



## Risk factors of ischemic heart disease among the patients of Cardiology Department of Chittagong Medical College Hospital

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### ABSTRACT

Cardiovascular risk factors are the most inimical and deleterious elements to develop ischaemic heart disease (IHD). To identify the factors contributing to develop IHD is therefore of paramount importance. It needs endless attention to address the riddle. This study aimed to assess the risk factors of IHD among the patients of Cardiology Department of Chittagong Medical College Hospital. This is a descriptive cross-sectional questionnaire-based study. One hundred and seven hospitalized patients with a diagnosis of IHD were selected conveniently from the Cardiology Department. Data regarding socio-demographic and risk factors were collected by a structured case record form. The mean age of  $54.5 \pm 10.3$  years and 67.3% were male. The most frequent risk factor was hypertension (77.6%), followed by diabetes mellitus (53.3%), smoking tobacco (43.9%), family history of IHD (41.1%), use of smokeless tobacco (29.0%), dyslipidemia (28.0%). Sleep disturbance (21.5%), sedentary lifestyle (19.6%), psychosocial stress (19.6%), and obesity (15.9%). Less frequent risk factors were alcohol consumption, gambling, sex abuse, and un-healthy diet habit. Frequency of hypertension, dyslipidemia, obesity, and smokeless tobacco use were significantly higher among female than male, while reverse trend was observed regarding smoking and alcohol drinking. All these findings suggest that a substantial evidence of risk factors of IHD were prevailing among the study population. Proper care through positive motivation, avoidance of risk behaviour, intervention of clinical conditions can resist risk factors of IHD thus IHD can be prevented.

### INTRODUCTION

Ischemic heart disease (IHD) is a group of chronic diseases characterized by coronary ischemia of the heart and subsequent myocardial damage. The incidence and mortality rates related-to IHD are falling in most developed and developing countries, but the incidence, death and disability-adjusted life years (DALYs) of IHD were still at a high level and caused a considerable burden of disease (Wang et al., 2021).

Due to lack of preventive care and screening for cardiovascular diseases (CVD) risk factors, people in Low to Middle Income Countries (LMICs) often develop IHD at a younger age and have poorer outcomes (Gupta and Yusuf, 2019). IHD is major cause of disability in the LMIC of Bangladesh for example, accounting for 13% of all DALYs lost (GHDX, 2020).

A high CVD prevalence along with an upward trend was observed in Bangladeshi adults with the highest reported prevalence (21%) was for IHD which demand proper strategies for primary prevention of CVD so that a further increase can be alleviated and the morbidity and mortality associated with it can be reduced (Chowdhury et al., 2018; Islam and Majumder, 2013).

The pathogenesis of IHD remains incompletely understood. Interplay between environmental and genetic factors likely contributes to the pathophysiology of IHD. The 'classic' risk factors such as hypertension, dyslipidemia, diabetes mellitus and smoking undoubtedly play vital role; in addition, some emerging risk factors and as-yet-unrecognized factors may be important (Regmi and Siccardi, 2022). These factors in isolation, or in different combinations, in a genetically

predisposed population, may explain the high prevalence of IHD in Bangladesh (Islam and Majumder, 2013).

Early recognition of risk factors and primary prevention have significantly decreased the morbidity and mortality associated with IHD. Lifestyle modification with diet, exercise, and smoking cessation is crucial to reduce cardiovascular risk factors. Further control of hypertension, diabetes, and hyperlipidemia is essential to reduce the risk of IHD. Secondary prevention is the therapy to prevent further damage and progression of the disease after the patient has a diagnosis of CVD, including coronary artery, cerebrovascular, or peripheral arterial disease. The guidelines are somewhat similar to that of primary prevention, including diet, exercises, and smoking cessation as discussed above (Becker et al., 2008).

