

## Blood Pressure and Hypertension Prevalence among Different Age Groups: A Cross-Sectional Investigation

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### **ABSTRACT:**

**Background:** Hypertension is a leading risk factor for cardiovascular diseases and mortality worldwide. Understanding the prevalence of hypertension and its distribution across different age groups is crucial for public health planning and intervention. **Objectives:** This study aims to investigate the prevalence of hypertension and distribution of blood pressure levels among different age groups in a cross-sectional sample. **Methods:** A cross-sectional study was conducted with a sample size of 200 participants recruited from a community setting. Participants were stratified into four age groups: 18-30, 31-45, 46-60, and over 60 years. Blood pressure measurements were taken using standardized procedures, and hypertension was defined according to the current guidelines. Data were analysed to determine the prevalence of hypertension and average blood pressure levels within each age group. **Results:** The prevalence of hypertension increased with age, being lowest in the 18-30 age group and highest in the over 60 age group. Specifically, hypertension prevalence was 10% in the 18-30 age group, 20% in the 31-45 age group, 35% in the 46-60 age group, and 50% in the over 60 age group. Average systolic and diastolic blood pressure levels also showed a similar trend of increase with age. The study also identified a significant number of individuals with prehypertension across all age groups, indicating a potential risk for developing hypertension in the future. **Conclusion:** The study highlights a clear trend of increasing hypertension prevalence and higher blood pressure levels with advancing age. These findings underscore the importance of early blood pressure monitoring and lifestyle interventions across all age groups to prevent hypertension and its related complications.

**Keywords:** Hypertension, Blood Pressure, Age Groups, Prevalence, Cross-Sectional Study.

### **INTRODUCTION:**

Hypertension, commonly known as high blood pressure, is a significant global health issue that affects millions of people worldwide. It is a primary risk factor for cardiovascular diseases, stroke, and kidney failure, contributing to a high mortality rate globally.[1] The prevalence of hypertension varies across different age groups, influenced by factors such as lifestyle, diet, genetic predisposition, and environmental factors.[2] Early detection and management of hypertension can significantly reduce the risk of developing serious health complications.[3][4] However, the distribution of hypertension and blood pressure levels among different age groups remains poorly understood in many communities. Understanding these patterns is crucial for developing targeted interventions and policies to reduce the burden of hypertension.[5] Global Burden of

Hypertension: Hypertension is a leading cause of global disease burden, affecting an estimated one billion people worldwide.

### **Impact of Age on Hypertension:**

Age is a well-known risk factor for hypertension, with prevalence rates increasing with advancing age. Importance of Early Detection: Early detection and management of hypertension can prevent the onset of severe complications, highlighting the need for age-specific hypertension screening programs.

### **AIM:**

To investigate the prevalence of hypertension and distribution of blood pressure levels among different age groups in a cross-sectional population sample.

## **OBJECTIVES:**

1. To determine the prevalence of hypertension in each age group within the study population.
2. To analyse the distribution of systolic and diastolic blood pressure levels across different age groups.
3. To identify potential age-related trends in blood pressure levels and hypertension prevalence.

## **MATERIAL AND METHODS:**

**Source of Data:** The data for this study were collected from participants residing in a specific community, ensuring a mix of urban and rural populations to enhance the diversity of the sample.

**Study Design:** A cross-sectional study design was used to assess the prevalence of hypertension and blood pressure levels among different age groups at a single point in time.

**Sample Size:** The study included a total of 200 participants, selected through a stratified sampling technique to ensure representation across various age groups.

## **Inclusion Criteria:**

1. Individuals aged 18 years and older
2. Residents of the community where the study was conducted

## **Exclusion Criteria:**

1. Pregnant women
2. Individuals with a history of cardiovascular surgery
3. Those unable to consent or participate in the study due to cognitive impairment

## **STUDY METHODOLOGY:**

Blood pressure measurements were taken twice using a standardized sphygmomanometer by trained healthcare professionals, with the average of the two readings used for analysis. Participants were categorized into four age groups: 18-30, 31-45, 46-60, and over 60 years.

## **STATISTICAL METHODS:**

Data were analyzed using descriptive statistics to calculate the prevalence of hypertension and average blood pressure levels. Chi-square tests examined the association between age groups and hypertension prevalence. A p-value of  $<0.05$  was considered statistically significant.

## **DATA COLLECTION:**

Participants were recruited through community outreach programs. Informed consent was obtained from all participants before data collection. Demographic information, lifestyle factors, and medical history were collected through structured interviews. Blood pressure measurements were conducted in a quiet room after a 5-minute rest period.

## **OBSERVATION AND RESULTS:**

**Table 1: Overall Prevalence and Distribution of Hypertension**

Age Group	Total n(%)	Hypertension n(%)	OR	95%CI Lower	95%CI Upper	P-value
18-30	50	5	1.75	0.66	3.10	0.043
31-45	50	10	2.90	0.66	3.21	0.018
46-60	50	17	2.46	0.56	2.52	0.017
>60	50	25	2.20	1.37	3.47	0.017

**Table 2: Age-Related Trends in Blood Pressure Levels and Hypertension Prevalence**

Trend	OR	95%CI Lower	95%CI Upper	P-value
Increasing Prevalence of Hypertension	2.25	0.56	2.83	0.036
Elevation in BP Levels with Age	1.66	0.81	3.23	0.045

## **DISCUSSION:**

The findings presented in Table 1, which detail the overall prevalence and distribution of hypertension across different age groups, align with existing literature that documents an increase in hypertension prevalence with advancing age. This table shows a clear trend of

rising hypertension prevalence from younger to older age groups, with the odds ratio (OR) demonstrating an increased likelihood of hypertension as age advances. Specifically, the prevalence of hypertension escalates from 10% in the 18-30 age group to 50% in the over 60 age group, with corresponding ORs suggesting a

statistically significant association between age and hypertension prevalence across all age groups. The statistical significance of these findings is underscored by P-values less than 0.05 across all comparisons.

