



## Original Article

# Risk Factors of Cardiovascular Disease among Hypertensive Patients: A Study in A Tertiary Care Hospital in Bangladesh

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### Abstract

**Background:** Identifying the risk factors for cardiovascular disease (CVD) in hypertensive patients is crucial in cardiovascular research and public health. Hypertension is a major CVD risk factor and uncovering additional contributors to cardiovascular risk in hypertensive individuals is vital for prevention and treatment. **Aim of the study:** This study aimed to assess the risk factors of cardiovascular disease among hypertensive patients. **Materials and Methods:** This prospective observational study was conducted at the Department of Medicine, Eastern Medical College & Hospital, Cumilla, Bangladesh from July 2022 to June 2023. In this study, 95 hypertensive patients were included as the study subjects, and they were selected by purposive sampling technique. Data was collected using a semi-structured pre-designed questionnaire and data analysis was carried out using MS Office tools. **Results:** Among the participants, it was observed that hyperlipidemia was present in 83% of the cases as the most common risk factor. Additionally, physical inactivity (51.6%), obesity (46.3%), and smoking (44.2%) were identified as risk factors in more than 40% of cases. Some participants also had a family history of cardiovascular diseases (22.1%), diabetes mellitus (14.7%) and hypothyroidism (3.2%). **Conclusion:** Among hypertensive patients, the most common risk factors for cardiovascular disease include hyperlipidemia, physical inactivity, obesity and smoking. Patients in this group should also be aware of additional risk factors such as a family history of cardiovascular diseases, diabetes mellitus and hypothyroidism.

**Key words:** Hypertension, Cardiovascular disease, Risk factors.

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### Introduction

Cardiovascular diseases (CVD) are responsible for the majority of non-communicable disease-related deaths, with an estimated 17.7 million annual fatalities worldwide<sup>1,2</sup>. An estimated 7.4 million of these deaths were due to ischemic heart disease (IHD), while 6.7 million were due to stroke<sup>3</sup>. One-third of this mortality occurs in people under 70 years of age<sup>4</sup>.

In Bangladesh, CVDs and their associated known risk factors are responsible for 13.4% of disability-adjusted life years (DALYs) lost<sup>5</sup>. Major CVD risk factors, including abnormal glucose metabolism, dyslipidemia, high blood pressure, smoking and the aging process, are well-documented contributors to the disease burden<sup>6</sup>. Obesity is a significant risk factor for CVD, both directly through its impact on insulin resistance and inflammatory processes and indirectly by increasing the likelihood of other immediate risk factors such as type 2 diabetes, dyslipidemia and hypertension<sup>7-9</sup>.

Bangladesh ranks third in the prevalence of diabetes mellitus (DM) among low- and middle-income countries (LMICs), with an estimated 10% or 8.4 million of the population affected and this prevalence is expected to increase by 13% in 2030<sup>10</sup>. According to the INTERHEART study, Bangladesh has the highest prevalence of cardiovascular disease (CVD) risk factors among five South Asian countries, with significant rates of self-reported history of hypertension (14.3%), abdominal obesity (43.3%), existing and former smoking (59.9%) and relatively low levels of regular physical inactivity (1.3%) and regular consumption of vegetables and fruits (8.6%)<sup>11</sup>. Shockingly, nearly 99.6% of males and 97.9% of females in Bangladesh are exposed to at least one established risk factor for CVDs and are at risk of developing these diseases at a younger age (under 40 years in men)<sup>12,13</sup>. Given the increasing trend of CVD-associated mortality in Bangladesh, there is a pressing need to understand the epidemiology of CVDs and their risk factors in the

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country. While a limited number of review studies have been conducted on the impact of type 2 diabetes mellitus (T2DM) and hypertension (HTN), there is a lack of research on other risk factors for CVD<sup>14,15</sup>. The objective of this current study was to assess the risk factors of cardiovascular disease among hypertensive patients.

**Materials and Methods**

This was a prospective observational study that was conducted at the Department of Medicine, Eastern Medical College & Hospital, Cumilla, Bangladesh from July 2022 to June 2023 with ethical approval from IERB. A total of 95 hypertensive patients were included in this study as the study subjects. A purposive sampling technique was applied in the selection of participants for this study, which was conducted after receiving approval from the ethical committee of EMC. All participants provided written consent before their data was collected. The inclusion criteria for this study encompassed patients of all age groups and genders who had been suffering from hypertension for more than 3 years and were seeking treatment at the mentioned hospital. Conversely, the exclusion criteria encompassed patients who had undergone surgical procedures or angioplasty. Detailed demographic and clinical information about the participants were documented and data analysis was carried out using MS Office tools.

**Results**

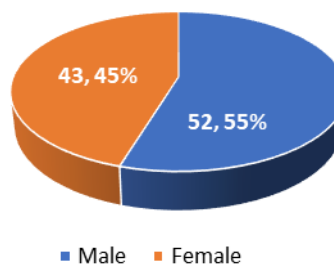
In this study, when considering the age distribution of the study subjects, it was observed that the highest number of patients (26.3%) fell into the 46-55 years age group. Additionally, 24.2%, 20.0%, and 9.5% of cases were from the 56-65, >65, and ≤ 35 years age groups, respectively, with another 20.0% from the 36-45 years age group (Table-I). In terms of gender distribution, it was observed that the majority of the patients (55%) were male, while 45% were female (Figure-1).

