Cardiovascular Diseases and Their Relationship with Hypertension in Bangladesh

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Abstract:

Background: The leading cause of cardiovascular disease (CVD) risk, hypertension is introduced. **Objective:** Our major goal is to learn more about the incidence of heart disease among hypertensive people in Bangladesh.

Method: This cross-sectional research included 530 individuals (aged 21) from both rural and urban regions in Khulna's private hospitals between January 2022 and January 2023. The data was collected methodically and statistically examined thoroughly.

Results: The end result was that there were a total of 99 males and 64 females in the hypertension group. Age was shown to have a significant association with cardiovascular disorders when considering hypertension.

Conclusion: Our results confirm that hypertension is closely linked to an elevated risk of cardiovascular illnesses in Bangladesh. To more accurately ascertain the prevalence of hypertension in cardiac diseases, further research is necessary.

Keyword: cardiovascular disease (CVD), hypertension, high blood pressure.

Introduction

A medical condition known as hypertension (HTN or HT), also known as high blood pressure (HBP), is a condition that lasts for an extended period of time and is characterized by persistently raised blood pressure in the arteries. In most cases, high blood pressure does not produce any noticeable symptoms. Primary high blood pressure, also known as essential high blood pressure, may be distinguished from secondary high blood pressure by its essential nature. Primary hypertension, which is defined as high blood pressure that is caused by nonspecific lifestyle and hereditary factors, accounts for around 90–95% of all cases. Lifestyle variables such as excessive salt in the diet, being overweight, smoking cigarettes, and drinking alcohol all contribute to an increased likelihood of developing the condition. The other 5–10% of instances are classified as having secondary high blood pressure. This kind of hypertension is described as having high blood pressure due to a recognized cause, such as chronic kidney disease, constriction of the renal arteries, an endocrine problem, or the use of birth control pills. [1][2]

Blood pressure is expressed as a combination of two measurements: the systolic pressure, which is the greatest pressure, and the diastolic pressure, which is the lowest pressure. At rest, a typical adult's blood pressure falls somewhere between 100 and 130 millimeters of mercury

(mmHg) on the systolic side, and between 60 and 80 mmHg on the diastolic side. The majority of persons are considered to have high blood pressure if their blood pressure at rest is consistently at or above 130/80 or 140/90 mmHg.

It would indicate that office-based blood pressure measurement is less accurate than ambulatory blood pressure monitoring performed one-on-one over the course of 24 hours. [2] More than two thirds of individuals who have hypertension call low- and middle-income countries (LMICs) home. This is despite the fact that hypertension being the leading risk factor for mortality and disability on a global scale. It is estimated that hypertension was the cause of 9.4 million deaths in 2010 as well as the loss of 162 million years of life. In addition to being the primary reason behind more than half of all cases of cardiovascular disease (CVD), stroke, and heart failure, hypertension is also a leading risk factor for fetal and maternal mortality during pregnancy, dementia, and renal failure. The prevalence of hypertension is increasing all across the globe, and it is projected that by the year 2025, it would affect more than 500 million individuals. [3] [4]

The burden of hypertension that it places on community health is significant, and it has a significant effect on the expenses of medical treatment, accounting for about 10% of the entire amount spent on medical care throughout the world. Individuals, families, healthcare institutions, and the state as a whole are all forced to shoulder a significant financial burden as a result of hypertension. Rapid urbanization, a rise in life expectancy, an unhealthy diet, and variations in lifestyle are some of the factors that have contributed to an increase in hypertension and cardiovascular diseases in recent years in South-East Asia, including Bangladesh. [3] The incidence of cardiac illnesses caused by hypertension is the primary focus of this investigation, the purpose of which is to determine its prevalence in Bangladesh.

