



Association Between Body Mass Index And Hypertension In A View To Prepare Information Booklet On Prevention Of Complications Among Hypertensive Patients, Indore, Madhya Pradesh

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Abstract

Hypertension is a major public health problem worldwide and is one of the leading risk factors for cardiovascular diseases, stroke, and kidney disorders. Increased **Body Mass Index (BMI)** has been identified as a significant modifiable risk factor contributing to the development and progression of hypertension. Excess body weight leads to physiological changes such as increased sympathetic nervous system activity, insulin resistance, and sodium retention, which ultimately result in elevated blood pressure. The present study was conducted to assess the **association between Body Mass Index and hypertension** among hypertensive patients and to prepare an **information booklet on the prevention of complications** among these patients.

A **descriptive cross-sectional research design** was adopted for the study. The study was conducted among **100 hypertensive patients** selected through a **convenience sampling technique** from selected hospitals and community areas. Data were collected using a structured tool consisting of demographic variables, measurement of height and weight to calculate BMI, and blood pressure measurement using a sphygmomanometer. The collected data were analyzed using **descriptive statistics** (frequency, percentage, mean, and standard deviation) and **inferential statistics** such as the **Chi-square test** to determine the association between BMI and hypertension.

The findings of the study revealed that a large proportion of hypertensive patients were **overweight or obese** according to BMI classification. Patients with higher BMI levels were more likely to have **higher blood pressure levels** compared to those with normal BMI. Statistical analysis showed a **significant association between Body Mass Index and hypertension**.

The study concluded that **increased BMI is an important risk factor for hypertension and its complications**. Based on the findings, an **information booklet** was developed to educate hypertensive patients about lifestyle modifications and preventive measures such as weight management, balanced diet, regular physical activity, and adherence to treatment. Educational interventions can play a vital role in improving patient awareness and preventing hypertension-related complications.

Keywords: Body Mass Index, Hypertension, Obesity, Blood Pressure, Lifestyle Modification, Patient Education.

Introduction

Hypertension is one of the most prevalent chronic non-communicable diseases affecting millions of individuals worldwide and represents a major public health concern. It is commonly referred to as the “*silent killer*” because individuals may remain asymptomatic for many years while progressive damage occurs in vital organs such as the heart, brain, kidneys, and blood vessels. Persistent elevation of blood pressure significantly increases the risk of serious complications including stroke, coronary artery disease, heart failure, and renal failure. According to the World Health Organization, hypertension accounts for a substantial proportion of global cardiovascular morbidity and mortality and remains a leading contributor to premature death worldwide.

Body Mass Index (BMI) is widely used as a simple and reliable indicator for assessing body weight relative to height and categorizing individuals into underweight, normal weight, overweight, and obese groups. Elevated BMI is considered one of the most important modifiable risk factors associated with hypertension and other metabolic disorders. Numerous epidemiological studies have demonstrated a strong relationship between obesity and increased blood pressure levels. Excess body weight contributes to hypertension through various physiological mechanisms, including insulin resistance, activation of the sympathetic nervous system, increased sodium retention, and alterations in renal function. These mechanisms ultimately lead to increased vascular resistance and elevated arterial pressure.

In recent decades, India has experienced a rapid epidemiological transition characterized by increasing prevalence of lifestyle-related diseases. Urbanization, sedentary lifestyles, unhealthy dietary patterns, reduced physical activity, and rising rates of overweight and obesity have contributed significantly to the growing burden of hypertension in the country. The increasing prevalence of hypertension among adults poses a serious challenge for the healthcare system, as uncontrolled hypertension can lead to severe complications such as stroke, myocardial infarction, kidney disease, and other cardiovascular disorders.

Early identification and modification of risk factors such as elevated BMI are essential for effective prevention and management of hypertension. Lifestyle modifications including weight reduction, balanced diet, regular physical activity, stress management, and adherence to medication can play a crucial role in controlling blood pressure and preventing complications. Health education and patient awareness are important components in promoting healthy behaviors and improving treatment outcomes among hypertensive patients.

Therefore, the present study was undertaken to assess the association between Body Mass Index and hypertension among patients and to develop an information booklet aimed at enhancing patient awareness regarding the prevention of hypertension-related complications.