Chittagong Medical College Hospital is the second largest tertiary hospital of Bangladesh. Most of the complicated cases of IHD (in the form of unstable angina or myocardial ischemia) are referred to this hospital for appropriate management. So, IHD patients from the southeastern part of Bangladesh are being managed in the Hospital. The distribution of risk factors of IHD widely varied among different region due to socio-cultural and socio-economic diversity. In this regard, region specific burden of different risk factors are necessary to initiate most cost-effective prevention program for primary and secondary prevention of IHD.

Traditionally there are some conventional risk factors for IHD e.g. increasing age, male sex, positive family history, hypertension, smoking, obesity, dyslipidemia, metabolic syndrome, diabetes, lack of exercise and some emerging risk factors, e.g. C-reactive protein, Fibrinogen, Homocysteine etc (Maron et al., 2008). However, certain risk factors may predominate in certain regions. Knowledge of region specific distribution of risk factors is essential for policy and panning of most appropriate and cost-effective primary and secondary prevention of IHD. In this background, present study was conducted to describe the risk factors of IHD among the hospitalized patients

with IHD in a tertiary hospital of Chittagong, Bangladesh.

There is shortage of recent study regarding the risk factors of IHD among hospitalized patients in this region of Bangladesh, especially in the study site. So, the present study would provide the present distribution of risk factors of IHD in this region of Bangladesh, based on which policy makers could change or modify the ongoing primary and secondary prevention program in Bangladesh. The objective of this study was to investigate the risk factors among the hospitalized patients with IHD in the Cardiology Department of Chittagong Medical College Hospital.

## **MATERIAL AND METHODS**

A Descriptive type of cross-sectional study was conducted at Department of Cardiology, Chittagong Medical College Hospital, Chittagong, Bangladesh. Patients admitted from October 2021 to March 2022 in the Department of Cardiology CMCH with a diagnosis of IHD. A total of 107 hospitalized patients with IHD were included in the study.

### **Data collection**

Data were collected by using a pretested structured case record form. Data were collected by the researcher himself by face to face interview. The demographic and risk factors related data were collected by asking simple questions like, do you have any sleep disturbance, do you feel psychosocial stress, etc., and by reviewing medical records to confirm the presence of any comorbidity like hypertension, diabetes. Height and weight was measured following standard procedure to calculate BMI. Collected data were analyze using IBM SPSS-23.0 Statistics software. Distribution of risk factors between male and female patients was compared by the Chi-square test. A P value <0.05 0.05 was considered statistically significant.

### **Ethical considerations**

Before recruitment, participants were informed about the purpose, length, and anonymity of the study. The parents were also informed that their

data would be used for research purposes, but without disclosing the identity of the participants. The study was conducted following the Declaration of Helsinki.

## RESULTS

### Variables of IHD

**Table 1:** Variables of IHD in the study areas

SL No	Name of Variables	Percentage	Female	Male	Present	Percentage	Absent %	Female %	Male%
1	Smoking	43.90%	1	46	47	56.10%	60	2.90%	63.90%
2	Hypertension	77.60%	32	51	83	22.40%	24	91.40%	70.80%
3	Alcohol Drinking	8.40%	0	9	9	91.60%	98	0.00%	12.50%
4	Dyslipidemia	28.00%	17	13	30	72.00%	77	48.60%	18.10%
5	Gambling	4.70%	1	4	5	95.30%	102	2.90%	5.60%
6	Sex abuse	0.90%	0	1	1	99.10%	106	0.00%	1.40%
7	Sedentary lifestyle	19.60%	7	14	21	80.40%	86	20.00%	19.40%
8	Obesity	15.90%	11	6	17	84.10%	90	31.40%	8.30%
9	Diabetes mellitus	53.30%	18	39	57	46.70%	50	51.40%	54.20%
10	Family history of IHD	41.10%	17	27	44	58.90%	63	48.60%	37.50%
11	Psychosocial stress	19.60%	6	15	21	80.40%	86	17.10%	20.80%
12	Dietary habit	6.50%	3	4	7	93.50%	100	8.60%	5.60%
13	Sleep disturbance	21.50%	10	13	23	78.50%	84	28.60%	18.10%
14	Tobacco chewing	29.00%	16	15	31	71.00%	76	45.70%	20.80%

### Socio-demographic characteristics

The majority of the patients were in 41-60 years age groups 69 (64.5%) followed by 27 (25.2%) patients in more than 60 years age group and 11(10.28%) below 40years age group.

