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Factors Associated with Coronary Heart Disease among Patients in Bangladesh: A Single Center Study

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Abstract **Original Research Article**

Background: Coronary heart disease ((CHD) is the term that describes what happens when one's heart's blood supply is blocked or interrupted by a build-up of fatty substances in the coronary arteries. It is the major leading cause of death which poses serious health problems in developed as well as developing countries like Bangladesh. It has also high substantial economic impact in national healthcare expenditure. ***Aim of the Study:*** The aim of this study was to evaluate the factors associated with coronary heart disease among patients in Bangladesh. ***Methods:*** This was a cross sectional descriptive study, conducted during the period from the 1st September 2017 to 28th February 2018. A total of 135 clinically diagnosed CHD patients were included as the study subjects. For this purpose, non-probability convenient sampling technique was used. After taking inform consent, we measured height, weight, waist and hip circumference of the participants. Recording all the data, we filled up the predesigned questionnaire. Data were collected by both qualitative and quantitative method by using semi- structured questionnaire developed for the study. All data were processed, analyzed and disseminated by using MS Excel and SPSS version 20.0 program as per necessity. ***Results:*** Among the total participants 65.2% were with positive family history of cardiovascular diseases, 87.4% with habit of tobacco intake, 90.4% physically inactive, 2.2% with habit of alcohol intake, 31.9% with diabetes mellitus, 82.2% with hypertension, 75.6% with dyslipidemia, 30.4% overweight, 7.4% obese and 5.2% underweight. In this study, we found significant correlations of coronary heart diseases (CHD) with age (P=0.012), BMI (P=0.023), habit of tobacco intake (P=0.003) and hypertension (P=0.011). ***Conclusion:*** Age, body weight, habit of tobacco and hypertension may be considered as some potential factors which are associated with coronary heart disease. In Bangladesh, the frequencies of peoples with family history of CHD, habit of tobacco intake, physically inactivity, DM and hypertension among CHD patients are very high.

Keywords: Factors, Coronary heart disease, Cardiovascular, Chest pain, Artery.

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INTRODUCTION

Coronary heart disease (CHD) is a major public health problem in developed and developing countries. It is a non-communicable disease. It is the major leading cause of death which poses serious health problems in Bangladesh. The Global Burden of Diseases (GBD) study 2017 survey revealed that, non-communicable diseases (NCDs) comprised the greatest fraction of deaths, contributing to 73.4% of total deaths in 2017, while communicable, maternal, neonatal, and nutritional (CMNN) causes accounted for 18.6% and injuries 8.0%. Total numbers of deaths from NCD causes increased from 2007 to 2017 by 22.7%, representing an additional 7.61 million deaths estimated in 2017 versus 2007 [1]. Coronary heart disease (CHD) is the leading cause of mortality and morbidity in developed countries and it is emerging as a prominent public health problem in developing countries. Similar to many other low- and middle-income countries (LMICs), Bangladesh has undergone an epidemiological transition from communicable to non-communicable diseases. NCDs are estimated to account for 59% of total deaths where 17% of death from