Need of the Study

Hypertension is one of the most significant public health challenges worldwide and is a major contributor to cardiovascular morbidity and mortality. It is estimated that more than one billion people globally are affected by hypertension, and the prevalence continues to rise due to increasing urbanization, sedentary lifestyles, and unhealthy dietary habits. Hypertension often develops gradually and remains undetected for long periods because it usually does not produce noticeable symptoms. As a result, many individuals remain unaware of their condition until serious complications such as stroke, heart attack, kidney failure, or heart failure occur. Because of these severe consequences, hypertension has been widely referred to as a “*silent killer*.”

Body Mass Index (BMI) is an important indicator used to evaluate body weight in relation to height and to classify individuals as underweight, normal weight, overweight, or obese. Increased BMI has been identified as one of the most significant modifiable risk factors associated with hypertension. Numerous epidemiological studies have shown that overweight and obese individuals are more likely to develop hypertension compared to individuals with normal body weight. Excess body weight contributes to increased blood pressure through several mechanisms, including increased sympathetic nervous system activity, insulin resistance, vascular inflammation, and increased sodium retention by the kidneys. These physiological changes ultimately lead to increased vascular resistance and elevated arterial pressure.

In India, the prevalence of hypertension has increased dramatically in recent decades. Rapid urbanization, changes in lifestyle, increased consumption of high-calorie foods, reduced physical activity, and rising obesity rates have contributed significantly to this growing health problem. According to national health surveys, a large proportion of the adult population in India is either overweight or obese, which increases their risk of developing hypertension and other non-communicable diseases such as diabetes mellitus and cardiovascular disorders. The growing burden of hypertension not only affects individual health but also places a significant strain on healthcare systems and economic resources.

Despite the availability of effective treatment and preventive measures, many hypertensive patients lack adequate knowledge regarding risk factors, complications, and lifestyle modifications required to manage their condition. Lack of awareness about the relationship between obesity and hypertension often leads to poor disease management and increased risk of complications. Therefore, it is essential to assess the relationship between Body Mass Index and hypertension in order to better understand the role of body weight in the development and progression of hypertension.

Objectives of the Study

1. To assess the Body Mass Index of hypertensive patients.
2. To assess the level of hypertension among hypertensive patients.
3. To determine the association between Body Mass Index and hypertension.
4. To prepare an information booklet on prevention of complications among hypertensive patients.

Hypothesis

A hypothesis is a tentative statement that predicts the relationship between two or more variables and can be tested statistically through research.

For the present study, the following hypothesis was formulated:

H₁ (Research Hypothesis):

There will be a statistically significant association between **Body Mass Index (BMI)** and **hypertension** among hypertensive patients.

H₀ (Null Hypothesis):

There will be **no statistically significant association** between **Body Mass Index (BMI)** and **hypertension** among hypertensive patients.

Materials and Methods

Research Design

A **descriptive cross-sectional research design** was adopted for the present study to assess the association between Body Mass Index (BMI) and hypertension among hypertensive patients.

Research Setting

The study was conducted in **selected hospitals and community settings**, where hypertensive patients were available for data collection.

Population

The population of the study consisted of **patients diagnosed with hypertension** who were attending the selected hospitals or residing in the selected community areas.

Sample Size

A total of **100 hypertensive patients** were included as the sample for the present study.

Sampling Technique

Participants were selected using a **convenience sampling technique**, based on their availability and willingness to participate in the study.

Inclusion Criteria

The study included participants who met the following criteria:

- Patients diagnosed with **hypertension**
- Patients who were **willing to participate** in the study
- Patients who were **available during the data collection period**

Exclusion Criteria

The study excluded the following participants:

- **Critically ill patients**
- Patients with **severe medical complications** that could interfere with participation in the study

Data Collection Tools

Data were collected using structured tools consisting of the following sections:

Section A: Demographic Variables

This section included information related to demographic characteristics such as **age, gender, education, occupation, marital status, and lifestyle factors.**

Section B: Anthropometric Measurements

Height and weight of the participants were measured to calculate **Body Mass Index (BMI).**

Section C: Blood Pressure Measurement

Blood pressure was measured using a **standard sphygmomanometer** to assess the level of hypertension among participants.