Methodology

A total of 530 adults (aged 21 and above) from both rural and urban areas were selected at random for this cross-sectional research that took place in private hospitals throughout the Khulna region between January 2022 and January 2023. Eligible participants, with the exception of pregnant women and those taking certain medications, were told of the study's goals and provided informed permission. Following the WHO-STEPS procedure, we gathered information on things like levels of physical activity, family history of hypertension, diabetes, smoking, and income. Grade 1 (mild) hypertension was defined as 140-159/90-99 mmHg, Grade 2 (moderate) as 160-179/100-109 mmHg, and Grade 3 (severe) as 180/110 mmHg, in accordance with World Health Organization (WHO) regulations. Careful notations were made on a standard prepared sheet, and Windows software version 12.0 was used to evaluate the gathered information. Percentage prevalence rates of hypertension were calculated. Correlations were analyzed using correlation coefficients (r), and statistical significance was determined using unpaired t-tests and chi-square tests. To quantify individual risk estimates for hypertension using many independent risk variables, binary logistic regression was used. At the 95% confidence level (p 0.05), all statistical tests were considered to be significant.

Result

Table 1 illustrates the distribution of patient ages, revealing that the majority of both male and female patients fall within the (41-50) age bracket. For a more comprehensive view, please refer to the detailed figure below:

Table 1: Patient Age Distribution

Age group	Male, %	Female, %
21-30	5%	4.9%
31-40	8%	8.1%
41-50	56%	53%
51-60	21	22
61-70	10%	12%

Figure-2 depicts the gender breakdown of the clinic's patients, with males making up 18.1% more of the clinic's total patient population of 530. The following diagram is explained in further depth below:
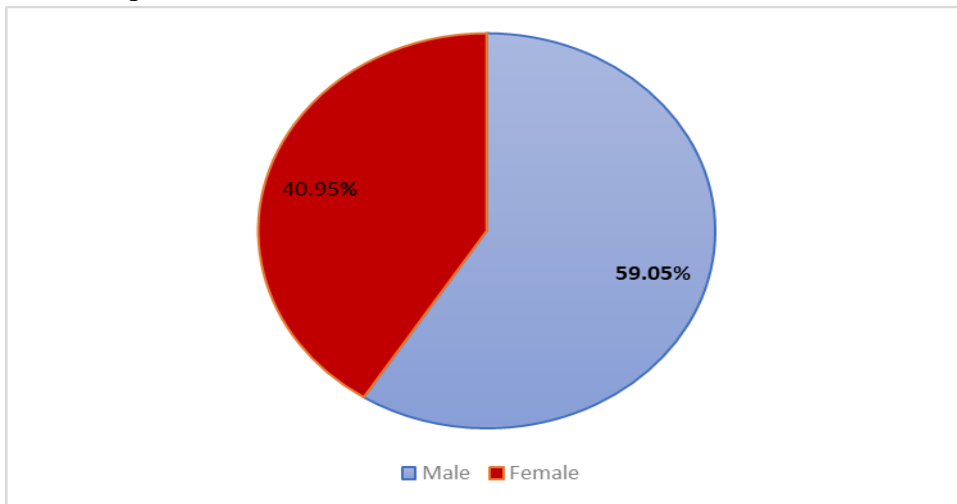
Figure-2: Gender distribution of the patients

Figure 3 depicts the percentage of individuals with hypertension compared to those without; 99 males and 64 females out of 530 are shown to be hypertensive. The following diagram is explained in further depth below:
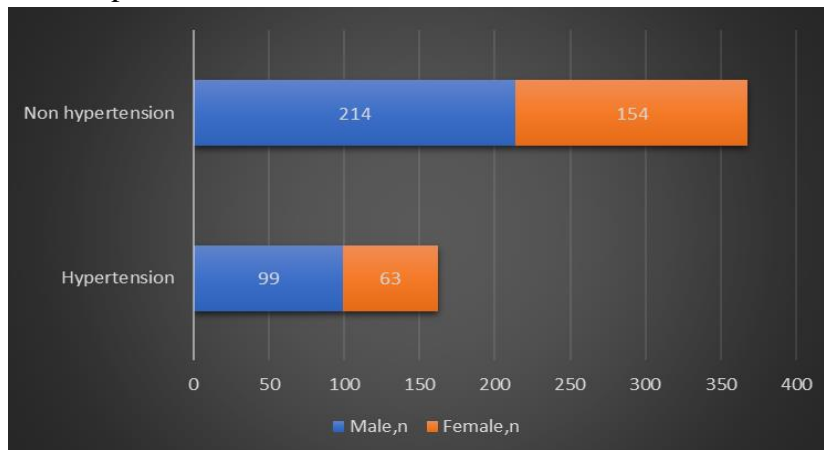
Figure-3: The frequency of hypertension and non-hypertension in the patients

