

# Original Article



## Association of Hypertension and Coronary Heart Diseases

Zaheedur Rahman<sup>1</sup>, Md Fakhru Alam<sup>2</sup>, Israt Jahan<sup>3</sup>.

### Abstract

**Background:** Hypertension is one of the major non-transferable diseases in the world and contributing altogether to the burden of cardiovascular diseases, stroke, kidney failure, and premature death. The association of hypertension and coronary heart disease is a very frequent one. Just 11% of the total instances of hypertension have compelling control of circulatory strain. **Objective:** The main goal of this study is to assess the association between hypertension and coronary heart diseases. **Materials and Methods:** A prospective observational study was conducted in a total of 300 patients from January 2016 to July 2016 in a single institution (Private hospital) in Dhaka, Bangladesh. The incidence of hypertension, its control, and association with coronary heart diseases was analysed in the patients. **Results:** In our investigation, the outcomes demonstrated that hypertension is highly associated with cardiovascular diseases in patients above 50 years old ( $p=0.001$ ). A total of 228 patients in the study had hypertension and 30 were recently recognized. 63% of the patients with hypertension have viable control of blood pressure with medications and systolic hypertension was revealed in 6% cases. **Conclusion:** Hypertension and its treatment are related to coronary heart diseases. Treatment should be meant to achieve optimal values of blood pressure, and all the methodologies to treat coronary heart diseases should be considered on an individual premise.

**Key words:** Hypertension, Coronary Heart Disease, Risk factors, Prospective.

**Date of received:** 11.12.2020

**Date of acceptance:** 25.02.2021

*KYAMC Journal. 2021;12(1): 44-47.*

**DOI:** <https://doi.org/10.3329/kyamcj.v12i1.53368>

### Introduction

Cardiovascular diseases have become a predominant general medical issue in both developed and developing countries. The risk factors of coronary heart diseases were first described in studies in the mid-twentieth century.<sup>1</sup> Hypertension, one of the most traditional risk factors, has been reliably corresponded with the expanded likelihood of creating this in different populations.<sup>1-3</sup> A predetermined number of studies indicated that there is a huge relationship between hypertension and acute myocardial infarction (MI) in older patients.<sup>4</sup> One examination portrayed hypertension as one of the most regular hazard factors for heart diseases.<sup>5</sup> It is conceivable that different environmental and genetic factors can modulate the impact of hypertension on the onset of such diseases. However, it is widely accepted that strategies adopted to lower blood pressure by delaying the formation of atherosclerotic lesions plays a protective role.

According to the World Health Organization (WHO), around 17 million deaths worldwide occur as a result of coronary heart diseases, of which hypertension alone accounts for 9.4 million deaths and 80% of such deaths occurred in developing countries.<sup>5-7</sup> The global prevalence of hypertension is projected to rise from 26% in 2000 to 29.2% by 2025, which will be around 29% by 2025. Countries in Asia, particularly Southeast Asia, are experiencing an increasing burden of hypertension including coronary heart diseases.<sup>6,7</sup> According to the WHO, hypertension has become a major health concern in the Asian region affecting more than 35% of the adult population. Bangladesh, a developing country in South Asia, has experienced an epidemiological transition from communicable disease. Only a limited number of lesser epidemiological studies are available. Blood pressure management is successful in about 11% of total cases. This may be due to socio-economic factors, including lack of awareness, high

1. Lieutenant Colonel, Commanding Officer, BNS Upasham, Khulna, Bangladesh Navy.

2. Lieutenant Colonel, BSP, Commanding Officer, 11 Field Ambulance, Savar Cantonment,

3. Medical Officer, Saver Upazilla Health Complex, Savar.

**Correspondence:** Lieutenant Colonel Dr. Zaheedur Rahman, Lieutenant Colonel, Commanding Officer, BNS Upasham, Khulna, Bangladesh Navy, Mobile:01769091002, Email: zaheedr77@gmail.com.

analphabetic rates, low income, and physician-access difficulties. This has led to late detection of hypertension and a lack of hypertension control compliance through changes in pharmacotherapy and lifestyle. We are not aware of our actual situation at the advent of the new millennium. The exploration of the various aspects of hypertension in Bangladesh requires a large-scale nation wide survey and clinical research.

