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Original Research Article

Prevalence and Determinants of Hypertension among Adults Attending Outpatient Departments in Tertiary Care Hospitals

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Conflict of interest: Nil

Abstract:

Background: One of the main modifiable risk factors for cardiovascular morbidity and death is hypertension, a significant non-communicable illness. Even with its increasing burden, knowledge and control are still insufficient, especially in poorer nations.

Aim: The purpose of this study was to establish the incidence of hypertension and identify related risk factors among people accessing outpatient departments in a tertiary care hospital.

Methods: Over the course of a year, 120 people over the age of 18 who visited the outpatient department of Department of General Medicine, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India. participated in cross-sectional observational research. A standardized questionnaire was used to collect information on sociodemographic, lifestyle variables, and family history. Blood pressure was measured using normal methods, and hypertension was determined using the JNC VII criteria. Anthropometric measures were obtained to determine body mass index. Descriptive statistics and chi square tests were used to assess the data.

Results: Overall, 31.7% of people had hypertension. The prevalence of hypertension increased significantly with age, reaching 80% of people over 60. Males and females had similar rates of hypertension. Family history of hypertension (78.6%), obesity (55.8%), physical inactivity (54.3%), smoking (48.7%), and alcohol intake (46.5%) all showed significant correlations ($p < 0.05$).

Conclusion: The prevalence of hypertension is quite high and is closely linked to aging, genetic susceptibility, and lifestyle variables that can be changed. Early detection, lifestyle changes, and focused therapies are critical for reducing its long-term cardiovascular consequences.

Keywords: Hypertension, Prevalence, Determinants, Risk factors, Outpatient Department (OPD), JNC VII criteria, Anthropometric measures, non-communicable diseases (NCDs), Cardiovascular morbidity.

Introduction

High blood pressure is a significant risk factor for coronary and ischemic disease, as well as hemorrhagic stroke. The risk of stroke and coronary heart disease has been demonstrated to be strongly correlated with blood pressure levels [1]. Hypertension is one of the most controllable cardiovascular risk factors. However, low and middle-income countries (LMICs), like Ethiopia, have very poor levels of understanding on the management and control of hypertension. Furthermore, additional issues such as HIV/AIDS, TB, and malaria overburden LMICs' health care resources. As a result, many low- and middle-income countries have yet to devote adequate attention to their prevention and management [2].

Hypertension among young adults (18-24 years) and middle-aged people (25-44 years) has arisen as a major public health concern worldwide in recent decades. Hypertension, which is becoming more common, is one of the primary causes of mortality and disability globally [3]. Hypertension is responsible for 9.4 million deaths per year throughout the world [4]. In 2008, 28% of Indian individuals suffered from uncontrolled hypertension [5].

Hypertension has been referred to as a silent killer due to its lack of strong symptoms and possibly lethal consequences. It is impossible to overestimate the importance of early hypertension screening and therapy [6]. Even though young people have a lower incidence of hypertension than middle-aged adults and the elderly, early diagnosis and appropriate treatment of these cases may prevent future repercussions [7]. Furthermore, prehypertension, which is more prevalent in youth than full-blown hypertension, is a significant risk factor for the development of hypertension and cardiovascular disease in later life. When identified early, lifestyle modifications may reduce prehypertension, but not always

successfully [8]. Despite this, clinicians are less likely to administer antihypertensive medications to young individuals with hypertension than to older patients, and there is a shortage in prehypertension and hypertension screening among young people.

This is a crucial tool since lowering risk variables may help avoid hypertension and achieve better blood pressure control. The risk is increased by diets high in salt, excess body fat, inactivity, insufficient intake of fruits and vegetables, and excessive alcohol drinking [9]. Numerous studies have examined the prevalence of hypertension in aspiring physicians. Numerous epidemiological studies have been conducted on hypertension worldwide. According to this study, there are several serious conditions associated with high blood pressure, including stroke, coronary heart disease, congestive heart failure, and chronic kidney disease or reduced renal function. Due to risk factors including smoking and frequent intoxication, young individuals are more susceptible to hypertension.

