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Original Research Article

Risk Factors for CAD Among the Patients with Ischemie Heart Disease- A Cross Sectional Study

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Abstract: ***Introduction:*** Coronary heart disease (CHD) is an impairment of heart function due to inadequate blood flow to the heart compared to its needs, caused by obstructive changes in the coronary circulation to the heart. It is a common multifarious public health crisis today and a leading cause of morbidity and mortality in both developing and developed countries. ***Objective:*** To analyses the risk factors for coronary artery disease (CAD) for patients with ischemia heart disease. ***Methods:*** A cross sectional study was conducted at Department of Cardiology, Bangladesh Medical College Hospital, Dhaka, Bangladesh from January to December 2022. Total 150 with acute coronary syndrome or coronary angiographic or Electrocardiography evidence of ischemic heart disease. Risk factors studied were the conventional risk factors for coronary artery disease- hypertension, diabetes mellitus, dyslipidemia, body mass index (BMI), smoking, and family history of coronary artery disease Data are collected from the patients, old medical records, Clinical Examination and Laboratory results of the patients were analyzed for the study. ***Results:*** A total of 100 (66.6%) patients in the study gave a positive family history for CAD. Based on the blood 'pressure monitoring, the patients were classified according to JNC 7 (reviewed) classification for hypertension as normotensive 78 (78.0%), pre-hypertensive 4(4.0%), stage 1 hypertension was found in 18 patients (18.0%). There was no gender difference noted in the occurrence of hypertension. From the study, diabetes or impaired glucose tolerance (79%) and dyslipidemia (71%) are the major risk factor for Coronary artery disease as only a minority of the study population had hypertension or gives a history of cigarette smoking. 57% of the study population had a family history of coronary artery disease. Among the studied population, 55% of females are with increased BMI, whereas only 16% of males with CAD were with BMI above 30. ***Conclusion:*** Among diabetes mellitus and dyslipidemia are the major Risk factor for Coronary artery disease. So early detection of diabetes mellitus and dyslipidemia and proper treatment of both, before developing the end organ damage, play a vital role for the prevention of coronary artery disease.

Keywords: Coronary Artery Disease, Diabetes Mellitus, Dyslipidemia, Hypertension Risk Factors.

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INTRODUCTION

Coronary heart disease (CHD) is an impairment of heart function due to inadequate blood flow to the heart compared to its needs, caused by obstructive changes in the coronary circulation to the heart [1]. There has been a sharp increase in the number of deaths due to cardiovascular diseases in the last two decades, in 1990 there were an estimated 50 million deaths globally and approximately 14 million (28%) were due to cardiovascular diseases [2]. Coronary artery disease (CAD) is a condition that develops due to the accumulation of atherosclerotic plaque in the epicardial coronary arteries leading to myocardial ischemia [2, 3]. It is a common multifarious public health crisis today and a leading cause of morbidity and mortality in both developing and developed countries [3]. Cardiovascular disease is affecting millions of people in both developed and developing countries. CAD includes a spectrum of disease manifestation ranging from asymptomatic atherosclerotic disease to acute coronary syndrome, which includes ST elevation myocardial infarction (STEMI), Non-ST elevation myocardial infarction (NSTEMI) and unstable angina [4-5]. The risk factors for CAD are broadly classified as modifiable and non-modifiable risk factors. Modifiable risk factors include hypertension, diabetes mellitus, dyslipidemia, obesity, and smoking. Non-modifiable risk factors Include age, sex, race, and family history for CAD [6, 7]. The Systematic Coronary Risk Evaluation system is recommended to assess an individual's total cardiovascular risk. CAD is closely related to life-style and modifiable physiological factors, and risk factors modification has been shown to reduce cardiovascular morbidity and mortality. CAD is the most common cause of mortality in Bangladesh. Hence, understanding the predominant risk factors among the Bangladeshi Population is important.