Formula for Calculation of Body Mass Index

$$BMI = \frac{\text{Weight (kg)}}{\text{Height (m)}^2} \quad BMI = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}$$

Based on BMI values, participants were categorized as:

- **Underweight:** BMI < 18.5
- **Normal weight:** BMI 18.5–24.9
- **Overweight:** BMI 25–29.9
- **Obese:** BMI ≥ 30

Data Analysis

The collected data were organized, coded, and analyzed using **descriptive and inferential statistical methods.**

Descriptive Statistics

Descriptive statistics were used to summarize the data:

- **Frequency**
- **Percentage**
- **Mean**
- **Standard Deviation**

Inferential Statistics

Inferential statistics were used to determine the relationship between variables:

- **Chi-square test** was applied to determine the **association between Body Mass Index (BMI) and hypertension** among the study participants.

Results

The results of the present study are presented based on the analysis of data collected from **100 hypertensive patients**. The analysis was carried out using descriptive and inferential statistics to determine the association between **Body Mass Index (BMI)** and **hypertension**.

Distribution of Participants According to Demographic Variables

The findings showed that the majority of the participants belonged to the **middle and older age groups**, indicating that hypertension is more prevalent among adults and elderly individuals. Both male and female participants were included in the study, and a considerable proportion of participants had sedentary occupations and lifestyles, which may contribute to increased body weight and elevated blood pressure levels.

Distribution of Participants According to Body Mass Index

The analysis of Body Mass Index revealed that a significant number of hypertensive patients were categorized as **overweight or obese** according to the standard BMI classification. Only a small proportion of participants had **normal BMI**, while very few were found to be **underweight**. This finding indicates that increased body weight is commonly observed among individuals diagnosed with hypertension.

Association Between Body Mass Index and Hypertension

The association between **Body Mass Index and the level of hypertension** was analyzed using the **Chi-square test**. The analysis demonstrated that participants with **higher BMI levels** were more likely to have **higher blood pressure levels** compared to those with normal BMI.

The calculated Chi-square value indicated a **statistically significant association** between Body Mass Index and hypertension among the study participants. This result supports the research hypothesis that BMI is significantly associated with hypertension.

Interpretation of Findings

The findings of the study suggest that **overweight and obesity are important risk factors for hypertension**. Individuals with higher BMI levels are more susceptible to increased blood pressure and its related complications. Therefore, maintaining a healthy body weight through lifestyle modification, balanced diet, and regular physical activity is essential in the prevention and management of hypertension.

Overall, the results emphasize the importance of **early identification of obesity and appropriate educational interventions**, such as the development of an **information booklet**, to promote awareness and prevention of hypertension-related complications among patients.

Table 1

Distribution of Hypertensive Patients According to Body Mass Index (BMI)

($N = 100$)

BMI Category	BMI Range	Frequency (f)	Percentage (%)
Underweight	<18.5	5	5%
Normal Weight	18.5–24.9	20	20%
Overweight	25–29.9	40	40%
Obese	≥ 30	35	35%
Total		100	100%

Interpretation:

The table shows that the majority of hypertensive patients were **overweight (40%) and obese (35%)**, while only **20% had normal BMI** and **5% were underweight**.

Table 2

Distribution of Hypertensive Patients According to Level of Blood Pressure

($N = 100$)

Blood Pressure Category	Frequency (f)	Percentage (%)
Stage 1 Hypertension	45	45%
Stage 2 Hypertension	40	40%
Hypertensive Crisis	15	15%
Total	100	100%

Interpretation:

The table shows that **45% of patients had Stage 1 hypertension**, **40% had Stage 2 hypertension**, and **15% had hypertensive crisis**.