Few studies have shown no connection between exercise and hypertension. Nonetheless, the types of inactivity listed are associated with hypertension [10]. If the systolic and diastolic blood pressure readings on two separate days are ≥140 mmHg and ≥90 mmHg, respectively, hypertension is diagnosed. In addition to improving quality of life, well-managed and controlled hypertension lowers the risk of complications such as heart failure, coronary artery disease, cerebrovascular disease, and chronic renal disease [11]. There are two types of risk factors for hypertension: those that can be changed and those that cannot. Diet, exercise, alcohol and tobacco use, and obesity or being overweight are among the modifiable risk factors. On the other hand, age over 65, a family history of hypertension, and the existence of other concomitant conditions such diabetes and chronic renal disorders are nonmodifiable risk factors [12].

The most severe type of poorly managed hypertension, termed as hypertensive crisis (HTNC), can occur in both people with known pre-existing hypertension and those who are unaware that they have the condition (i.e., have not yet received a diagnosis). In certain people, hypertensive crises may be the first sign of hypertension [13]. According to the existence or absence of immediate target organ damage, hypertensive emergency (HTN-E) and hypertensive urgency (HTN-U) are the two forms of hypertensive crisis, which is described as a significant and abrupt increase of blood pressure [14].

Methodology

Study Design: It was cross-sectional observational research carried out in a hospital environment to determine the prevalence of hypertension and the risk factors associated with hypertension among adult patients. There was no direct patient involvement or intervention throughout the trial; instead, previously recorded patient data was reviewed. The goal was to determine the prevalence of hypertension and the risk factors associated with it among adult patients.

Study Area: The study was carried out at Department of General Medicine, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India.

Study Duration: The research was conducted over a one-year period from January 2017 to December 2017.

Sample Size: The study included one hundred twenty adult patients who were 18 years or older. This sample size was determined based on practicality, hospital attendance, and previous research into the prevalence of hypertension in similar hospital settings. To eliminate selection bias, we employed simple random sampling to choose our patients.

Inclusion and Exclusion Criteria: The study included adult patients aged 18 and above who presented themselves in the outpatient department (OPD) for whatever reason, as long as they provided written informed consent to participate. Additionally, patients had to be critically ill and require immediate hospitalization, have known secondary causes of hypertension, such as renal artery stenosis or endocrine disorders, or have pregnancy-induced hypertension, which could complicate the results. By ensuring that the study's sample was appropriate for measuring primary hypertension and its risk factors, these inclusion criteria helped to minimize confounding variables.

Data Collection: A standardized questionnaire was used to gather demographic and clinical data, which included age, gender, employment, socioeconomic status, family history of hypertension, and lifestyle-related variables (smoking, alcohol use, physical activity), as well as nutrition.

Blood pressure and anthropometric measurements: Conventional methods were used to measure height and weight. The Body Mass Index (BMI) was computed as weight (kg)/height 2 (m2), and among Asian people, obesity was defined as BMI 25 kg/m2 or more. Blood pressure was recorded in a sitting position with a standard mercury sphygmomanometer at the end of a 5-minute rest interval, and two measures no less than 5 minutes apart were collected and averaged for analysis. According to JNC VII (2003), hypertension was classified as either antihypertensive medication or systolic blood pressure of 140 mmHg and diastolic blood pressure of 90 mmHg.

Study Procedure: This cross-sectional observational study was carried out over the course of a year in the outpatient department of the Department of General Medicine at Jawaharlal Nehru Medical College and Hospital in Bhagalpur, Bihar. After receiving written informed permission, 120 people who

were at least 18 years old and visiting the OPD were included using simple random selection. Patients with secondary causes of hypertension, pregnant women, and severely sick patients were not included. A systematic questionnaire was used to gather information on lifestyle variables, family history, and sociodemographic traits. BMI was calculated using anthropometric measures, and obesity was classified as BMI ≥25 kg/m². After five minutes of rest, a mercury sphygmomanometer was used to monitor blood pressure; the average of two readings was utilized. The JNC VII criteria were used to define hypertension. Descriptive statistics and chi square tests were used for statistical analysis; a p-value of less than 0.05 was deemed statistically significant.

Risk Factor Analysis: Physical inactivity (less than 150 minutes of moderate physical activity each week), smoking (present, former, or never), and alcohol usage were identified as risk factors in the lifestyle. Families with a good family history included those with one or more hypertensive parents or siblings.

Statistical Analysis: Descriptive statistics such as mean, standard deviation, frequency, and percentage were used to describe the demographic and clinical features of the study population. Chi-square tests were used to examine the relationship between hypertension and categorical risk variables, including gender, obesity, smoking, alcohol intake, physical activity, and family history. A p-value of less than 0.05 was deemed significant."

