVD in 27.15% patients, normal coronary vessels in 17.19% and nonsignificant lesion were seen in 2.11% patients out of 800 patients.

Table-III
Distribution of study population according to extent of disease

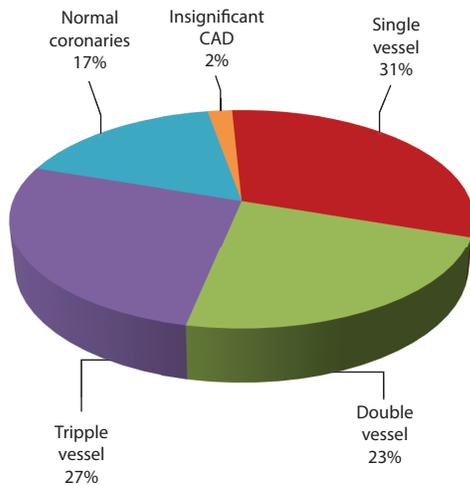| Extent of Disease	Frequency	Percent
Single Vessel	243	30.32
Double Vessel	186	23.23
Triple Vessel	217	27.15
Normal Coronaries	137	17.19
Insignificant CAD	17	2.11

Fig.-5: *Distribution of study population according to extent of disease*

Discussion:

Epidemiological studies have revealed that the prevalence of CAD is increasing along with the rising prevalence of conventional risk factors for CAD in Bangladesh[31]. Present health transition from predominance of infections to the preponderance of cardiovascular disorders, such as hypertension, diabetes and CAD is now responsible for 53% of all deaths[10,13]. At present developing countries contribute a greater share to the global burden of cardiovascular disease than developed countries[14]. The disease is very common in westernized population affecting the majority of adults over the age of 60 years. It is also rising in developing countries. This retrospective study was carried out at the Department of Cardiology, DMCH, Dhaka during the period of January 2016 and December 2017. Coronary artery disease tends to be more aggressive and manifests at a younger age[15]. The mean age of the study population was 51.27±8.80 years as compared to 52±10.8 years in a study reported by Maqbool Jafary et al[16] and 58±11 years by Sahed et al[17] in Pakistan and 62±5 years in COURAGE trial[18] conducted in USA. It is also similar to the study done by Islam AEMM et al[19] where the mean age in male was 51±9.8 and female 47.2±9.67. This signifies that Bangladeshi patients are relatively younger as compared to the western people. The skewed gender distribution (males 78.5% versus females 21.5%) of the study population can be attributed to the gender bias and atypical presentation, which is also a feature in INTERHEART study and its South Asian cohort (overall male, 76% and South Asian cohort, 85%)[20]. The study showed that the prevalence of diabetics was 29.38%, which is higher than the reported prevalence in INTERHEART study but near to other Indian studies

(CREATE, Jose and Gupta)[10,21]. Diabetes mellitus alone was a risk factor in 7.13% patient and combined with hypertension and diabetes mellitus were been in 22.25% patients. Diabetes mellitus is well known to have an adverse influence on the prognosis of patients with acute myocardial infarction[22]. Majority of the patients suffered from TVD (40.66%) which was also higher in Akanda et al[23] (42.11%) conducted in Bangladesh. Hypertension is another conventional risk factor implicated in CAD. In this study 36.13% patients were hypertensive. The prevalence of hypertension in South Asian cohort of INTERHEART study[16] (31.1%) is comparatively lower than this study but is similar to Akanda et al[23] (35%). The higher prevalence of diabetes and hypertension in this region could be explained by the comparatively higher development and increasing epidemic of CAD[24]. Tobacco smoking is a known modifiable risk factor for CAD. In our study, 388 (48.5%) patients were smoker or tobacco leaf/betel nut chewers. All reported data show that smoking is the commonest risk factor encountered in patients with acute myocardial infarction[25,26]. The male preponderance and smoking being the major risk factors has been well documented in many studies in this subcontinent[27,28,29,30]. However in contrast to this study, smoking is not a major risk factor in the COURAGE trial (29% vs 60%). The prevalence of obese patients was only 44.5% which is less than the prevalence seen in South Asian cohort of INTERHEART study (44.2%). Single-vessel involvement was 30.32% in all groups of ACS including UA, NSTEMI and STEMI, followed by triple-vessel (27.15%) and double vessel disease (23.23%). Akanda et al[23] also showed more single vessel involvement. Angiographically, the absolutely normal vessels were present in 14.25% cases have been attributed to complete recanalization whether spontaneously or post-thrombolysis. The study limitations include the noninclusion of factors like detailed dietary habits, exercise frequency and substance abuse.

Conclusion:

CAD is highly prevalent in Bangladesh, as well as is a major health challenge for us. Despite decrease in cardiovascular disease mortality in developed countries, substantial increases have been experienced in developing countries like ours. Along with the classical risk factors, genetic make-up and environmental factors unique to our population may contribute. The rapid changes in lifestyle, unhealthy habits (smoking, sedentary life style etc.), dietary factors, economic development and higher prevalence of diabetes and hypertension are considered to be responsible for the increase of mortality. Overall, SVD was most prevalent in ACS patients. Diabetic patients had more multi-vessel disease than non-diabetics. Hence large-scale, preferably,

nation-wide survey and clinical research should be conducted to determine the different aspects of CAD in Bangladesh as well as to identify the magnitude of problem and timely primary and secondary prevention strategies should be vigorously pursued.

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