cardiovascular diseases in Bangladesh [2]. In Bangladesh, cardiovascular diseases, diabetes, COPD, and cancers have already become major health problems [3]. STEPS survey 2010 found that, 54% of population used tobacco in some form, <1% consumed alcohol within the past 30 days, 92% did not consume adequate fruit and vegetables and 35% had low physical activity level. About 17% participants were overweight, 21% had abdominal obesity and 21% people had hypertension [4]. It also identifies the key issues positioning NCDs within the Universal Health Coverage (UHC) and Sustainable Development Goals (SDGs) in country context. SDG-3.4 is the most important goal that by 2030, reduce by one third premature mortality from non- communicable diseases through prevention and treatment and promote mental health and well-being. CVDs and its associated known risk factors account for 13.4% of disability adjusted life years (DALYs) lost in Bangladesh [5]. Identification of high-risk individuals for vigorous risk factor modification-especially control of hypertension, regression of left ventricular hypertrophy, control of diabetes, treatment of dyslipidemia and smoking cessation is key for successful risk reduction [6]. Waist/height ratio, an index of abdominal obesity, may be a better predictor of multiple CHD risk factors in men than waist/hip ratio in mass epidemiologic studies [7]. Differences in serum total cholesterol level, blood pressure, body mass index, and diabetes prevalence explained about one-third of the age-related increase in CHD risk among men and 50% to 60% among women [8]. An increased risk of CHD was found in cigarette smokers of ≥20 pack years (1.5; 0.9–2.5) but not with lesser amounts [9]. The findings of a study indicated that the risk of coronary heart disease was prevailing among the urban study population. The risk was found significantly associated with the education level and economic status of the respondents (p<0.01). That study might help the people by providing important information about risk of coronary heart disease and for further in-depth study [10].

METHODOLOGY

This was a cross sectional descriptive type of study which was conducted during the period from 1st September 2017 to 28th February 2018. A total of 135 respondents were selected purposively from a tertiary level hospital. Sylhet MAG Osmani Medical College Hospital, Sylhet, Bangladesh. The whole intervention was conducted in accordance with the principles of human research specified in the Helsinki Declaration [11] and executed in compliance with currently applicable regulations and the provisions of the General Data Protection Regulation (GDPR) [12]. In this study, inclusion criteria were as all atherosclerotic CHD patients who fulfilled their diagnostic criteria and age of the respondents were between 40 and 60 years. On the other hand, exclusion criteria were as all non-atherosclerotic CHD patients and those who were not interested. After taking inform consent, we measured height, weight, waist and hip circumference of the participants. Recording all the data, we filled up the predesigned questionnaire. Data were collected by both qualitative and quantitative method by using semi-structured questionnaire developed for the study. After collection, data were checked thoroughly for consistency and completeness. The collected data were checked, rechecked and verified by the investigator herself at the end of every working day. To ensure reliability and validity of data, 5% data were recollected and compared with the previous data randomly within 72 hours. Data were analyzed by using SPSS version 20.0. Descriptive statistics were used to describe the data i.e. mean and standard deviation for quantitative variables, frequency and percentage for qualitative variables by chi-square test. P value of <0.05 was considered as significant. The result was presented in tables and figures. The chi-squire test was done according to application at 5% level of significant. The study protocol was approved by the ethical committee of the mentioned hospital. The study was approved by the ethical committee of the mentioned hospital.

RESULTS

In this study, among total 135 participants, 86% were male whereas the rest 46% were female. So, male participants were dominating in number and the male-female ratio was 1.7:1. The mean ±SD age of the participants was 52.01±6.91 years. Among the total participants, 65.2% were with positive family history of cardiovascular diseases. Among the total participants 65.2% were with positive family history of cardiovascular diseases. Habit of tobacco intake was found in 87.4% cases. Only 9.6% respondents were found as physically active and the mean activity period of our participants was 114.52 ±32.72 hours. Among the total respondents, only 2.2% of the respondents were with the habit of alcohol intake. The majority of the female respondents (51%) were past user of OCP, and only 2% were current user of OCP. In this intervention, 31.9% of the respondents were with diabetes mellitus. In analyzing the cases of hypertension, we observed that, majority of our respondents were with hypertension which was 82.2%. Among total participants, 75.6% were with dyslipidemia. In this study, 57% of the respondents were with normal BMI, 30.4% were with overweight, 7.4% were obese and 5.2% were underweight. A significant association was found between coronary heart disease and age category of the respondents (P=0.012). Besides these, significant association was found between coronary heart disease and Body Mass Index (BMI) of the respondents (P=0.023). Another significant association was found between coronary heart disease and habit of tobacco intake of the respondents (P=0.003). Moreover, a significant association was found between coronary heart disease and hypertension of the respondents (P=0.011).