Table 2 provides insights into the occurrence of both systolic and diastolic hypertension among the entire cohort of 530 study participants. Among these patients, 25.81% exhibited systolic hypertension, while 30.61% presented with diastolic hypertension. For a more detailed breakdown, please consult the comprehensive table below:

Table 2: Incidence of Systolic and Diastolic Hypertension in the Study Cohort.

Group	%
Systolic hypertension	25.81%
Non systolic hypertension	74.1%
Total	100%
Diastolic hypertension	30.61%.
Non diastolic hypertension	69.3%
Total	100%

Figure 4 displays the breakdown of patients by their location of residence, with 51% being from the country and 49% from the city. The following diagram is explained in further depth below:
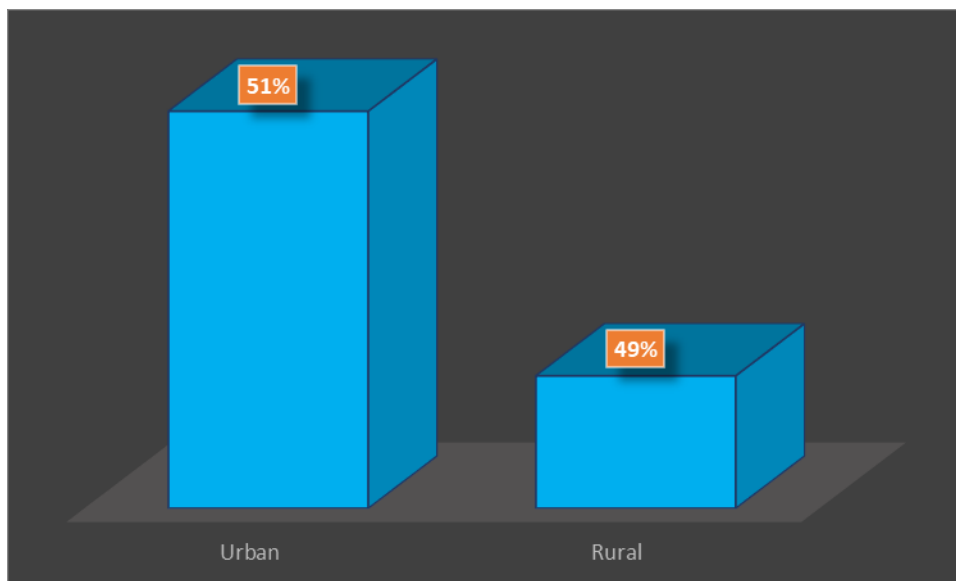

Figure-4: Distribution of patients according their living place

Table 3 presents the associations between hypertension and various factors, including family history, smoking, occupation, physical activity, annual income, obesity, BMI, gender, heart diseases, and age among patients. Notably, age and the presence of heart diseases exhibited a particularly robust correlation with hypertension compared to other variables. For comprehensive details, please refer to the detailed table below:

Table 3: Hypertension Correlations with Patient Characteristics

Correlation of hypertension with	r-value	p-value
Family history	-.228	<0.01
Smoking	-.126	<0.01
Income	-.131	<0.01
Occupation	.009	>0.05
Physical activity	-.141	<0.01
Obesity	-.284	<0.01
BMI	.276	<0.01
Gender	-.023	>0.05
Age	-.286	<0.01
Heart diseases	-.287	<0.01

