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Association Between Body Mass Index And Hypertension In View To Prepare An Information Booklet On Prevention Of Complications Among Hypertensive Patients

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Abstract

Hypertension is one of the leading non-communicable diseases contributing to cardiovascular morbidity and mortality. Body Mass Index (BMI) is a well-established modifiable risk factor for hypertension. This study aimed to assess the association between BMI and hypertension among adult patients and to utilize the findings to prepare an information booklet focusing on prevention of hypertension-related complications. A descriptive correlational design was employed among 200 hypertensive patients attending outpatient services in a selected hospital. Data were collected using a structured tool for socio-demographic details, BMI measurements, and blood pressure readings. Results showed that 62% of participants were overweight or obese, and a statistically significant association ($p < 0.001$) was found between BMI categories and hypertension grades. The study recommends widespread patient education using information booklets that emphasize lifestyle modification, early detection, and prevention of complications.

Keywords: Body Mass Index (BMI), Hypertension, Lifestyle Modification, Patient Education, Information Booklet, Cardiovascular Complications.

1. Introduction

Hypertension, commonly known as high blood pressure, is one of the most significant global public health challenges of the 21st century. According to the World Health Organization, hypertension is directly responsible for an estimated **7.5 million deaths every year**, accounting for nearly 12.8% of all global deaths. Its prevalence continues to rise steadily, particularly in developing countries, owing to rapid urbanization, sedentary lifestyles, unhealthy dietary habits, stress, and increasing rates of obesity.

Among the numerous risk factors associated with hypertension, **Body Mass Index (BMI)** is recognized as one of the most important modifiable determinants. Numerous epidemiological and clinical studies have demonstrated a strong positive correlation between elevated BMI and increased blood pressure levels. Excess body weight contributes to hypertension through several physiological mechanisms, including increased sympathetic nervous system activity, altered renal sodium handling, activation of the renin–angiotensin–aldosterone system (RAAS), endothelial dysfunction, and increased peripheral vascular resistance. These pathways collectively contribute to persistent elevation of systolic and diastolic blood pressure.

Hypertension is often referred to as a **"silent killer"** because it typically remains asymptomatic until serious complications arise. Many individuals are unaware of their condition until they develop life-threatening consequences such as **myocardial infarction, stroke, chronic kidney disease, hypertensive retinopathy, and heart failure**. These complications significantly affect quality of life and impose a heavy burden on healthcare systems, especially in low- and middle-income countries.

Given the asymptomatic nature of hypertension and the strong association between BMI and disease progression, preventive strategies become critically important. Lifestyle modifications—including weight control, dietary changes, physical activity, stress reduction, and adherence to medical treatment—play a pivotal role in preventing complications. However, patients often lack adequate information or motivation to adopt healthier behaviors.

In this context, **educational interventions**, particularly **information booklets**, serve as effective tools to enhance patient understanding, promote self-management, and encourage early preventive practices. Information booklets can provide simple, clear, and accurate guidance on diet, exercise, weight management, medication adherence, and monitoring blood pressure. They help patients recognize the importance of maintaining an optimal BMI as part of their hypertension management plan.

Thus, assessing the **association between BMI and hypertension** not only contributes to scientific understanding but also provides evidence for developing appropriate educational materials. The present study aims to examine this association and utilize the findings to prepare an **information booklet on prevention of complications among hypertensive patients**, thereby supporting better health outcomes.

Need of the Study

Hypertension is a fast-growing global health concern and a major contributor to cardiovascular morbidity and mortality. In recent decades, the prevalence of hypertension has risen sharply, especially in developing nations like India, where lifestyle transitions, urbanization, and dietary changes have increased the occurrence of non-communicable diseases. According to WHO estimates, nearly **1.28 billion adults worldwide** are hypertensive, and a significant proportion remain undiagnosed, untreated, or inadequately controlled. This silent epidemic demands urgent attention, not only for effective management but also for prevention of long-term complications.