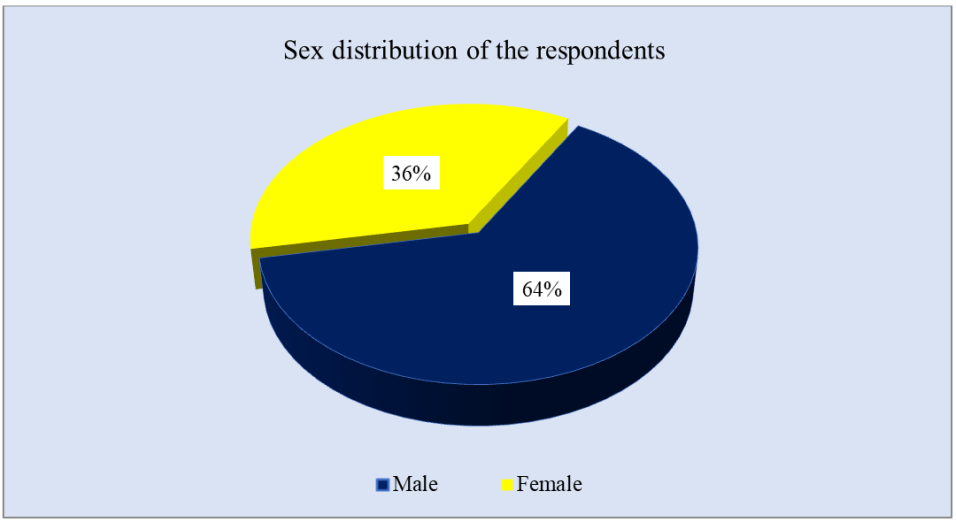

Figure I: Pie chart showed Distribution of the respondents by sex (N=135)

Table 1: **Distribution of the respondents through family history of cardiovascular disease (N=135)**

Family history	n	%
Yes	47	34.8
No	88	65.2

Table 2: Distribution of the respondents by habit of tobacco intake (N=135)

Habit	n	%
Yes	118	87.4
No	16	11.9
Sometimes	1	0.7

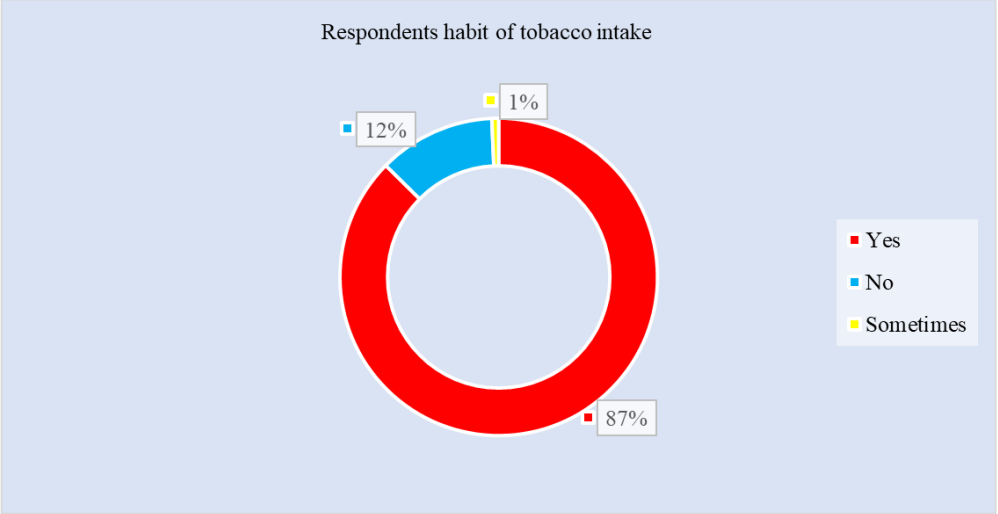

Figure II: Ring chart showed tobacco intake habit of the respondents (N=135)

Table 3: Distribution of the respondents by physical activity (N=135)