MATERIALS & METHODS

A cross sectional study was conducted at Department of Cardiology, Bangladesh Medical College Hospital, Dhaka, Bangladesh from January to December 2022. A total of 150 with acute coronary syndrome or coronary angiographic or electrocardiographic evidence of ischemic heart disease. Risk factors studied were the conventional risk factors for coronary artery disease-hypertension, diabetes mellitus, dyslipidemia, body mass index (BMI), smoking, and family history of coronary artery disease Data are collected from the patients, old medical records, Clinical Examination and Laboratory results of the patients were analyzed for the study. Inclusion criteria/The inclusion criteria were:

Acute Coronary Syndrome - STEMI, NSTEMI or

Unstable Angina

Post-myocardial infarction state - with history of coronary bypass graft or percutaneous coronary interventionwith or without stenting or with history of medical management either with fibrlnolytics or with heparins;

Chronic Ischemie heart disease-evidence from coronary angiogram or from a positive stress test. The data usedfor the study was the history taken from the patients and their previous medical records.

Physical examination of the patient included height, weight abdominal circumference, and two blood pressure measurement: At the time of admission and on the following day. Hypertension was classified based on the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7) classification for hypertension (reviewed). Laboratory investigations included random blood sugar, fasting blood sugar, 2-h post-prandial blood sugar, glycosylated hemoglobin - (HbAlc), fasting lipid profile (totalcholesterol, LDL cholesterol, HDL cholesterol and trlglyceride level), and Troponin I and electrocardiography (ECG). Patients were defined as Diabetic or with impaired glucose tolerance based on their blood sugar levels and HbAlc value. Dyslipidemia was defined based in the Fasting Lipid Profile. Classification of the patients according to the inclusion criteria were carried out based on ECG findings, Troponin I, and medical records.

RESULTS

A total of 100 (66.6%) patients in the study gave a positive family history for CAD. Based on the blood 'pressure monitoring, the patients were classified according to JNC 7 (reviewed) classification for hypertension as normotensive 78 (78%), pre-hypertensive 4(4%), stage 1 hypertension was found in 18 patients (18%). There was no gender difference noted in the occurrence of hypertension (Fig-1).

Diabetes mellitus was found to be a major rick factors in both males and females in the study population. Of the total 150 patients, 85 (56.6%) had diabetes mellitus, and 27 (18.0%) were with impaired glucose tolerance. Of the male patients, 49 (32.6%) were diabetics and 27(18.0%) were found with impaired glucose tolerance. For the female group, the values were 55 (55%) and 10 (20%), respectively (Fig-2).

In the study group, the fasting lipid profile tests revealed evidence of dyslipidemia in (70.6%) of the patients: (66%) of the males and (34%) of the females were with dyslipidemia of the study population, only 90 (60%) were current smoker. The number of females who smoked in the study population was 60 (40%) (Fig-3).

Considering obesity as the risk factor for CAD, based on the body mass index (BMI), only 24(16.0%) of the males had a BMI higher than 30, whereas 126 (84.0%) of the females had a BMI higher than 30. Only 18 (12%) of the studied population reported walking at least 30 min a day (Table-1 & Fig-4).

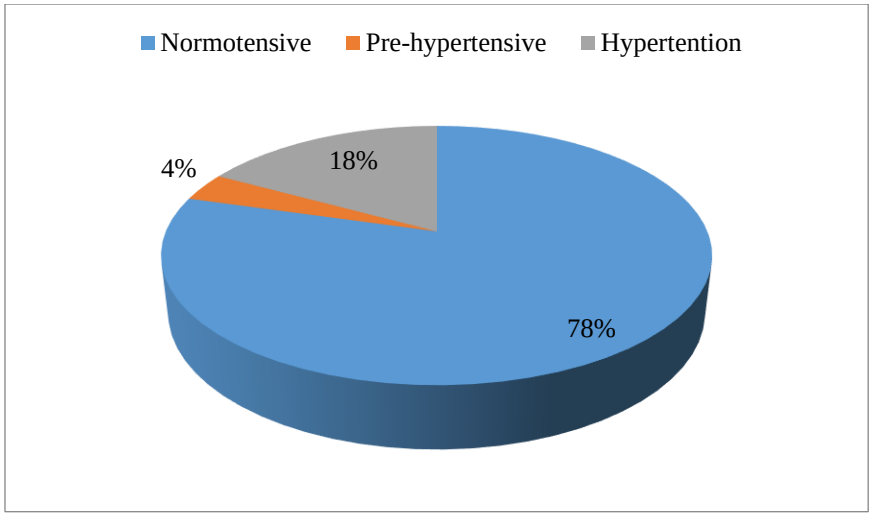

Figure-1: Classification for hypertension as normotensive, pre-hypertensive.