Result

The current study's goal was to ascertain the prevalence of hypertension in 120 adult patients in the outpatient department (OPD) and assess the risk variables associated with that frequency. Demographics, gender distribution, age-related factors, and the ways in which modifiable and non-modifiable risk factors affect blood pressure levels were among the many categories in which the analysis was conducted. In addition to identifying the major factors that may be connected to the development and aggravation of high blood pressure, the systematic review of these would help the research provide a deeper understanding of the burden of hypertension in this particular population. These lessons are very helpful in obtaining high-risk focused individualized management plans, early detection programs, and specific preventive measures. The distribution of patients by age and gender, the prevalence of hypertension by age group, and the statistical relationships between different risk factors and high blood pressure are all summarized in the following tables, which will help paint a clear picture of the causes and trends of hypertension in this outpatient population.

The age distribution of patients is shown in Table 1, which sheds light on the study population's demographics. The study involved 120 patients in total. The age range of 41–50 years old accounted for the biggest percentage of patients (40%), suggesting that middle-aged adults make up the majority of outpatient patients. Patients between the ages of 31 and 40, who made up 35% of the total, and those between the ages of 18 and 30, who made up 30%, came next, indicating a significant presence of younger and early middle-aged people. On the other hand, only 10% of patients were in the 51–60 age range and 5% were over 60, making up a comparatively lower percentage of the research population. Overall, people between the ages of 31 and 50 emerged as the most often impacted group, despite the fact that patients were spread throughout a wide range of age groups. When evaluating the research population's risk patterns for hypertension and similar lifestyle-related health concerns, this tendency might be important.

Table 1: Distribution of Patients by Age Group

Age Group (years)	Number of Patients	Percentage (%)
18–30	30	25
31–40	35	29.2
41–50	40	33.3
51–60	10	8.3
>60	5	4.2
Total	**120**	**100**

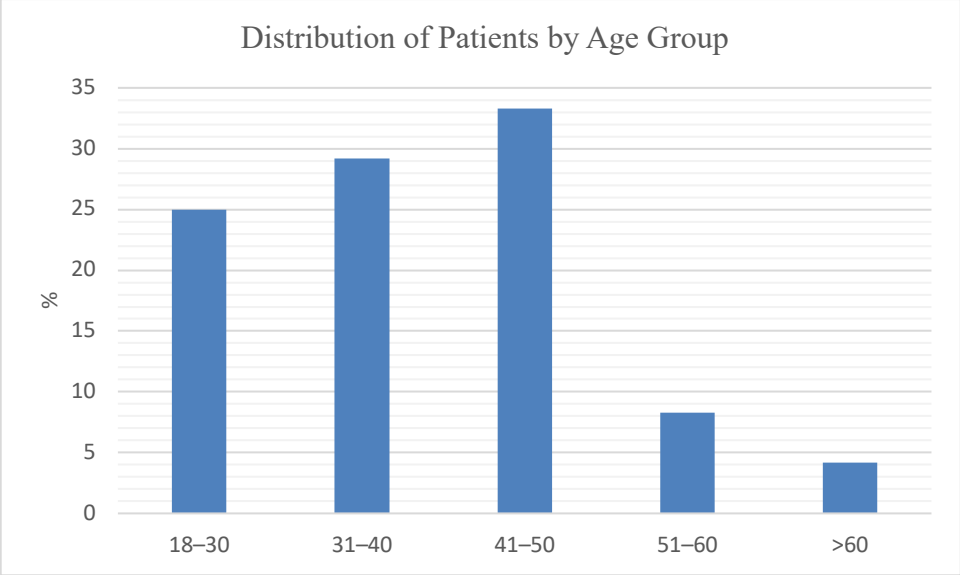

Figure 1: Distribution of Patients by Age Group

The distribution of hypertension among patients by gender is shown in Table 2, which sheds light on potential variations in prevalence by gender. 38 of the 120 participants in the study were found to have hypertension, whereas the remaining 82 did not. Twenty patients (31.3%) and forty-four (68.7%) of the male participants had hypertension and non-hypertension, respectively. In a similar vein, 38 patients (67.9%) and 18 patients (32.1%) of the female participants did not have hypertension. These results show that the prevalence of hypertension is almost equal in men and women, with a slightly larger percentage found in female participants. In general, the distribution of people with and without hypertension is still quite equal for both sexes. This implies that gender may not be a substantial independent risk factor for hypertension, highlighting the necessity of frequent blood pressure screening and preventive treatments for both men and women, regardless of gender.