Physical activity	n	%
50-150 minutes (Inactive)	122	90.4
151-320 minutes (Active)	13	9.6

Table 4: Distribution of the respondents by alcohol intake (N=135)

Alcohol intake	n	%
Yes	3	2.2
No	132	97.8

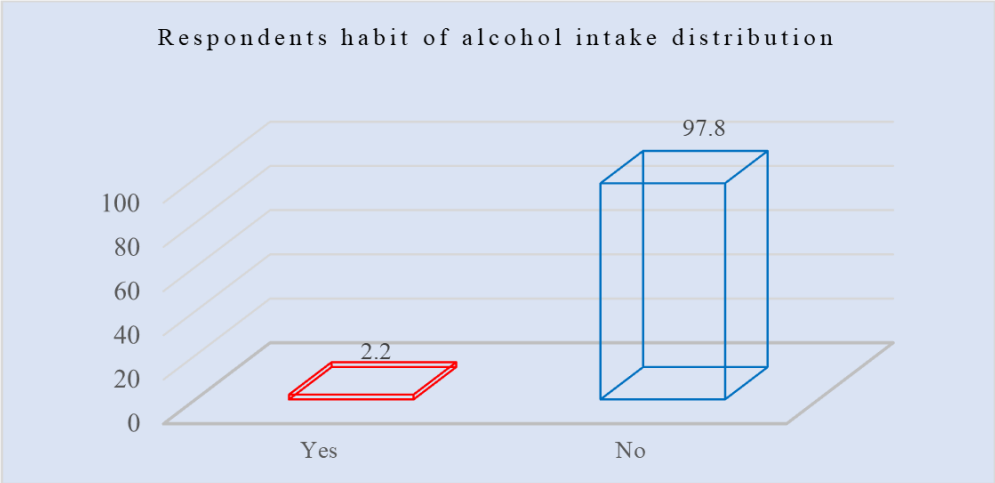

Figure III: Bar chart showed alcohol intake of the respondents (N=135)

Table 5: Distribution of the female respondents by time of taking oral contraceptive pill (OCP) (N=49)

OCP status	n	%
No user	23	46.9
Current user	1	2.0
Past user	25	51.1

Table 6: Distribution of the respondents by diabetes mellitus (N=135)

Diabetes mellitus	n	%
Yes	43	31.9
No	92	68.1

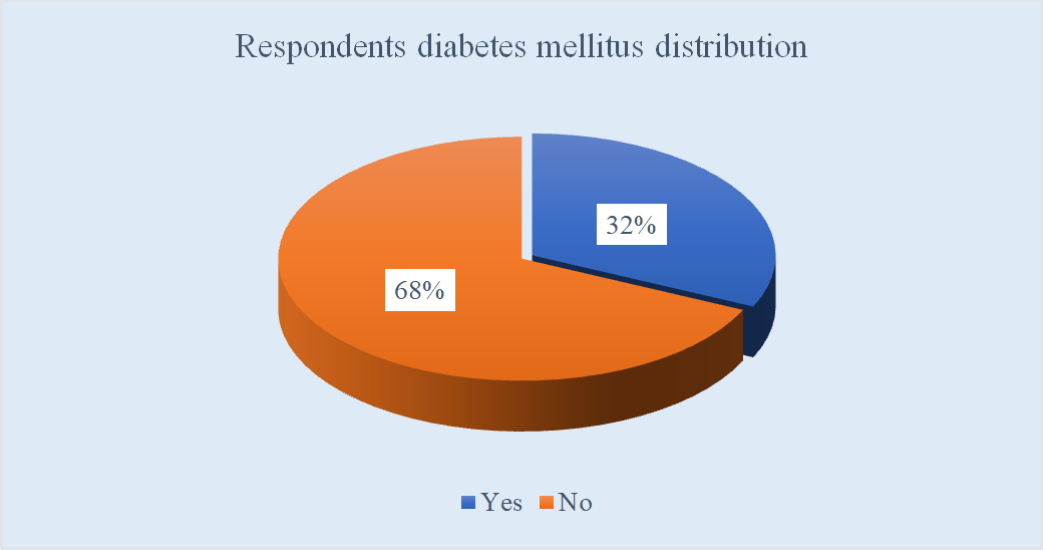

Figure IV: Pie chart showed diabetes mellitus of the respondents (N=135)