## Materials and Methods

This retrospective observational research was carried out in a private hospital in a total of 300 individuals between January 2016 and July 2016. Each applicant had received an informed, voluntary written consent before enrolment. A data sheet has included detailed medical history and physical examination of the study population. It omitted people with physical disabilities and documented mental disorder. The population group has been screened for Joint National Committee (JNC-7) hypertension (systolic blood pressure < 140 mmHg and diastolic blood pressure < 90 mmHg or taking antihypertensive drugs). During the course of the interview, two measurements of blood pressure were measured by the auscultatory method on each study participant using the mercury sphygmomanometer. Participants in the study were instructed to refrain from drinking any caffeinated drink and smoking half an hour before the check-up. Both measurements of blood pressure were obtained after the subject had rested in a seated position for at least 5 min. The first (appearance) and fifth (disappearance) sounds of Korotkoff were recorded as systolic (SBP) and diastolic blood pressure (DBP) indicators, respectively. The mean of two SBP and DBP readings was used to describe the participants' blood pressure. If the two readings varied by more than 10 mm of Hg a third reading was obtained and the three measurements combined. The monitoring of each individual's blood pressure was tested by evaluating the Blood Pressure in various settings. The study population's body mass index (BMI) was calculated by measuring body height and weight with the subject standing motionless on the weighing scale, feet about 15 cm apart, and weight distributed equally on each leg. Those participants were advised to wear minimal outwear (as culturally appropriate) and no boots when measuring their weight. Fasting Blood Glucose, 2 Hours after Breakfast Blood Glucose, HbA1C and fasting Lipid Profile, also assessed this population group for Metabolic Derangement.

By using SPSS version 25, data were evaluated for mean, percentage, and standard deviation. P-value < 0.05 has been deemed significant.

## Follow-Up

The minimum follow-up period of the patients in the series was 12 months. They were followed up to a maximum of 36 months. The mean follow up period was 20.81 months (range 12-36 months). Routine postoperative outpatient follow-up appointments were scheduled within one week, and then one month, three months, six months, and then every 12 months postoperatively.

## Results

The patient's demographic characteristics are represented in the chart below (Table-I). There were 244 (81.3%) males and 56 (18.7%) females. 115 (38.3%) patients had the age below 50 years and 185 (61.7%) patients had age above 50 years.

**Table I:** Characteristics of the patients

Variables	Parameters	No of patients	Percentage
Age	50	115	38.3%
	>50	185	61.7%
Sex	Male	244	81.3%
	Female	56	18.7%
BMI	Under Weight (<18)	2	0.6%
	Normal (18-24)	102	34%
	Over Weight (25-29)	162	54%
	Obesity G-I (30-34)	29	9.6%
	Obesity G-II (35-39)	4	1.3%
	Obesity G-III (40)	1	0.3%
Other factors	Hypertension	228	76%
	Diabetes	194	64.6%
	Smoking	128	42.7%

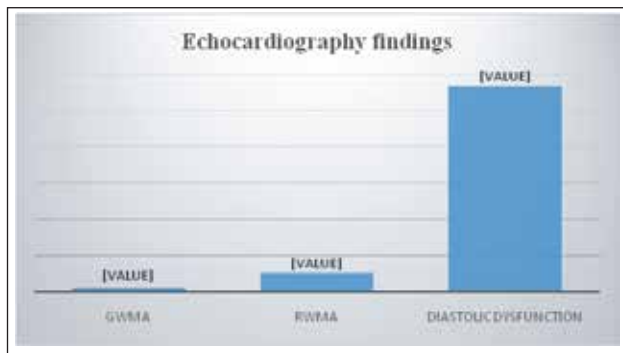
In this study population, 228 (76%) patients were found to have hypertension of which only 30 (10%) were newly detected and 198 (66%) were previously known cases of hypertension. 63% were taking drugs regularly and had effective control of blood pressure, 8.6% person had no control and only 6% had systolic hypertension (Table-II).