Table 2: Distribution of Hypertension by Gender

Gender	Hypertensive	Non-hypertensive	Total
Male	20	44	64
Female	18	38	56
Total	**38**	**82**	**120**

Table 3 shows how hypertension is distributed among various age groups and shows a distinct upward trend with age. Only 13.3% of participants in the youngest age group (18–30 years old) had hypertension, showing a comparatively modest burden of high blood pressure in early adulthood. As people entered middle age, this incidence gradually rose to 22.9% in the 31–40 age range. 40% of participants in the 41–50 age group showed a significant rise, indicating a crucial time for the onset of hypertension. With 60% of people in the 51–60 age range and 80% of people over 60 reporting having hypertension, the trend became more noticeable in older age groups. Overall, our results point to a significant positive association between age and hypertension, highlighting growing older as a significant non-modifiable risk factor for the onset of high blood pressure.

Table 3: Prevalence of Hypertension Across Different Age Groups

Age Group (years)	Total Patients	Hypertensive	Percentage (%)
18–30	30	4	13.3
31–40	35	8	22.9
41–50	40	16	40
51–60	10	6	60
>60	5	4	80
Total	**120**	**38**	—

Note: It should be noted that there were only five volunteers above the age of 60, four of whom had hypertension.

Table 4 illustrates statistically significant correlations between the distribution of hypertension among people with different risk factors. People

with a positive family history of hypertension had the highest frequency of the condition (78.6%), suggesting a strong genetic propensity. With 55.8% of people with a body mass index of ≥25 being categorized as hypertensive, obesity appeared as a significant modifiable risk factor. The prevalence of physical inactivity was similarly high, affecting 54.3% of sedentary people, highlighting the influence of lifestyle factors on blood pressure regulation. With prevalence rates of 48.7% and 46.5%, respectively, smoking and alcohol use were also linked to higher rates of hypertension, indicating their potential role in raising cardiovascular risk. Family history, obesity, and physical inactivity showed very high levels of statistical significance ($p < 0.001$), whereas all observed relationships were statistically significant ($p < 0.05$). These results underline the significance of targeted risk assessment, lifestyle modification, and close monitoring of high-risk individuals, especially those with a positive family history. They also highlight the combined influence of genetic susceptibility and modifiable lifestyle factors in the pathogenesis of hypertension.

Table 4: Association of Risk Factors with Hypertension

Risk Factor	Hypertensive (%)	p-value
Obesity (BMI ≥ 25)	55.8	<0.001
Physical inactivity	54.3	<0.001
Smoking	48.7	0.018
Alcohol consumption	46.5	0.049
Family history of HTN	78.6	<0.001

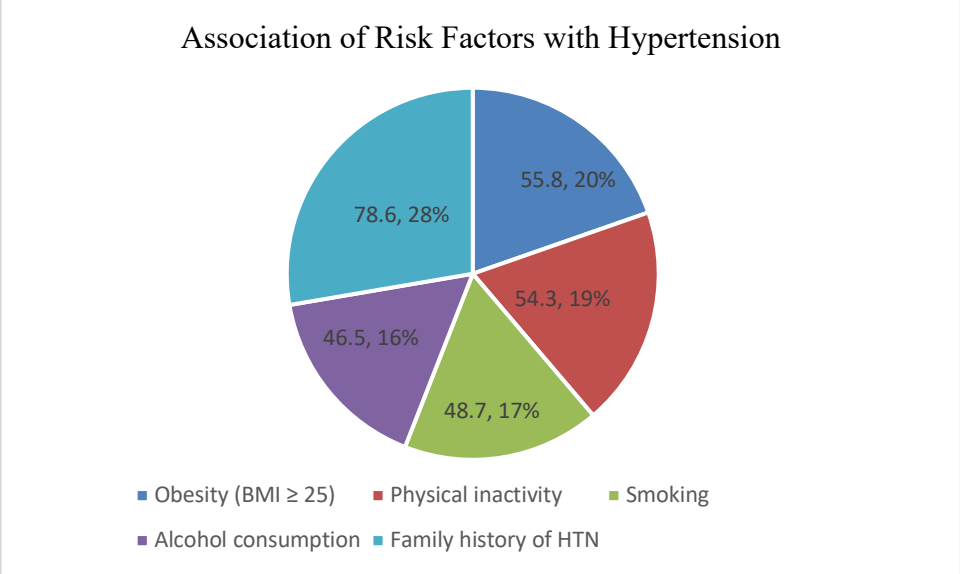

Figure 2: (Risk Factors with Hypertension)