Table 7: Distribution of the respondents by hypertension (N=135)

Hypertension	n	%
Yes	111	82.2
No	24	17.8

Table 8: Distribution of the respondents by dyslipidemia (N=135)

Dyslipidemia	n	%
Yes	102	75.6
No	33	24.4

Table 9: Distribution of the respondents by Body Mass Index (N=135)

Body Mass Index	n	%
<18.5 BMI (Underweight)	7	5.2
18.5-24.9 BMI (Normal)	77	57.0
25-29.9 BMI Overweight)	41	30.4
>30BMI (Obese)	10	7.4

Table 10: Association between coronary heart disease and age category (N=135)

Age category	C H D				Chi-Square value	P value
	CSA		ACS			
40-44 yrs.	20	35.7%	14	17.7%	10.868	0.012
45-49 yrs.	12	21.4%	12	15.2%		
50-54 yrs.	4	7.1%	19	24.1%		
55-60 yrs.	20	35.7%	34	43.0%		
Total	**56**	**100%**	**79**	**100%**		

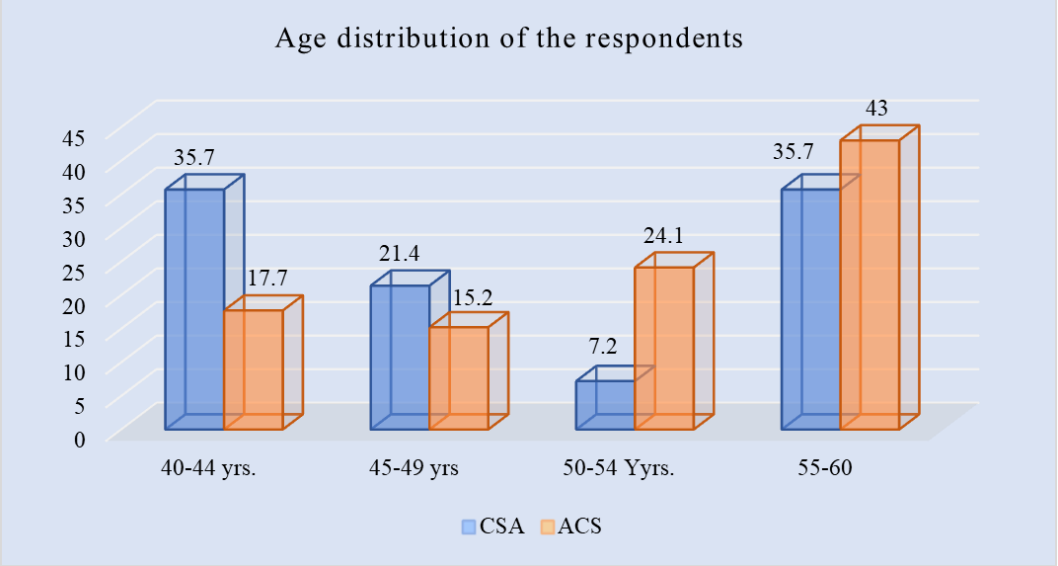

Figure V: Bar chart showed age wise association between coronary heart disease (N=135)

Table 11: Association between coronary heart disease and Body Mass Index (N=135)

BMI	C H D				Chi-Square value	P value
	CSA		ACS			
<18.5 BMI (Underweight)	3	5.4%	4	5.1%	9.234	0.023
18.5-24.9 (Normal)	24	42.9%	53	67.1%		
25-29.9 (Overweight)	22	39.3%	19	24.1%		
>30 (Obese)	7	12.5%	3	3.8%		
Total	**56**	**100%**	**79**	**100%**		