Figure 4 displays the association between diastolic blood pressure and the 6-year incidence of coronary heart disease events in the Framingham Heart Study, stratified by total cholesterol level. Those with higher cholesterol levels showed a more significant increase in CHD event risk with DBP. The following diagram is explained in further depth below:
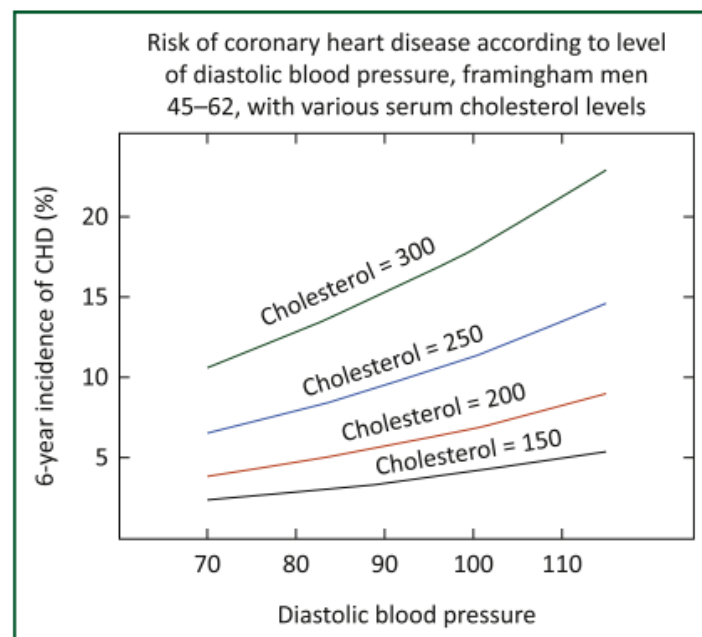
Figure-5: Relation of diastolic blood pressure stratified by total cholesterol level to 6-year incidence of coronary heart disease events. [5]

*Source by: https://www.banglajol.info/index.php/BHJ/article/view/32379

Discussion

In this research, the objective was to determine the prevalence of cardiovascular illnesses associated with hypertension in Bangladesh using a cross-sectional methodology. The most significant risk factor for cardiovascular disease (CVD), often known as heart disorders, is high blood pressure.

All of the patients in our research had their blood pressure monitored, and what we discovered was that the blood pressure of those who had hypertension was statistically considerably higher than the blood pressure of those who did not have hypertension. During the course of the research, we made the observation that the prevalence of hypertension found in this study was much greater than that found in the previous study. [6]

In Bangladesh, India, and other developing nations alike, hypertension has emerged as a significant threat to the general population's health. It is reasonable to anticipate that nations with an aging population would have a larger prevalence of hypertension than developing countries with younger populations, such as Bangladesh and India; yet, there are studies that have demonstrated a high prevalence rate of hypertension in developing countries [7].[8]. In addition, the results of our research demonstrated that the prevalence of hypertension increases with age in a manner that is consistent with the findings of previous research. [9]

According to the findings of this research, the incidence of hypertension was shown to be 99 times more common in males than in females (64 times), respectively. There was no statistically significant difference between male and female patients, despite the fact that the prevalence rate was much greater in males. According to the findings of our research, the prevalence of hypertension was greater among persons who had a high obesity level. The same conclusion was also reported in a number of other research that were carried out in various rural areas of India. In this research, we also found that patients who had positive cardiac disorders and heart diseases had a significant incidence of hypertension. Also hypertension had a substantial correlation with each other, which was corroborated by a number of studies confirming our result. In this research, we also noticed a significant frequency of hypertension among patients who tested positive for heart illnesses. Furthermore, we found that heart diseases and hypertension had a close correlation with one another, and other studies validated our finding.