**Table 2:** Socio-demographic characteristics of the participants

Socio-economic characters	Category	Percent
Age	20-40	10.28
	41-60	64.5
	>60	25.2
Sex	Male	67.3

There are 14 variables observed in the study. Majority of the patients were with hypertension (77.60%) followed by Diabetes mellitus (53.30%) and smoking habit (43.90%). Gambling and sex abuse are the least variables among the study population.

Occupation	Female	32.71
	House maker	32.71
	Service	29.91
	Business	25.23
	Day labor	1.87
	Retired	10.28
Religion	Islam	83.18
	Sonaton	14.95
	Budhist	1.97
Monthly family income	<= 10000	19.63
	11000- 20000	44.86
	>20000	35.51
Education level	No former education	14.02
	Primary /below	25.23
	SSC / below	40.19
	HSC/above	20.56

The maximum of the patients was male 72 (67.3%) and ratio of Male to female is around 2:1). Among the patients house maker 32.71%, Service 29.01% and Businessman 25.23%. The most of the patients were Muslim (83.2%), followed by Sanaton (15%) and Buddhism (1.8%). The most of the patients (44.7%) had monthly family income of 11000 to 20000 taka, 35.51% were above 20000 taka. The majority of the patients (40.2%) had education up to secondary level and above primary level. About 15% of the patients did not have any formal education and 20% had education higher secondary or above (Table 2).

**Table 3:** Behavior and Life style of the participants (n=107)

Behavior and Life style		Sex		Chi-square test
		Male	Female	
Smoking behavior	Non-smoker	36.1%	97.1%	P<0.001
	Smoker	63.9%	2.9%	
Hypertension	Absent	29.2%	8.6%	P=0.017
	Present	70.8%	91.4%	
Alcohol drinking	Absent	87.5%	100.0%	P=0.029,
	Present	12.5%	0.0%	
Dyslipidemia	Absent	81.9%	51.4%	P=0.001
	Present	18.1%	48.6%	
Gambling	No	94.4%	97.1%	P=0.535
	Yes	5.6%	2.9%	
Sedentary lifestyle	Absent	80.6%	80.0%	P=0.946
	Present	19.4%	20.0%	
Obesity	Absent	91.7%	68.6%	P=0.002
	Present	8.3%	31.4%	
Diabetes mellitus	Absent	45.8%	48.6%	P=0.484
	Present	54.2%	51.4%	
Family history of IHD	Absent	62.5%	51.4%	P=0.275
	Present	37.5%	48.6%	
Psychosocial stress	Absent	79.2%	82.9%	P=0.652
	Present	20.8%	17.1%	
Dietary habit	Normal	94.4%	91.4%	P=0.554
	Fast food	5.6%	8.6%	
Sleep disturbance	Absent	81.9%	71.4%	P=0.214
	Present	18.1%	28.6%	
Tobacco chewing	Absent	79.2%	54.3%	P=0.008
	Present	20.8%	45.7%	

Out of 107 included patients, 17 (15.9%) were obese. Obesity was significantly higher in female than the male (31.4% versus 8.3%, p=0.002)

(Table 3). Majority of male reported to have diabetes mellitus in the study. 43.9% Participants were smoker in the study and majority of them were male. Only one female (2.9%) patient reported to smoke tobacco. The sex difference in smoking was highly significant statistically (p<0.001).