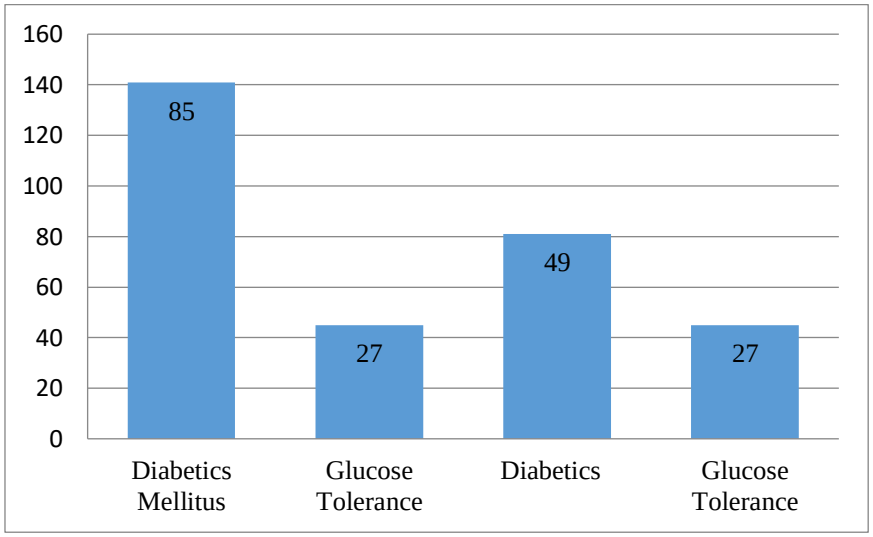

Figure-2: Risk factors for coronary artery disease.

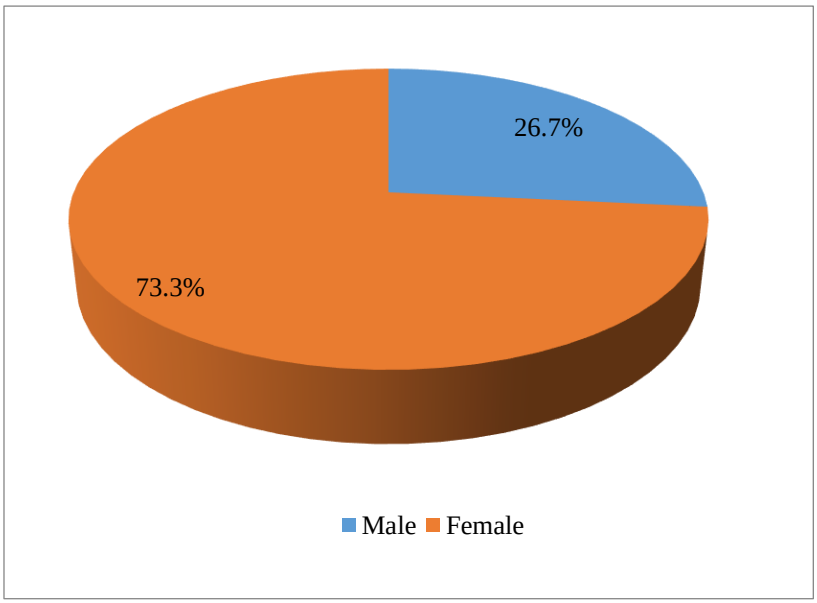

Fig-3: Sex distribution of coronary artery disease.

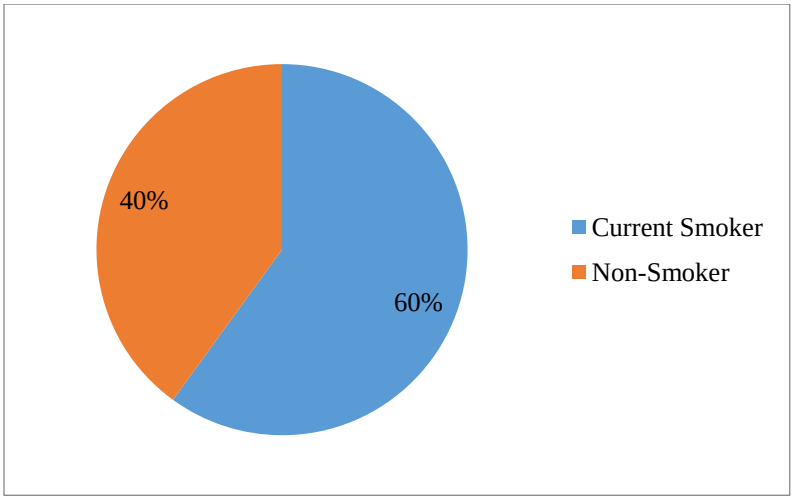

Fig-4: Smoker and non-smoker of coronary artery disease.