**Table II:** Incidence of Hypertension

Types of cases	No of patients	Percentage
Total population with HTN	228	76%
Newly detected HTN	30	10%
Known case of HTN	198	66%
Controlled HTN	189	63%
Uncontrolled HTN	26	8.6%
Systolic HTN	18	6%

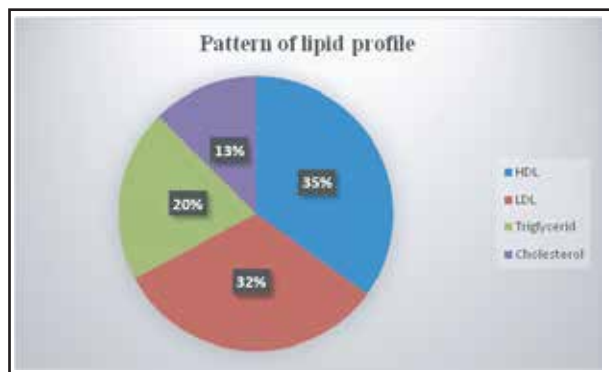
### HTN- Hypertension

Echocardiography with colour Doppler study was carried out in all patients and regional and global wall motion abnormality were seen in only 14 cases and diastolic dysfunction was present in 114 cases (Figure-1).



**Figure 1:** Echocardiography findings of the patients

All patients were evaluated for lipid profiles in a fasting state. 32% of patients had raised LDL, 35% had low HDL and 20% had raised Triglycerides. Status of the Lipid Profile in the study population is shown in the following bar diagram (Figure 2).



**Figure 2:** Lipid profile status of patients

### Discussion

Human communities have traditionally related the health status and disease profile to the extent of their economic and social growth. With industrialization, the major causes of death and disability have shifted in more advanced societies from a predominance of nutritional deficiencies and infectious diseases to those classified as chronic diseases such as cardiovascular disease (CVD), cancer, and diabetes. High-fat diets, cigarette smoking, and sedentary lifestyles are becoming more common along with continuous life expectancy improvement.<sup>8</sup> Non-communicable diseases become predominant, with the highest mortality caused by atherosclerotic CVD, ischemic heart disease, and athero-thrombotic stroke most frequently. Hypertension is one of the most important preventable causes of premature morbidity and mortality and is a substantial contributing factor for ischemic and hemorrhagic stroke, myocardial infarction, cardiac failure, progressive kidney disease, cognitive impairment, and premature death. With aging, as a result of progressive stiffening and loss of compliance with larger arteries, systolic hypertension becomes a more important problem. The high current burdens of non-communicable diseases (NCDs) are highlighted by estimates from the Global

Burden of Disease Study and the 1999 World Health Report, which show that these disorders together contributed to 59% of global mortality and 43% of the global disease burden in 1998.<sup>9</sup> It is estimated that 30.9% of all deaths in 1998, as well as 10.3% of the total disease-related burden, were attributable to CVD in terms of disability-adjusted life-year loss (DALY loss).<sup>10</sup> In this study we only had 30 cases of newly detected hypertension, 63% had effective control contrary to effective control of hypertension, 6% population revealed systolic hypertension. Of only 42.7% of the population in the study had a history of smoking or tobacco use. Over weight was approximately 54% of the sample populations and Diabetes Mellitus was 64.6%.