Participants were 83 (77.6%) had hypertension in the study. Among 24 (22.4%) had absent. Only 8.4% patients reported to drink alcohol and all of them were male. Out of 107 included patients, 30 (48.6%) reported to have Dyslipidemia. female 17 (48.6% ) than male 13 (18.1%). Out of 107 included patients, only 5 (4.7%) reported to participate in gambling and though the percentage was higher among male (5.6%) than the female (2.9%) the difference failed to reach statistical significance (p=0.535) (Table 3). 41.1% patients reported to have family history of IHD in the study and absent 58.9%. 19.6% patients reported to have psychosocial stress in the study and absent 80.4%. Only 6.5% patients reported to have fast food in the study. There was no sex difference in the prevalence of fast food taker in the study (Table 3). Out of 107 included patients, 23 patients (21.5%) reported to have sleep disturbance in the study. There was no sex difference in the prevalence of sleep disturbance in the study (Table 13). 31 (29.0%) patients reported to chew tobacco in the form of sada/zorda. Smokeless tobacco users were significantly higher in female compared to male (45.7% versus 30.8%, p=0.008).

## DISCUSSION

The mean age of the patients was 54.5±10.3 years and majority of them (64.5%) were in 41-60 years age groups. The age distribution was similar to the other study conducted in Bangladesh (51.27±8.80 years) (Ahmed et al., 2018) but lower than the in COURAGE trial conducted in USA (62±5 years) (Boden et al., 2007). This signifies that Bangladeshi patients are relatively younger as compared to the western people.

Similar to the previous study where was male predominance in the present study (Ahmed et al., 2018; Rahman et al., 2021). The skewed gender distribution (males 67.3% versus females 32.7%) 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%) (Yusuf et al., 2004).

Other socioeconomic characteristics like religion, education, occupation, and monthly family income might not be representative of the general population as the sample were collected from a public tertiary hospital. Usually patients from low socioeconomic strata take service from the public hospital of Bangladesh.

The overall smoking prevalence in the study was 43.9% in the study and majority of them were male. Worldwide smoking is still seen mainly as a male problem. Overall prevalence was about four times higher in men than women globally (48% versus 12%) and in the South East Asia region the World Health Organization observed a high prevalence of smoking in men ranging from 25% to 60% (WHO, 2003). The smoking problem in Bangladesh is masked by the very significant sex difference because relatively few women smoke. Thirty one (29.0%) patients reported to chew tobacco in the form of sada/zorda. On the contrary to the smoking tobacco, smokeless tobacco users were significantly higher in female compared to male (45.7% versus 30.8%,  $p=0.008$ ) in the present study which was comparable to the national data (Flora et al, 2009).

Alcohol use is low in Bangladesh; and the present study findings confirmed this as only 9 (8.4%) patients reported to drink alcohol and all of them were male (Islam et al., 2017). A lower risk of coronary heart disease and myocardial infarction among moderate drinkers compared to abstainers has been consistently observed in epidemiological studies and meta-analyses of these studies. However, ambiguity remains on the effect of alcohol on other CVDs and all-cause mortality (Hoek et al., 2022).

Gambling is religiously and socially prohibited in Bangladesh and similarly very few of the patients (4.7%) with IHD reported to engage in gambling. Pathological gamblers (PG), because of their high level of stress, depression, and alcohol or nicotine consumption may be overexposed to IHD. To test this association, Germain et al (2011) assessed

pathological gambling among 73 patients hospitalized in cardiology for IHD and 61 inpatients from the same department hospitalized for a non-coronary disorder. They found six cases of PG (8.2%) and one case of problem gambling in the IHD group versus no case in the non-coronary group ( $p = 0.01$ ) (Germain et al., 2011).