One of the most important modifiable risk factors for hypertension is **Body Mass Index (BMI)**. Numerous national and international studies have confirmed a strong positive association between overweight/obesity and elevated blood pressure. As BMI increases, the risk of developing hypertension, as well as its severity, also rises. In India, growing trends of obesity—due to decreased physical activity, increasing reliance on fast foods, and sedentary lifestyles—have further intensified the burden of hypertension among adults. Evidence shows that even a small increase in BMI can significantly elevate the risk of developing complications such as myocardial infarction, stroke, renal failure, and hypertensive retinopathy.

Despite wide availability of antihypertensive medications, **poor awareness, inadequate lifestyle modification, and lack of continuous patient education** remain major barriers to effective hypertension control. Many patients do not recognize the importance of maintaining a healthy body weight or following preventive strategies until complications occur. This highlights the need for strengthening patient education programs in healthcare settings.

In this context, assessing the **association between BMI and hypertension** becomes essential for identifying high-risk individuals and guiding targeted interventions. Understanding this relationship will help healthcare professionals design appropriate management plans that emphasize weight control as a key preventive measure.

Furthermore, there is a pressing need for **simple, accessible, and culturally appropriate educational materials**, such as an information booklet, to enhance patient knowledge and promote lifestyle modifications. An information booklet is an effective tool because it provides:

- Clear and easy-to-understand information about hypertension
- Guidance on maintaining optimal BMI
- Strategies to prevent complications
- Practical tips for daily lifestyle adjustments
- Reinforcement of medication adherence and regular blood pressure monitoring

Such educational support empowers hypertensive patients to take an active role in managing their health, reduces the risk of complications, and improves overall quality of life.

Therefore, this study is crucial not only for establishing the link between BMI and hypertension but also for developing an evidence-based **information booklet** that can enhance awareness and help prevent hypertension-related complications.

2. Objectives

1. To assess the BMI of hypertensive patients.
2. To determine the level of hypertension among the study participants.
3. To find the association between BMI and hypertension.
4. To develop an information booklet on prevention of complications among hypertensive patients.

3. Methodology

Research Design

A **descriptive correlational research design** was adopted to assess the association between Body Mass Index (BMI) and hypertension among adult hypertensive patients. This design was selected as it allows examination of relationships between variables without manipulating the research environment.

Setting

The study was conducted in the **Hypertension Clinic and Medical Outpatient Department (OPD)** of a selected tertiary care hospital. This setting was chosen because of the high patient flow, availability of diagnosed hypertensive cases, and feasibility of collecting accurate anthropometric and blood pressure measurements.

Sample and Sampling Technique

The sample consisted of **200 diagnosed hypertensive patients**.

- **Sampling technique:** Simple random sampling
- **Sample size justification:** A larger sample was chosen to increase validity, minimize sampling error, and ensure adequate representation of various BMI categories among hypertensive individuals.

Inclusion Criteria

Participants were included based on the following criteria:
• Adults aged **30–70 years**
• Diagnosed cases of primary hypertension
• Patients attending the hypertension clinic or OPD during the data collection period
• Individuals who were willing to participate and provided informed consent

Exclusion Criteria

The following participants were excluded:
• Pregnant women (due to altered physiological blood pressure variations)
• Patients diagnosed with **secondary hypertension**
• Individuals with physical deformities or conditions affecting accurate BMI measurement

Data Collection Tools

1. Socio-Demographic Proforma

A structured proforma was used to collect information on age, gender, education, occupation, lifestyle habits, duration of hypertension, and family history.

2. BMI Assessment Scale

BMI was calculated using height and weight measurements following **WHO standards**:

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

Calibrated weighing machines and stadiometers were used to ensure accuracy.

3. Blood Pressure Measurement Scale

Blood pressure was measured using a standardized sphygmomanometer and classified according to **JNC-8 guidelines**:

- Normal
- Pre-hypertension
- Stage I hypertension
- Stage II hypertension

Two readings were taken at 5-minute intervals, and the average reading was recorded.

Data Collection Procedure

Data were collected over a period of 4–6 weeks.