Although previous studies have confirmed the strong relationship between hypertension and ischemic heart disease in general, it is clear that there are differences between populations about how hypertension affects this in particular that few studies have investigated the direct link between the presence of hypertension and the CVD.<sup>11</sup> The increased risk of elevated blood pressure for ischemic heart failure in a limited group of Canadian patients declined with increasing age.<sup>12</sup> The connection between high blood pressure and CVD has been explored by a few research in the Middle East countries. Hypertension pathogenesis involves the interaction of genetic and environmental factors including fluid volume regulatory abnormalities, increased vasoconstriction, and vascular wall remodeling (decreasing diameter and increasing resistance). The mechanisms by which atherosclerosis can be caused by hypertension were not well elucidated. These mechanisms are all slow grade processes that take years to grow.

### Conclusion

Our study presents a primary general observation of hypertension and coronary heart disease associations. We are not sure of the severity of these diseases in our population and to find it out, a large-scale nationwide study is needed. Such a prospective study would be ideal to investigate the potential genetic and nutritional variants involved in this association.

### Acknowledgement

We are deeply grateful to all the doctors, nurses, paramedics and other staff of BNS UPASHAM for their outstanding services to the patients. We recall the contribution of Lt Col Md Emran Hossain for his cordial support. We are also grateful to our patients for their whole hearted cooperation.

### References

1. Dawber TR, Kannel WB, Revotskie N, Stokes 3rd J, Kagan A, Gordon T. Some factors associated with the development of coronary heart disease: six years' follow-up experience in the Framingham study. *Am J Public Health Nations Health.* 1959; 49:1349-1356.
2. Lakka TA, Salonen R, Kaplan GA, Salonen JT. Blood pressure and the progression of carotid atherosclerosis in middle-aged men. *Hypertension.* 1999; 34:51-56.

3. Lewington S, Clarke R, Qizilbash N, Peto R, Collins R. Prospective Studies Collaboration Age-specific relevance of usual blood pressure to vascular mortality: a meta-analysis of individual data for one million adults in 61 prospective studies. *Lancet* 2002; 360:1903-1913.
4. Sengul C, Ozveren O, Cevik C, Izgi C, Karaveliolu Y, Oduncu V, et al. Comparison of psychosocial risk factors between patients who experience acute myocardial infarction before and after 40 years of age. *Turk Kardiyol Dern Ars.* 2011; 39:396-402.
5. Sadeghi R, Adnani N, Erfanifar A, Gachkar L, Maghsoomi Z. Premature coronary heart disease and traditional risk factors-can we do better? *Int Cardiovasc Res J.* 2013; 7:46-50.
6. Singh RB, Suh IL, Singh VP, Chaithiraphan S, Laothavorn P, Sy RG, et al. Hypertension and stroke in Asia: prevalence, control and strategies in developing countries for prevention. *J Hum Hypertens.* 2000; 14(10-11):749-764.
7. Van Minh H, Byass P, Chuc NTK, Wall S. Gender differences in prevalence and socioeconomic determinants of hypertension: findings from the WHO STEPs survey in a rural community of Vietnam. *J Hum Hypertens.* 2005; 20(2):109-115.
8. Krishnan A, Garg R, Kahandaliyanage A. Hypertension in the South East Asia region Regional Health Forum: WHO South East Asia Region 2013. 17(1): 7-14.
9. Krishnan A, Garg R, Kahandaliyanage A. Hypertension in the South East Asia region Regional Health Forum: WHO South East Asia Region 2013. 17(1): 7-14.
10. World Health Organization. A global brief on hypertension: silent killer, global public health crisis: World Health Day 2013.
11. Benfante RJ, Reed DM, MacLean CJ, Yano K. Risk factors in middle age that predict early and late onset of coronary heart disease. *J Clin Epidemiol.* 1989; 42:95-104.
12. Tate RB, Manfreda J, Cuddy TE. The effect of age on risk factors for ischemic heart disease: the Manitoba Follow-Up Study, 1948-1993. *Ann Epidemiol.* 1998; 8:415-421.