Discussion

The total prevalence of hypertension among patients visiting the outpatient department in the current study was found to be 31.7%, suggesting a significant burden of hypertension in the studied group. This result demonstrates that hypertension is still a significant public health issue in semi-urban and rural areas. The prevalence found in this study is within the range reported in earlier studies carried out in various rural areas of India, where estimates of the incidence of hypertension have ranged greatly from lower to greater [15]. Variations in geographic location, food habits, socioeconomic level, lifestyle patterns, and methodological issues like age group composition and the diagnostic criteria used to define hypertension may all contribute to this variation across studies".

The current investigation found a statistically significant correlation between rising age and hypertension. From 13.3% in the 18–30 age group to 80% in those over 60, the prevalence of hypertension rose steadily across all age categories. This age-related pattern is in line with results from several Indian research, supporting the idea that growing older is a significant non-modifiable risk factor for hypertension [16, 17]. The greater prevalence seen in older age groups may be explained by age-related metabolic changes, cumulative exposure to risk factors, and degenerative vascular abnormalities.

Males had a slightly greater prevalence of hypertension (31.3%) than females (32.1%), however this difference was not statistically significant. Several previous research have shown similar findings, implying that gender variations in hypertension

prevalence may be affected by sociocultural factors, health seeking behavior, and sample characteristics rather than biological causes [18, 19].

78.6% of those with a positive family history of hypertension were found to be hypertensive in the current investigation, demonstrating a substantial and statistically significant correlation between the two conditions. This emphasizes how shared environmental conditions and genetic predisposition contribute to the development of hypertension. People with a family history should be given priority for early screening and preventative measures because they are a high-risk population [20].

Obesity (BMI ≥25) was found to be a substantial risk factor for hypertension, with 55.8% of overweight and obese people having hypertension. This result confirms the well-established connection between high blood pressure and excess body weight. In a similar vein, over half of sedentary people had hypertension, which was strongly linked to physical inactivity [21]. This highlights the significance of consistent physical activity in controlling blood pressure.

In this study, lifestyle factors such as smoking and alcohol use were found to be strongly linked with hypertension, however the level of correlation was lower than that identified for obesity and physical inactivity. Smoking promotes sympathetic activity and endothelial dysfunction, whereas alcohol intake contributes to high blood pressure via a variety of physiological pathways. These results highlight the cumulative cardiovascular risk associated with bad lifestyle choices.

Overall, the findings of this study show that hypertension is a complex disorder influenced by both non-modifiable factors like age and family history, as well as modifiable factors like obesity, physical inactivity, smoking, and alcohol consumption. The significant correlations shown underscore the necessity of all-encompassing approaches that emphasize early detection, lifestyle adjustment, and focused monitoring of high-risk individuals, especially older persons and those with a positive family history of hypertension.

Conclusion

This study offers a thorough evaluation of the prevalence and risk factors for hypertension in the study population, emphasizing the important impact of age, genetic predisposition, and risk factors related to lifestyle. The overall prevalence of hypertension was 31.7%, suggesting that even in a society that is somewhat diverse, high blood pressure remains a significant public health concern. The prevalence of hypertension was shown to climb steadily with age, with young persons (18–30 years old) having the lowest rates and those over 60 having the highest. This age-related gradient emphasizes the necessity of early screening and preventative treatments prior to middle age and firmly supports growing older as a significant non-modifiable risk factor. Strong and statistically significant correlations between hypertension and behavioral and genetic factors were found when related risk factors were analyzed. The strongest predictor was a positive family history of hypertension, indicating the importance of genetic susceptibility. Obesity and physical inactivity had notably high prevalence rates among modifiable factors, highlighting the crucial role that bad lifestyle choices have in controlling blood pressure. Alcohol use and smoking were also strongly linked to hypertension, which increased the risk of cardiovascular disease over time. Overall, the results support the complex character of hypertension and emphasize the necessity of integrated public health approaches that emphasize early detection, lifestyle adjustment, and focused monitoring of high-risk patients in order to lower long-term cardiovascular consequences.

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