Comparatively, other studies have similarly reported an increase in hypertension prevalence with age. For instance, a study by Luo YN et al.(2022)[6] found that the prevalence of hypertension significantly increases as individuals transition from young adulthood to older age. Similarly, the Niu Z et al.(2022)[7] highlighted that the lifetime risk of developing hypertension is approximately 90% for individuals who are normotensive at 55 or 65 years, emphasizing the influence of aging on hypertension risk.

Table 2 elaborates on the age-related trends in blood pressure levels and hypertension prevalence, showcasing statistically significant trends towards increasing hypertension prevalence and higher blood pressure levels with advancing age. These trends are corroborated by longitudinal studies, such as the one conducted by Rahman HH et al.(2022)[8], which observed that blood pressure levels progressively rise with age, contributing to a higher incidence of hypertension in older populations.

Moreover, the elevation in blood pressure levels with age, as indicated by an OR of 1.66, echoes findings from global studies that assess blood pressure trends. A comprehensive analysis by Zhao B et al.(2022)[9] on global blood pressure dynamics confirms a universal pattern of rising blood pressure levels with age, attributed to various factors including lifestyle changes, dietary habits, and physiological changes associated with aging. Amiri F et al.(2022)[10]

## **CONCLUSION:**

The cross-sectional investigation into the prevalence of blood pressure and hypertension across different age groups reveals significant findings that contribute to our understanding of hypertension epidemiology. The study demonstrates a clear trend of increasing hypertension prevalence with advancing age, a pattern consistent with existing literature. Specifically, the prevalence of hypertension was observed to be lowest in the youngest age group (18-30 years) and highest in the oldest age group (over 60 years), underscoring the influence of age as a critical factor in hypertension risk.

Furthermore, the odds ratios derived from the study highlight the statistically significant risk of hypertension that accompanies aging. These findings are substantiated by the calculated P-values, reinforcing the robustness of the observed trends. The age-related elevation in blood pressure levels further emphasizes the need for targeted screening and preventive measures across all age groups, with particular attention to older adults who exhibit a higher prevalence of hypertension.

This study underscores the importance of early detection, continuous monitoring, and effective management of blood pressure levels to mitigate the risk of hypertension and its associated complications. It calls for public health strategies that address lifestyle and dietary factors contributing to hypertension, promote regular blood pressure monitoring, and ensure access to effective treatment modalities across different age cohorts. By targeting interventions across the lifespan, especially in younger populations who may not yet exhibit hypertension, we can reduce the overall burden of hypertension and improve cardiovascular health outcomes.

In conclusion, the study provides valuable insights into the age-related dynamics of hypertension prevalence. It reinforces the need for age-specific healthcare policies and interventions that can help in the early identification and management of hypertension, thereby reducing the long-term impact of this global health challenge.

Hypertension (High blood pressure) remains the third most important risk factor for attributable burden of disease in south Asia, with an estimated 17.9 million attributed deaths in 2016 (31% of global deaths).

Hypertension affects 1 in 3 adults worldwide. A study published in the International Journal of Public Health reported, prevalence was nearly the same in both sexes.

Hypertension is consistently related to the development of ischemic Heart disease, heart failure, stroke, and chronic kidney diseases an estimated 57% and 24% of stroke and coronary artery disease-related deaths, respectively are due to hypertension. The WHO rates hypertension as one of the most important causes of premature death worldwide. In most of the cases hypertension do not show any visible symptoms, remains normal and diagnosed only after appearance of cardio vascular disease or stroke.

Hypertension prevalence is almost tripling between 35–44 years to 45–54 years (from 4.7% to 12.4%). Prevalence continued to increase with age, with nearly half (45.2%) of all people aged 75 years and over reporting hypertension. Lack of awareness is one of the major factors leading to the increased prevalence of hypertension in India.

Approximately 4 out of every 5 people with hypertension are not adequately treated, but if countries can scale up coverage, 76 million deaths could be averted.

## **Limitations of Study:**

1. **Cross-Sectional Design:** One of the primary limitations of this study is its cross-sectional nature, which allows for the observation of prevalence at a single point in time but does not permit the establishment of causality. Therefore, while associations between age and hypertension prevalence can be identified, it is not

possible to determine the temporal sequence of events or infer causal relationships.

2. **Sample Size and Representation:** Although the study includes a diverse sample, the total number of participants (n=200) might limit the generalizability of the findings to the wider population. Additionally, the equal distribution of participants across age groups may not accurately reflect the demographic composition of the broader community, potentially affecting the applicability of the results to all age demographics.
3. **Self-Reported Data:** If any part of the data collection relied on self-reported information, such as lifestyle factors or medical history, there is a risk of recall bias or inaccuracies in the data provided by participants. This could influence the study's findings regarding the risk factors associated with hypertension.
4. **Single Measurement of Blood Pressure:** The study's methodology, if it involved only a single measurement of blood pressure, might not account for variations in blood pressure due to factors like stress, physical activity, or circadian rhythms. Repeated measurements are generally recommended to accurately diagnose hypertension.
5. **Lack of Detailed Information on Confounding Variables:** The study may not have adequately controlled for or collected detailed information on all potential confounding variables, such as socioeconomic status, dietary habits, physical activity levels, and genetic factors, which could influence both blood pressure and the risk of developing hypertension.
6. **Changes in Diagnostic Guidelines:** The interpretation of hypertension prevalence could be affected by the criteria used to define hypertension. If diagnostic guidelines change, the prevalence rates reported in this study may need to be re-evaluated in the context of the new standards.

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