

## Risk Factors of Coronary Heart Disease among Civil Employees of a Tertiary Level Hospital

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### ABSTRACT

**Background:** Cardiovascular risk factors are the most inimical and deleterious elements to develop coronary heart disease (CHD). To identify the factors contributing to develop CHD is therefore of paramount importance. It needs endless attention to address the riddle. This effort is to candle the light on sociodemographic & other factors of CHD.

**Methods & Materials:** This cross-sectional study was conducted in CMH Dhaka from September to December 2011 on 287 respondents. Data were collected by interview using semi-structured questionnaire. Data were checked, edited, coded, categorized, cleaned and analyzed using (SPSS version 20).

**Results:** The study disclosed that respondent's mean age was 39.40+9.42 years, 67.2% were male and 32.8% were female. It was founded that 34.14% were smoker. The prevalence rate of HTN and DM were 14.3% and 4.5% respectably. The mean BMI was 24.55 with 58.5% had normal weight and 41.5% were overweight, 18.8% had positive family history of suffering from CHD. among the respondents 88.5% has got at least one risk factor, 60% has got 5-10 risk factors, 13.6% got 6-10 risk factors, 14.3% got > 10 risk factors. Age was significantly associated with smoking ( $p < .049$ ), educational status ( $p < .001$ ) and blood pressure ( $p < .001$ ). Physical exercise was associated with BMI ( $p < .001$ ) and blood pressure ( $p < .001$ ). Risk factors had highly significant association with age ( $p < .001$ ).

**Conclusion:** All these findings suggest that a substantial evidence of risk factors of coronary heart diseases were prevailing among the study population. Proper care through positive motivation, avoidance of risk behaviour, intervention of clinical conditions can resist risk factors of coronary heart disease thus coronary heart disease can be prevented.

**Keywords:** Coronary heart disease (CHD), Risk factor,

### Introduction

CI n the history of mankind many dedicated soul immolated their honest and sincere effort with utmost sacrifice to combat the dark and rementerous catalogue of coronary heart disease in the sovereignty of glorious lives. Cardiovascular disease (CVS) were so called "western disease" brought about by ways of life utterly different from those in most of Africa, Asia and many parts of the developing world.<sup>1</sup>

The heart has always held a special fascination for humans: it has been the seat of the soul; the home of emotions; and the pump that when beating, symbolizes life, and when silent, signifies death.

Perhaps no other organ in the body has been so closely scrutinized. Therefore, as scientists and clinicians round the globe gathered at the 2011 American Heart Association (AHA) Scientific Session was devoted to cardiovascular disease (CVDs). However, carefully performed epidemiologic studies from the Framingham Heart Study and others identified the major CVD risk factors including hypertension, elevated cholesterol levels, smoking, and diabetes. These seminal works changed the view of CVD from a preordained fate to a preventable disorder.<sup>2</sup>

The disease caused by the anomalies of coronary

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system affecting the cardiovascular activities is termed as coronary heart disease. It is the cause of 25-30% of death of most industrialist countries. WHO has drawn attention to the fact that CHD is our modern epidemic. CHD itself may be manifested in many presentations like Angina pectoris on effort, Myocardial infarction, Irregularities of heart beat, Cardiac failure and Sudden death.<sup>3</sup>

A risk factor is a characteristic feature of an individual or population that is present in early life and is associated with increased risk of developing future disease. The risk factor of interest may be behavioral (e.g. smoking), inherited trait (e.g. Family history) or a laboratory measurement (e.g. cholesterol). For a risk to be considered causal, the marker of interest must predate the onset of the disease and must have biological plausibility.<sup>4</sup>

An epidemiological study on risk factors of coronary heart disease shows that most of the population-attributable risk is explained by eight factors: smoking, hypertension, diabetes mellitus, abnormal lipid, abdominal obesity, psychological factors, consumption of too few fruit and vegetable, too much alcohol and lack of physical activity. Smoking remains the number one preventable cause of coronary heart disease worldwide.<sup>5</sup>

Several study revealed that total cholesterol (TC), triglyceride (TG), low density lipoprotein cholesterol (LDL) were directly associated with coronary heart disease (CHD) and high density lipoprotein cholesterol(HDL) inversely proportional to coronary heart disease. Fatty diet, obesity, physical inactivity was positively related to TC, TG, LDL cholesterol. Exercise and plant base diet was positively associated with HDL.<sup>6</sup>