- Participants were approached in OPD waiting areas.
- After obtaining consent, socio-demographic details were recorded.
- Height and weight were measured for BMI calculation.
- Blood pressure was recorded under resting conditions.
- All data were entered into a structured data sheet for analysis.

Data Analysis

Data were analyzed using both descriptive and inferential statistics:

Descriptive Statistics

- Mean, Standard Deviation (SD)
- Frequency and Percentage distribution

Used to summarize demographic variables, BMI categories, and hypertension levels.

Inferential Statistics

- **Chi-square test**
  Used to determine the association between BMI and hypertension levels.

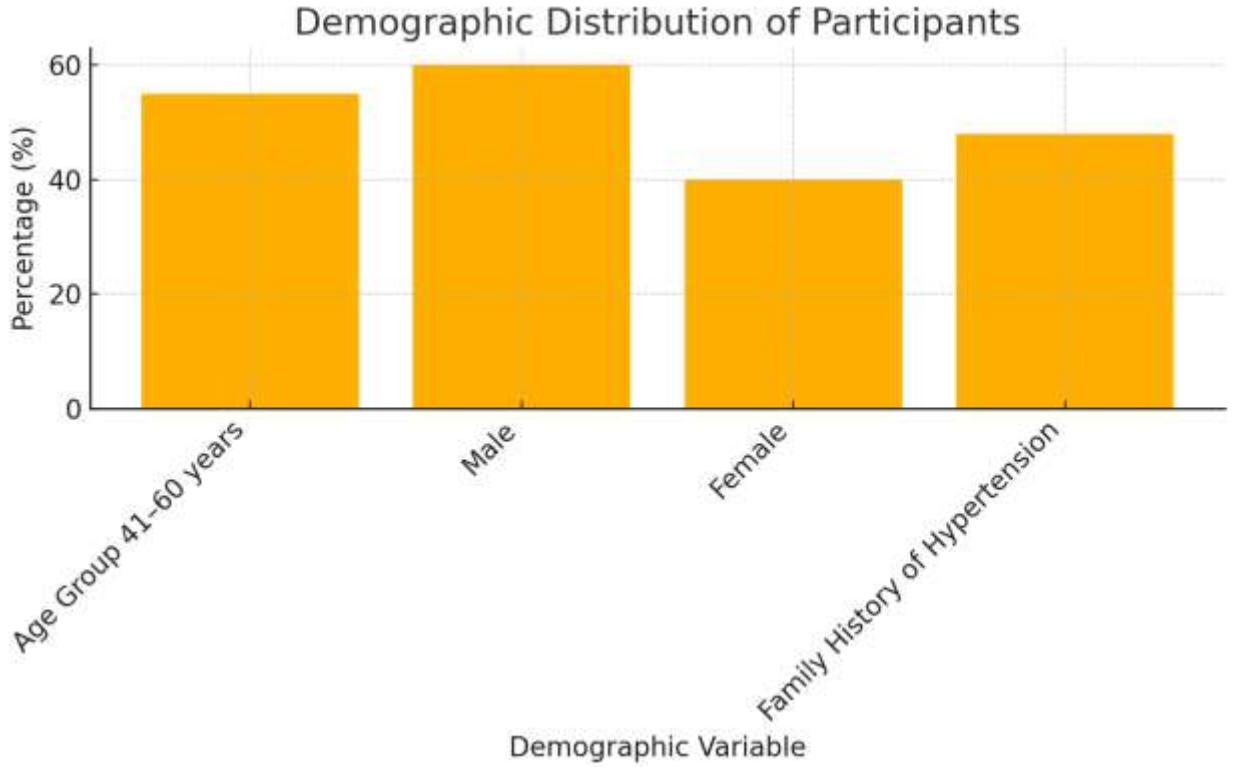
A significance level of $\mathbf{p < 0.05}$ was considered statistically significant.