Table 3

Association Between Body Mass Index and Hypertension

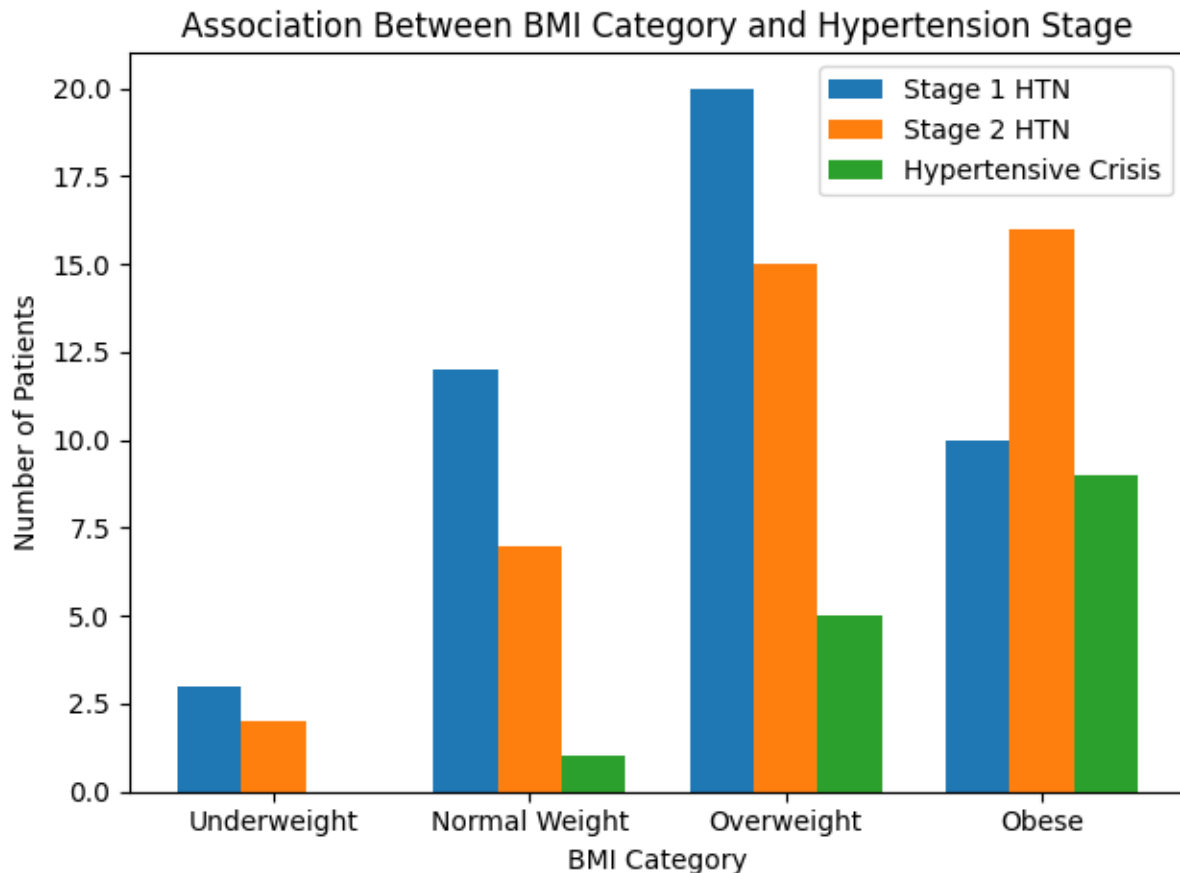
(N = 100)

BMI Category	Stage 1 HTN	Stage 2 HTN	Hypertensive Crisis	Total
Underweight	3	2	0	5
Normal Weight	12	7	1	20
Overweight	20	15	5	40
Obese	10	16	9	35
Total	45	40	15	100

Chi-square value (χ^2) = 12.65

Degree of freedom (df) = 6

p < 0.05 (Significant)

**Interpretation:**

The Chi-square analysis shows a **statistically significant association between Body Mass Index and hypertension**, indicating that individuals with **higher BMI are more likely to have severe hypertension**.

Discussion

The results of the present study indicate that increased BMI is significantly associated with hypertension. Similar findings have been reported in previous studies indicating that obesity is a major risk factor for hypertension.

Excess body weight contributes to increased blood pressure through several mechanisms including increased cardiac output, vascular resistance, and hormonal changes affecting sodium retention and sympathetic nervous system activity.

The study emphasizes the importance of lifestyle modification such as healthy diet, regular physical activity, weight control, stress management, and adherence to medication to prevent complications related to hypertension.

Based on the findings of the study, an **information booklet** was developed to educate hypertensive patients about preventive measures and management strategies.

Conclusion

The study concluded that Body Mass Index is significantly associated with hypertension. Individuals with higher BMI levels are at greater risk of developing severe hypertension and its complications. Educational interventions such as information booklets can play an important role in improving patient awareness and promoting healthy lifestyle behaviors.

Implications for Nursing

Nursing Practice

Nurses can educate patients regarding weight management and lifestyle modifications to control hypertension.

Nursing Education

Nursing students should be trained to assess BMI and educate patients about prevention of hypertension complications.

Nursing Administration

Hospitals can organize health education programs for hypertensive patients.

Nursing Research

Further studies can be conducted with larger samples to explore the relationship between obesity and hypertension.

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