In 1996 American college of sports medicine and the center for disease control (CDC) recommended 30 minute or more of the moderate intensity physical activity on most, preferably all days of the week, that the same year, the US preventive service task force recommended the health care providers counsel all patients on the importance of incorporating physical activity into their daily routine.<sup>7</sup>

World health organization report revealed that 12.5% of all non-communicable disease deaths were due to cardiovascular causes in Bangladesh in 2002 but within ten years the death toll increased to a

level that is more than double (27%) in 2011. As Bangladesh is steadily changing from agro-based socio-economic structure towards industry based settings, coronary heart disease is also getting a prominence.<sup>8</sup>

Silence is dark; dark means fear, breaking the silence now time has come to focus deeply to the catastrophe of coronary heart disease. In this study, efforts have been made to identify the attributing risk factors of coronary heart disease.

## Objectives

### 1.7.1 General Objective

To find out the risk factors of Coronary heart disease among the Civil Employees serving in Combined Military Hospital Dhaka.

### 1.7.2 Specific objectives

- To find out socio demographic characteristics among the civil employees serving in CMH Dhaka.
- To find out behavioral risk factors of coronary heart disease (smoking, exercise) among the civil employees serving in CMH Dhaka.
- To find out the morbidity status and number of risk factors related to CHD among the respondents.
- To delineate the relationship of age with smoking habit, educational status and blood pressure the respondents
- To determine the association of physical exercise with BMI and blood pressure among the respondents.

## Methods and Materials

This was a cross-sectional study carried out at CMH Dhaka between September to December 2011. The study population were all the entitled mothers and their newborn babies who reported to CMH Dhaka for delivery. A total of 287 babies and their mothers were selected conveniently for the study. Data were collected in collaboration with the Gynecologists and Obstetricians of the hospital through face to face interview of mothers by using semi structured questionnaire during the month of November 2011. Weights of the babies were taken within 1 hour of birth. Data were analyzed according to the key variables by using SPSS version 16.

## Results

**Table I:** Distribution of respondents by Age (n = 287)

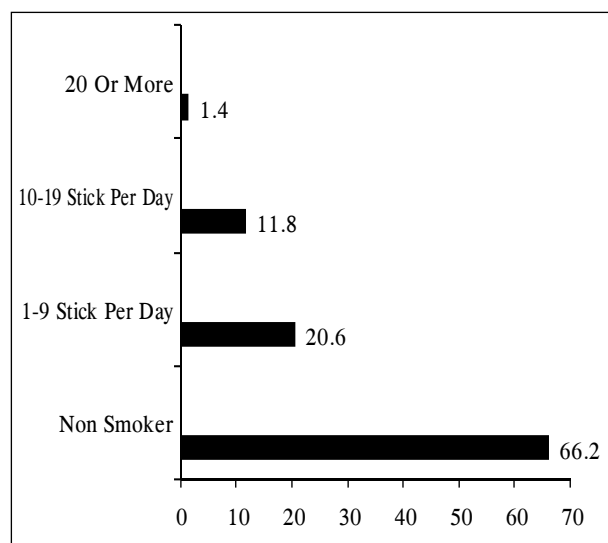
Age in years □	Frequency □	Percent
Up to 30 years □	74 □	25.8
31 to 40 years □	87 □	30.3
41 to 50 years □	90 □	31.4
50 years & above □	36 □	12.5
<b>Total □</b>	<b>287 □</b>	<b>100.0</b>

The distribution by age shows that out of 287 respondents the mean age of the respondent was 39.40 years with standard deviation of 9.42. Majority (31.40%) of the respondents were in the age group 41-50 years, next higher group was 31-40 years (30.30%). (Table 2.1). Mean + SD = 39.40 + 9.42 years (Range 23-59 years).

**Table- II:** Distribution of respondents by Sex (n = 287)

Sex □	Frequency □	Percent
Male □	193 □	67.2
Female □	94 □	32.8
<b>Total □</b>	<b>287 □</b>	<b>100.0</b>

Among the respondents 67.20% were male and 32.8% were female (Table 2.2) corresponds with the distribution pattern in combined military hospital Dhaka.



**Fig I:** Distribution of respondents by Smoking Quantity (n = 287)

It was evident from the study that among the smokers 20.6% were smoking 1-9 stick per day, 11.8% were 10-19 stick per day and 1.45% were smoking 20 or more stick per day.