Table 12: Association between coronary heart disease and habit of tobacco intake (N=135)

Habit of tobacco intake	C H D				Chi-Square value	P value
	CSA		ACS			
Yes	43	76.8%	75	94.9%	10.05	0.003
No	12	21.4%	4	5.1%		
Sometimes	1	1.8%	0	0.0%		
Total	56	100%	79	100%		

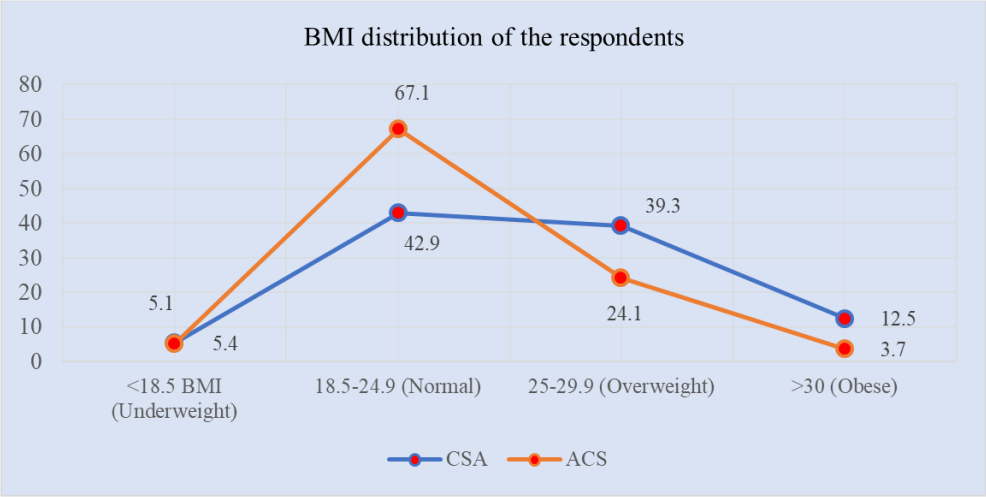

Figure VI: Line chart showed BMI wise Association between coronary heart disease (N=135)

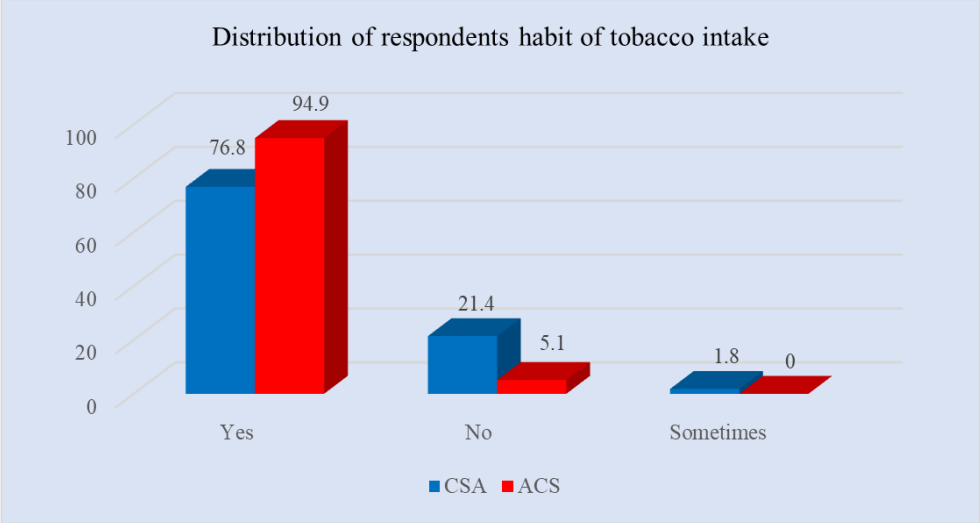

Figure VII: Bar chart showed respondents habit of tobacco intake (N=135)