**Table-I: Age distribution of the patients (n=95)**

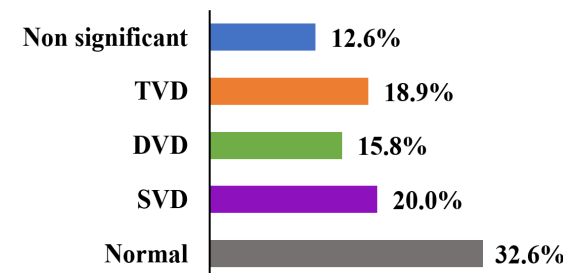
Age (Years)	Number (n=95)	Percentage (%)
≤35	9	9.5
36-45	19	20
46-55	25	26.3
56-65	23	24.2
>65	19	20.0

In the analysis of the cardiovascular disease status among our participants, it was noted that approximately one-third of the patients (32.6%) exhibited normal vessels. In addition, 20% had SVD (Single Vessel Disease), 15.8% had DVD (Double Vessel Disease), 18.9% had TVD (Triple Vessel

Disease) and the remaining 12.6% had non-significant findings (Figure-2). In analyzing the risk factors among the total of our participants we observed that in 83% of the cases, hyperlipidemia was present. Besides, in more than 40% of cases, physical inactivity (51.6%), obesity (46.3%) and smoking (44.2%) were found as risk factors. Moreover, in some cases, a family history of cardiovascular diseases (22.1%), diabetes mellitus (14.7%) and hypothyroidism (3.2%) were observed (Table-II).



**Figure-1: Pie chart showing distribution of Gender in the study cases (n=95)**



**Figure-2: Bar graph showing the vessel involvement among the study cases (n=95)**

**Table-II: Risk factors of the study subjects (n=95)**

Risk factors	Number (n=95)	Percentage (%)
Hyperlipidemia	79	83.2%
Inactivity	49	51.6%
Obesity	44	46.3%
Smoking	42	44.2%
Family history of CAD	21	22.1%
Diabetes mellitus	14	14.7%
Hypothyroidism	3	3.2%

**Discussion**

This study aimed to assess the risk factors of cardiovascular disease among hypertensive patients. The age distribution of our participants revealed that the largest proportion (26.3%) belonged to the 46-55 years age group. Additionally, 24.2%, 20.0%, and 9.5% of cases were from the 56-65, >65 and ≤35 years age groups, respectively, with another 20.0% from the 36-45 years age group. Regarding gender, most of the patients (55%) were male, while 45%

were female. This finding is consistent with another study in which the most hypertensive individuals were male<sup>16</sup>. Additionally, that study found a positive correlation between age and the prevalence of hypertension. In analyzing the cardiovascular disease status of our participants, it was observed that nearly one-third of the patients (32.6%) had normal vessels, followed by 20% had SVD, 15.8% had DVD, 18% had TVD and the remaining 12.6% had non-significant findings. In another study conducted by Mohammad AM, et al<sup>17</sup> showed that the rate of normal coronary angiograms was 29.3%. Among those with abnormalities, SVD (Single Vessel Disease) constituted the highest percentage at 23.3%, followed by TVD (Triple Vessel Disease) at 21.3% and DVD (Double Vessel Disease) at 14.3%. This study also noted notable gender differences, with a higher rate of TVD in men (25.2% vs. 17.4%) compared to women, whereas women had a lower percentage of normal angiography (21.4% vs. 36.8%). When examining the risk factors among all our participants, it was noted that hyperlipidemia was present in 83% of the cases. Additionally, physical inactivity (51.6%), obesity (46.3%), and smoking (44.2%) were identified as risk factors in over 40% of the cases. Furthermore, some participants had a family history of cardiovascular diseases (22.1%), diabetes mellitus (14.7%) and hypothyroidism (3.2%). These findings align closely with the results of other studies conducted in Bangladesh and India<sup>18,19</sup>. In another study also reported that most hypertensive patients had a strong family history (66%), diabetes mellitus (64%) and were smokers (67.2%)<sup>20</sup>. The findings of this study can provide valuable insights for future research in this field.

#### Limitation of the study

It was a single-center study with a relatively small sample size and the study duration was short. As a result, the findings may not be fully representative of the broader population and should be interpreted with caution. Further research with larger and more diverse samples and longer study durations would be beneficial for a more comprehensive understanding of the topic.

#### Conclusion

Hypertensive patients face a heightened risk of cardiovascular disease, with several prominent risk factors at play. Foremost among these are hyperlipidemia, physical inactivity, obesity, and smoking, which can significantly contribute to their cardiovascular health issues. It is crucial for individuals in this category to recognize and manage these factors effectively. Moreover, they should remain vigilant regarding other potential risk factors, including a family history of cardiovascular diseases, diabetes mellitus and hypothyroidism. Addressing these risk factors through lifestyle

modifications and proper medical management is essential to mitigate the cardiovascular risk associated with hypertension.

#### Conflict of interest

The authors declared that they have no conflict of interest.

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