Regarding dyslipidemia the prevalence was 48.6% in the present study and the prevalence was significantly higher among female than male (48.6% versus 18.1%,  $p=0.001$ ). Previously, Rahman et al (2021) found the presence of some type of dyslipidemia in 99% of all patients with no significant difference in male and female which was much higher than the present study. The difference might be attributable to the definition of dyslipidemia in the reported studies. In the present study only the reported dyslipidemia was included, whereas the study of Rahman et al. (2021) defines dyslipidemia as the newly diagnosed as well as the old cases. However, the present study findings were higher than the finding of Ahmed et al. (2018) where only 21.13% of the IHD patients had dyslipidemia.

Sedentary life style may have association with IHD. In the Bangladesh noncommunicable disease Risk Factor Survey 2010 (WHO, 2010), 27.0% of people (10.5% men and 41.3% women) were found to have low-level of physical activity. In the present study around 20% of both male and female participants reported to lead sedentary lifestyle.

Out of 107 included patients, 17 (15.9%) were obese. Obesity was significantly higher in female than the male (31.4% versus 8.3%). Previous studies reported a comparatively higher rate of obesity (45.2%, 50%) (Ahmed et al., 2018; Rahman et al., 2021).

More than half (53.3%) of the studied patients reported to have diabetes mellitus in the current study without any gender differences. reported to have diabetes mellitus which was higher than the earlier study by Rahman et al.(2021) (37.5%) and Ahmed et al. (29.38%) (Ahmed et al., 2018). Family history of CAD is another non-modifiable risk factor for IHD. Out of 107 included patients, 44 patients (41.1%) reported to have family history of IHD in the study which was much



higher than the previous studies (15.6%, 3.13%) (Ahmed et al., 2018; Rahman et al., 2021).

Out of 107 included patients, 21 patients (19.6%) reported to have psychosocial stress in the study without any gender difference. Psychosocial factors have repeatedly been shown to influence CHD risk in European white populations. Factors such as depression and chronic work stress are independently associated with increased risk of heart disease, whereas social networks and support appear to be protective (Brown et al., 2021; Volgman et al., 2018).

Out of 107 included patients, 6.5% reported to have fast food in the study. There was no sex difference in the prevalence of fast food taker in the study. Consumption of junk foods is associated with a significantly higher risk of coronary artery diseases. On the contrary, consumption of fish, fruits, fresh vegetables, and fat-free yogurt has the protective effects on CAD while beef and egg have a role to increase the risk of CAD (Khatun et al., 2021). According to a review by Giugliano et al. (2006) many diets high in refined starch, sugar, and saturated and trans fat and low in  $\omega$ -3 fatty acids and natural antioxidants and fiber from fruit, vegetables, and whole grains cause the inflammation associated with the metabolic syndrome by affecting the immune system (Giugliano et al., 2006).

Twenty three patients (21.5%) reported to have sleep disturbance in the study. There was no sex difference in the prevalence of sleep disturbance in the study. In a meta-analysis of 361,041 participants from ten studies the incidence of myocardial infarction and coronary artery disease in the short sleep duration group is 0.59%, and 5.43%, while the incidence of myocardial infarction and coronary artery disease is 0.61% and 6.55%, consecutively. Abnormal sleep duration (short and long sleep duration) may act as the predictor of cardiovascular diseases. The importance of having normal sleep duration should be stressed with other lifestyle modification to avoid the risk of getting cardiovascular diseases (Laksono et al., 2022).

## CONCLUSION

The study concluded that, the most frequent risk factor was hypertension, followed by diabetes mellitus, smoking tobacco, family history of IHD, use of smokeless tobacco, dyslipidemia, sleep disturbance, sedentary lifestyle, psychosocial stress, and obesity. Frequency of hypertension, diabetes mellitus, smoking tobacco were significantly higher among male than female, while reverse trend was observed regarding Dyslipidemia, obesity, and smokeless tobacco chewing. For primary and secondary prevention of IHD it is important to strengthen the ongoing program based on the burden of the risk factor in the community. The importance of early screening for hypertension, diabetes, Dyslipidemia and other lifestyle modification should be stressed to avoid the risk of getting IHD.

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