**Table IV:** Distribution of respondent by morbidity status (n = 287)

Name of disease □	Frequency □	Percent
No disease □	227 □	79.1
Hypertension □	41 □	14.3
Diabetes □	13 □	4.5
Hypertension & diabetes □	6 □	2.1
<b>Total □</b>	<b>287 □</b>	<b>100.0</b>

About history of chronic diseases, 14.3% had Hypertension, 4.5% had DM and 2.1% had both DM & HTN.

**Table V:** Distribution of respondent by risk factors (n = 287)

Number of risk factors □	Frequency □	Percent
1 - 5 risk factors □	207 □	72.2
6 - 10 risk factors □	49 □	13.5
> 10 risk factors □	08 □	02.8
No risk factors □	33 □	11.5
<b>Total □</b>	<b>287 □</b>	<b>100.0</b>

Among the respondents 72.2% had 1-5 risk factor of coronary heart disease, 11.50% were free from those risk factors.

**Table VI:** Association between age and smoking habit (n=287)

Age in years □	Smoker □	Non-smoker □	Total
Up to □	30 22(22.4) □	52(27.5) □	74
31-40 □	23(23.5) □	64(33.9) □	87
41-50 □	35(35.7) □	55(29.1) □	90
50 and above □	18((18.4) □	18(9.5) □	36
<b>Total □</b>	<b>98(100%) □</b>	<b>189(100%) □</b>	<b>287(100%)</b>

$$\chi^2 = 7.86; df = 3; P < .049$$

Distribution shows that out of 98 (100%) smoker up to 30 years (22.4%) were smoker, 31-40 (23.5%), 41-50 (35.7%) and among 50 and above 18.4% were smokers. Chi-square test was done to see the association between smoking status and age group and significant association was observed ( $\chi^2 = 7.86$ ;  $df = 3$ ;  $p < .049$ ). Because people smoke a bit less in early or late age and professional smokers were in the middle age group.

**Table VII:** Association between age and educational status

Age in years	Educational status				Total
	Illiterate	Sign	Up to class Eight	Class 9-10 SSC	
Up to 30	2(10.0%)	1(3.0%)	30(23.3%)	30(37.5%)	11(44.0%)
31-40	10(50.0%)	2(6.10%)	36(27.9%)	35(43.8%)	4(16.00%)
41-50	4(20.00%)	18(54.50%)	53(41.10%)	9(11.30%)	6(24.00%)
> 50	4(20.0%)	12(35.4%)	10(7.8%)	6(7.5%)	4(16.00%)
Total	20(100%)	33(100%)	129(100%)	80(100%)	25(100%)

$\chi^2 = 73.17$ ;  $df = 12$ ;  $P < 0.001$

Distribution of the respondents by educational status in relation to age shows that out of 287 respondents 209 were among up to Class VIII to SSC level only 20 respondents were illiterate and another 25 had got educational qualification beyond SSC. And young aged people were more educated and older aged were less ( $\chi^2 = 73.17$ ;  $df = 12$ ;  $p < .001$ ).

**Table VIII:** Association between age of the respondents and blood pressure

Age in Years	High Blood Pressure		Total
	NO	Yes	
Up to 30	74(31.1%)	0(0%)	74
31-40	71(29%)	16(32.7%)	87
41-50	71(29.8%)	19(38.8%)	90
50 and above	22(9.2%)	14(28.6%)	36
Total	238(100%)	49(100%)	287(100%)

$\chi^2 = 28.48$ ;  $df = 3$ ;  $P < 0.001$

Distribution of the respondents by high blood pressure (both systolic and diastolic) level very high association in relation to age, Chi-square test done and found significant ( $\chi^2 = 28.48$ ;  $df = 3$ ;  $p < .01$ ).

**Table IX:** Association between Physical exercise and BMI

Types of physical exercise	BMI Group of Respondent		Total
	Less than 25	25 and above	
No exercise	6(3.6%)	6(5.0%)	12(4.2%)
Mild	35(20.8%)	40(33.6%)	75(26.1%)
Moderate	104(61.9%)	72(60.5%)	176(61.3%)
Heavy	23(13.7%)	1(.8%)	24(8.4%)
Total	68(100.0%)	119(100.0%)	287(100.0%)

$\chi^2 = 18.41$ ;  $df = 3$ ;  $P < 0.001$

Distribution showed among those who did not do exercise 6 (3.6%) had normal BMI and rest 6 (5.0%) had high level. Among the mild exercise doer 35 (20.8%) had normal BMI and rest 40 (33.6%) had BMI level high. Among the heavy

exercise group 23 (13.7%) had normal BMI and 1(.8%) had high BMI. Chi-square test done and found significant ( $\chi^2 = 18.41$ ;  $df = 3$ ;  $p < .001$ ).