Table 13: Association between coronary heart disease and hypertension (N=135)

Hypertension	C H D				Chi-Square value	P value
	CSA		ACS			
Yes	52	92.9%	59	74.7%	7.405	0.011
No	4	7.1%	20	25.3%		
Total	**56**	**100%**	**79**	**100%**		

DISCUSSION

The aim of this study was to evaluate the factors associated with coronary heart disease among patients in Bangladesh. In this study, more than half (63.7%) of the respondents were male and 36.3% were female. Majority of the respondents (65.2%) were with positive family history of cardiovascular diseases. About 90.4% of our respondents were physically inactive. Majority of the respondents (97.8%) were not with the habit of alcohol intake. Among the female respondents about 57.1% were without the habit of OCP intake, 40.8% were with the habit of OCP. Around body weight of the respondents 57% weight were found with normal status, 30.4% were overweight, 7.4% were obese and 5.2% were underweight. Percent of variance explained by central obesity measures and food patterns were TC (10%), FPG (16%), FTG (6.6%) and VLDL-c (6.7%). Significant negative association of chicken and fish consumption with central obesity measures indicates the beneficial effect of both these items in this population [14]. A large number of the respondents (68.1%) were with diabetes mellitus, 82.2% were with hypertension. There was significant association found between coronary heart disease and habit of tobacco intake of the respondents. Among South Korean adults, the age-adjusted prevalence of the metabolic syndrome was 14.2% for men and 17.7% for women, whereas the age-adjusted prevalence of obesity (body mass index (BMI) ≥30 kg/m2) was 1.7% and 3.0% for men and

women, respectively. Age, unemployment, higher BMI, and current smoking were associated factors for the metabolic syndrome regardless of gender. Moderate exercise (2–3 sessions/week) in men and light alcohol drinking (<15 g/day) in women decreased the odds of the metabolic syndrome [15]. There was also significant association found between coronary heart disease and time of tobacco consumption of the respondents. Decreased physical activity and increased consumption of calories and saturated fat contribute to abdominal obesity, insulin resistance and atherogenic dyslipidemia. In contrast, smoking can precipitate coronary attack and sudden death, particularly in those with other risk factors. In spite of that, only a few studies have explored the association between smoking, alcohol consumption and body fat distribution on the one hand and metabolic risk factors for CHD on the other hand. To conclude, immigrant Asian Indian men to the US have high prevalence of CHD, NIDDM, low HDL cholesterol levels and hypertriglyceridemia. In a study, all of their patients have "insulin resistance" as a common pathogen etic mechanism and seem to be the most important risk factors [16]. On the other hand, family history of hypertension and family history of CHD proved to have a significant risk for CHD. Large-scale, randomized controlled trials on thrombolytic, blood-pressure-lowering, antiplatelet and blood-cholesterol-lowering treatment as well as cardiac intervention have been conducted for Chinese patients with myocardial infarction. The studies provide important information for the prevention and management of chronic CHD and acute myocardial infarction [16]. In another study, it was reported that, the corresponding multivariable-adjusted attributable risk percent associated with elevated total cholesterol (≥200 mg/dL) was 27% in men and 34% in women [17]. However, we think that, further large-scale studies with appropriate methodology are required to find out the factors associated with coronary heart disease to substantially reduce the magnitude of heart diseases in Bangladesh.

Limitation of the Study

This was a single centered study with small sized samples. Moreover, the study was conducted at a very short period of time. So, the findings of this study may not reflect the exact scenario of the whole country.

CONCLUSION & RECOMMENDATION

Age, body weight, habit of tobacco and hypertension may be considered as some potential factors which are associated with coronary heart disease. In Bangladesh, the frequencies of peoples with family history of CHD, habit of tobacco intake, physically inactivity, DM and hypertension among CHD patients are very high. For getting more specific results we would like to recommend for conduction similar more studies in several places with larger sized samples.

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