Table-1: BMI observation of coronary artery disease patients.

BMI		N	%
<30	Male	24	16.0%
	Female	126	84.0%
30 Min		18	12%

DISCUSSION

There are many risk factors for CAD and some can be controlled but not others. The risk factors that can be controlled (modifiable) are: High BP; high blood cholesterol levels; smoking; diabetes; overweight or obesity; lack of physical activity; unhealthy diet and stress. In this study, it was seen that in male CAD starts a decade prior to females more incidence of CAD in males (20%) when compared to females (8%) between the age group 35-65 and above 45 years male/female ratio for the occurrence of CAD was the same. The peak incidence of CAD was seen between 45 years and 64 years [8,9]. CAD that manifests at a younger age can have devastating consequences for individual, the family, and society. A low incidence of hypertension (38%) was seen among the study population. Hence, hypertension was revealed as an insignificant risk factor among the studied population. The prevalence of hypertension in Bangladesh is low compared to world figures. Sofia study and Eurospire 111 have shown that among the Europeans with advancing age, all forms of CAD increase [10]. In Sofia Study and Euro spire study, hypertension has been seen as a major risk factor for CAD [10]. A high incidence of Diabetes and impaired glucose were seen among the studied population. Of the total 150 patients, 85 (56.6%) had diabetes mellitus, and 27 (18.0%) were with impaired glucose tolerance. Of the male patients, 32 (32%) were diabetics and 18(18%) were found with impaired glucose tolerance. For the female group, the values were 55 (55%) and 20 (20%), respectively. Hyperinsulinemia, insulin resistance, and the higher rate of prevalence of metabolic syndrome in people with type 2 diabetes were attributed to high coronary risk in south Asians [11,12]. An urban population study the prevalence rates for CAD were 10% in normal subjects and 22% in those with type 2 diabetes. Attributable risk due to diabetes for myocardial infarction was 9.9% in the Inter-heart study. In the study group, the fasting lipid profile rests revealed evidence of dyslipidemia in 70 (70%) of the patients: 18(18%) of the males and 72 (72%) of the females were with dyslipidemia. The importance of dyslipidemia in the pathogenesis of CAD is well-known. Mohan et al. Showed that CAD occurred at much lower levels of total cholesterol and LDL-C than other population, and high triglyceride and low HDL level were of a universal phenomenon in this population [13]. Our study revealed a high prevalence of dyslipidemia (71%}-elevated levels of total cholesterol, LDL-C and high triglycerides with concurrent low HDL-C values. Nearly, 57% patients in the study gave a positive family history for CAD. Family history reflects not only genetic susceptibility, but also interactions between genetic, environmental, cultural and behavioral factors Enas et al. The family history not only indicates the genetic predisposition to disease, but may also represent the sum total of the interaction of the individual with environment, expressed in the several ways, including diabetes and thrombotic disorder [14]. Considering obesity as the risk factor for CAD, based on the BMI, only 24(16.0%) of the males had a BMI higher than 30, whereas 126 (84.0%) of the females had a BMI higher than 30. Although most of the co morbidities relating obesity to CAD increase as BMI increase, they also relate to body fat distribution. Long- term longitudinal studies; however, indicate that obesity as such not only relates to but independently predicts coronary atherosclerosis. Prevalence of an increasing number of risk factors in patients with CAD is also crucial since it has been shown that as the number of cardiovascular risk factors increases, so does the severity

of asymptomatic coronary artery atherosclerosis [15, 16].

CONCLUSION

This study lies in the fact that it revealed an association of diabetes mellitusand dyslipidemia among those suffering from CAD. The study highlighted diabetes mellitus, obesity, and dyslipidemia as potential targets. Most of the patients had more than two risk factors. Patient's need to be managed intensively for the control of multiple risk factors. Early detection of the risk factors and proper management by life-style modification, and by drugs if needed may play a key role in preventing the progress of the atherosclerotic process.

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