During the course of the research, which included 530 patients in total, we discovered that systolic hypertension made up 25.81% of cases, while diastolic hypertension made up 30.61% of cases. However, one research found that individuals suffering from MI were more adversely impacted by high systolic blood pressure than by high diastolic blood pressure. It is possible that high systolic blood pressure causes damage to the endothelium, which in turn leads to increased atherosclerosis. It was previously known that elevated levels of blood triglycerides, total cholesterol, and LDL all contributed to an increased risk of cardiovascular disease.

According to the findings of another research, excessive salt consumption, along with factors such as age, body mass index (BMI), lack of physical exercise, smoking, and a family history of stroke or cardiovascular disease, was shown to have a substantial link with hypertension and pre-hypertension. [5] In addition, more than 35 million people in coastal Bangladesh are at risk due to the rising salinization of freshwater sources. Researchers have discovered that greater levels of salt in drinking water are connected with increased blood pressure in younger coastal populations. During the course of the investigation, we also discovered a positive association with this report. This was due to the fact that the majority of patients in the study were from rural areas, meaning that they were likely uninformed of the potentially dangerous impact that

salt may have on drinking water. There is a prevalent but not universally held assumption that the act of cooking may make salt innocuous, contributing to the general consensus that an excessive use of salt has a minimal danger overall. Consuming a lot of salt almost certainly leads to hypertension, which is known to be a risk factor for coronary artery disease (CAD).[10][11]

Conclusion

As a result of many findings, we are able to draw the conclusion that people in Bangladesh who have hypertension are more likely to develop cardiac illnesses. More research are needed to provide a more accurate assessment of the prevalence of hypertension in cardiovascular illnesses.

Reference:

1. Naish J, Court DS (2014). *Medical sciences* (2 ed.). p. 562. ISBN 9780702052491
2. Lackland DT, Weber MA (May 2015). "Global burden of cardiovascular disease and stroke: hypertension at the core". *The Canadian Journal of Cardiology*. 31 (5): 569–71. doi:10.1016/j.cjca.2015.01.009. PMID 25795106
3. Islam, Shiekh Mohammed Shariful, A. K. M. Mainuddin, Md Serajul Islam, Mohammad Azizul Karim, Sabrina Zaman Mou, Shamsul Arefin, and Kamrun Nahar Chowdhury. "Prevalence of risk factors for hypertension: A cross-sectional study in an urban area of Bangladesh." *Global Cardiology Science and Practice* (2015): 43.
4. Anand, Sonia S., Shofiqul Islam, Annika Rosengren, Maria Grazia Franzosi, Krisela Steyn, Afzal Hussein Yusufali, Matyas Keltai, Rafael Diaz, Sumathy Rangarajan, and Salim Yusuf. "Risk factors for myocardial infarction in women and men: insights from the INTERHEART study." *European heart journal* 29, no. 7 (2008): 932-940.
5. Islam AM, Mohibullah AK, Paul T. Cardiovascular disease in Bangladesh: a review. Bangladesh Heart Journal. 2016;31(2):80-99.
6. Sayeed MA, Khan AR, Banu A, Hussain MZ. Prevalence of diabetes and hypertension in a rural population of Bangladesh. Diabetes Care1995; 18: 555–558.
7. Nissien A, Bothig S, Grenroth H, Lopez AD. Hypertension in developing countries. World Health Stat Q 1988; 41: 141–154.
8. Reddy KS. Hypertension control in developing countries: generic issues. J Hum Hypertension 1996; 10: 33–38.
9. Chobanion AV, Bakris GL, Black HR. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. JAMA 2003; 289: 2560– 2572.
10. U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015–2020 Dietary Guidelines for Americans. 8th Edition. December 2015. Available at http://health.gov/ dietaryguidelines/2015/guidelines/ .Accessed September 17, 2016.
11. Rasheed S, Siddique AK, Sharmin T, Hasan AM, Hanifi SM, Iqbal M, et al. Salt intake and health risk in climate change vulnerable coastal Bangladesh: What role do beliefs and practices play? PLoS One. 2016 Apr 4;11(4):e0152783