**Table X:** Association between Physical exercise and Blood Pressure

Types of Physical Exercise	Normal BP (89.99-139.99)		High BP (90-160)		Total
No exercise	11(4.6%)	1(2.3%)	12(4.2%)		
Mild	54(22.7%)	21(42.9%)	75(26.1%)		
Moderate	150(63.0%)	26(53.1%)	176(61.3%)		
Heavy	23(9.7%)	1(2.0%)	24(8.4%)		
Total	238(100.0%)	49(100.0%)	287(100.0%)		

$\chi^2 = 10.54$ ;  $df = 3$ ;  $p < .015$

Those who did not do any exercise amongst 11 (4.7%) had normal blood pressure and rest 1 (2.3%) had high. Those who did mild exercise 54 (22.7%) had normal blood pressure, 21 (42.9%) had high level. Among the moderate exercise group 150 (63.0%) had normal blood pressure and 26 (53.1%) had high level. Among the heavy exercise group 23 (9.7%) had normal blood pressure and rest 1 (2.0%) had high level. Chi-square test done and found significant ( $\chi^2 = 10.54$ ;  $df = 3$ ;  $p < .015$ ).

## Discussion

From "womb to tomb" every sincere momentary effort of the heart keeps vitality alive. The topmost leading medical challenges of the twenty-first century are the cardiovascular disease. A WHO expert committee report (1982) states that CVDs were one of the leading cause of death in industrial countries and also appearing as a public health problem in developing countries like India, Sirilanka and Bangladesh.<sup>1</sup>

This is a descriptive type of cross sectional study. A total of 287 respondents were selected randomly, out of 588 civil employees in combined military hospital Dhaka. The principal focus of the study was to determine the selected risk factors in terms of un-modifiable and behavioral risk factors, chronicity of disease, and risk factors of coronary heart disease, such as age, sex, educational status, physical activity, obesity, suffering from chronic disease, family history of heart disease. This study may act as a platform upon which future investigations may give a look on risk factors of coronary heart disease in army community and in a broader prospect to Bangladeshi people.

In the present study the mean age of the respondent was 39.40 years with standard deviation of 9.42. Majority (31.40%) of the respondents were in the age group 41-50 years, next higher group was 31-40 years (30.30%). (Table: 2.1). (Range 23-59 years). This study finding was almost similar to the study findings observed by Zaman et al, where the mean age of the respondents was 38.1 years.<sup>9</sup> In the present study 56 % of the respondents were in the age of 40 years or less and rest were above that limit. According to BBS findings 2010, about 37.1% of population was within this group, which differs from present study finding.<sup>10</sup>

This study found 67 % of the respondents were male and 33% were female, the male female ratio is 2.03:1 which commensurate with the strength of combined military hospital Dhaka.

55% of the respondents were minimally educated (Junior School Certificate) and rest were authoritatively educated. Educational status of 93% respondents was up to Class-IV rest was in upper Classes. It did not accord with the preliminary report of population census 2011, where literacy rate were shown about 57%. In this study literacy rate was high because education is a pre-requisite for government service.

Smoking remains the number one preventable cause of coronary heart disease worldwide.<sup>5</sup> Smoking habit was predominately positive amongst the male respondents, among the respondents about 34% were smoker and rest 66 % were non-smoker. 20.6% were smoking for at least 10 years or more, rest had duration less than 10 years. ( $p < .001$ ). The study findings were not consistent with the study findings observed by Patwary MSR *et al.* where he had found prevalence 73.33%<sup>11</sup>, Ahmed *et al.* who had found prevalence of 79%.<sup>12</sup> Shahidullah et al had found prevalence 69.7%, the study place was Gazipur<sup>13</sup>, Zaman *et al.* found 65% smoker.<sup>9</sup>

Hypertension and diabetes mellitus are two recognized risk factors of coronary heart disease. The researcher could not record the diurnal variation of the blood pressure of the respondents. As on time blood pressure measurement was taken. It was revealed from the study that about 14.3% respondents were suffering from hypertension. (Blood pressure  $\geq 140/90$  mm of Hg), among the respondents 74.9% had normal systolic blood pressure, 25.1% had high systolic blood pressure.

68.6% had normal diastolic blood pressure and rest 25.1% had high diastolic blood pressure. This study finding was similar to the study findings of Jaman *et al.*<sup>14</sup>. Malik et al who had found 58.9% respondents were hypertensive<sup>15</sup>, Ullah *et al.*, who studied on hypertension among adult Bangladeshi had found prevalence rate of 20%<sup>16</sup>.

From the above discussion, hypertension as a risk factor of coronary heart disease is evident. So, adequate screening, diagnostic and clinical measure should be taken to inume the inimical and insalubrious effect of high blood pressure.

The mean body mass index of this study population was 24.48 kg/m<sup>2</sup>, in the present study 41% of the respondents were overweight or obese, which was higher than the findings observed by Rahman MM, who had found mean body mass index 22.97.<sup>10</sup> Mouloupoulos *et al* had found 23.2% respondents were over wt or obese<sup>17</sup>, Rahman *et al.*<sup>18</sup>.

Physical activity is an exceptionally common modifiable risk factor of coronary heart disease.<sup>60</sup> It was evident from the present study that only 8.4% respondents did heavy physical exercise, 61.3% undergo moderate physical exercise and 26.10% mild or routine obligatory physical exercise. The association between physical exercise and systolic BP ( $p < .01$ ), diastolic BP ( $p < .01$ ), BMI ( $p < .001$ ), FPG ( $p < .001$ ) and both systolic and diastolic BP ( $< .001$ ) were found statistically significant.

These study findings corresponds with the study findings of Rahman *et al.*, where he had found mild, moderate and heavy exercise were highly significant with developing coronary heart disease<sup>19</sup>, also accorded by Jabeen S<sup>20</sup>, moreover Paffenbarger et al supports the above study findings where he has concluded that exercise inversely related with CHD, increase lifestyle and cardiovascular health<sup>21</sup>, mimicking the study findings of Pate *et al.*<sup>22</sup>

Present study depicted that 88.5% had at least 1 risk factor of coronary heart disease, 11.50% were free from those risk factors. After grouping the risk factors it was evident that 60.6% had 1-5 risk factors, 13.3% had 6-10 risk factors and 14.3% had more than 10 risk factors. The present study finding is a bit higher than the study findings of Diez-Roax AV et al. where 80% of the respondents had at list 1 risk factor, 9% men and 19% women had more than 3 risk factors<sup>23</sup>. In another study the prevalence of risk factors were a bit lower.<sup>24</sup>

The individual who are already within the risk group of coronary heart disease, steps like cessation of smoking, control of blood pressure and diabetes mellitus, body weight reduction, regular physical exercise, dietary control, anti-platelet drugs and beta blockers can be taken to halt further progression of risk factors into CHDs.

### Conclusion

The major aim of the study was to find out the pattern of selected risk factors of coronary heart disease. The inquest has discovered inimical and insalubrious factors which were smoking, hypertension, diabetes mellitus, obesity, less physical activity. Pumping heart symbolize life alike sailing boat which never stops like age. With the advancement of age suffering from chronic disease, blood pressure, obesity and bio-chemical parameters were identified as contributing risk factors. Habit is the servitude of intuition. Smoking, physical inactivity, showed significant influence on developing coronary heart disease. To revivify life, reverse has been proved to inseminate the light of hope. Education is indispensable to tie the noose of odds. Educational status has shown significant association with blood pressure.

### Recommendations

On the basis of the result of the study, the following are the recommendations to halt developing risk factors of CHD and say no to CHD those who are already with the risk factors:

- Increasing community awareness about the possible risk factors responsible for development and consequences of coronary heart disease addressing harmful effect of smoking, obesity, sedentary lifestyle and positive family history.
  - Steps can be taken to devise and implement strategy of primary preventive measures like no smoking, healthy diet, doing physical exercise,
  - Identification of high risk group by means of screening blood pressure, blood sugar thereby providing necessary advice as regards the development of coronary heart disease, all concern should avail the existing health facilities.
- Who are already within the risk group of coronary heart disease, steps like cessation of smoking, control of blood pressure and diabetes mellitus, body weight reduction, regular physical exercise, and beta blocker drugs can be taken to halt further progression of risk factors into CHDs.
  - Large sample size is required to have more precision of the results of the present study. It is, therefore, recommended that a multi-centered study should be undertaken for getting the external validity and wider reliability of the findings.

### Conflict of Interest - None

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