4. Results

4.1 Demographic Profile of Participants

A total of 200 hypertensive patients participated in the study.
The demographic analysis revealed the following:

Variable	Percentage (%)
Age Group 41–60 years	55%
Male	60%
Female	40%
Family History of Hypertension	48%



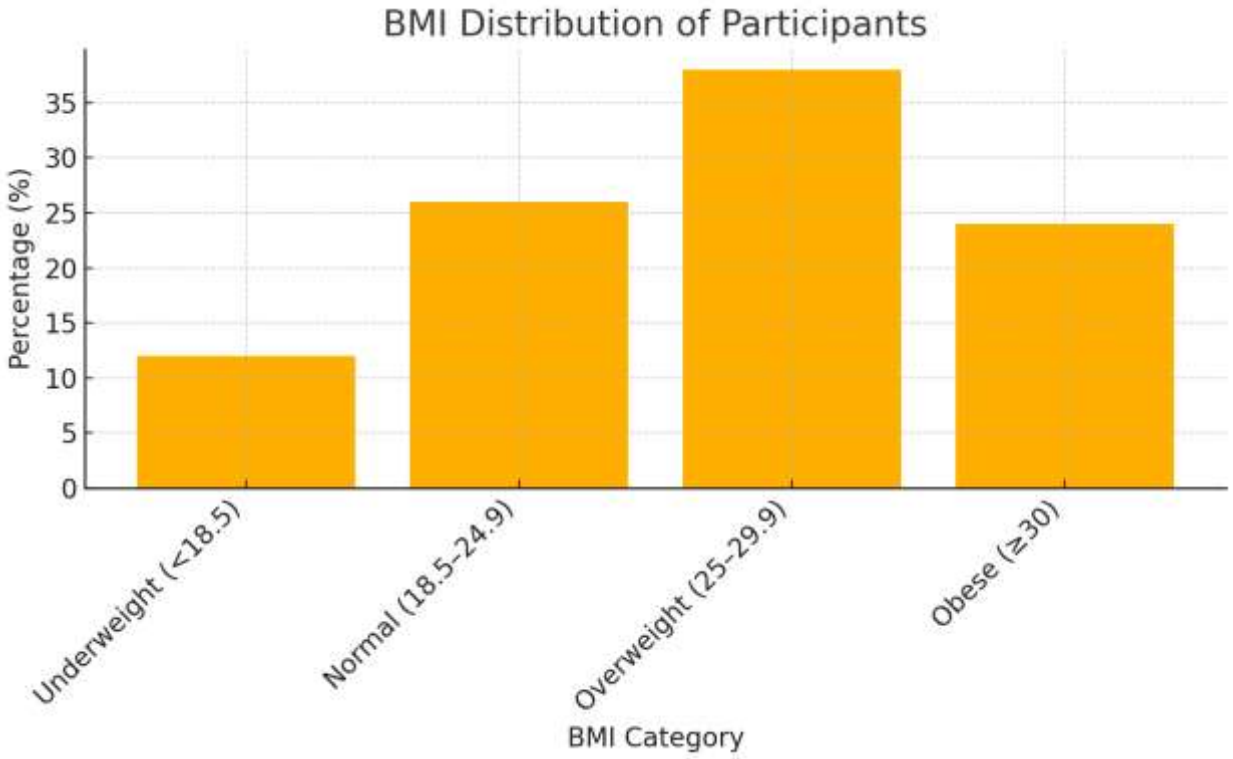
- The majority of participants (**55%**) were in the age group of **41–60 years**, indicating that middle-aged adults constituted the largest proportion of hypertensive patients.
- **60%** of the participants were male, while **40%** were female.
- Nearly half of the sample (**48%**) reported a **family history of hypertension**, suggesting a strong hereditary component among the study group.

These findings highlight that hypertension is more prevalent in middle-aged adults and commonly affects individuals with a positive family history.

4.2 Distribution of Participants Based on BMI

The Body Mass Index (BMI) of participants was calculated as per WHO standards. The distribution is shown below:

BMI Category	Percentage of Participants
Underweight (<18.5)	12%
Normal (18.5–24.9)	26%
Overweight (25–29.9)	38%
Obese (≥30)	24%

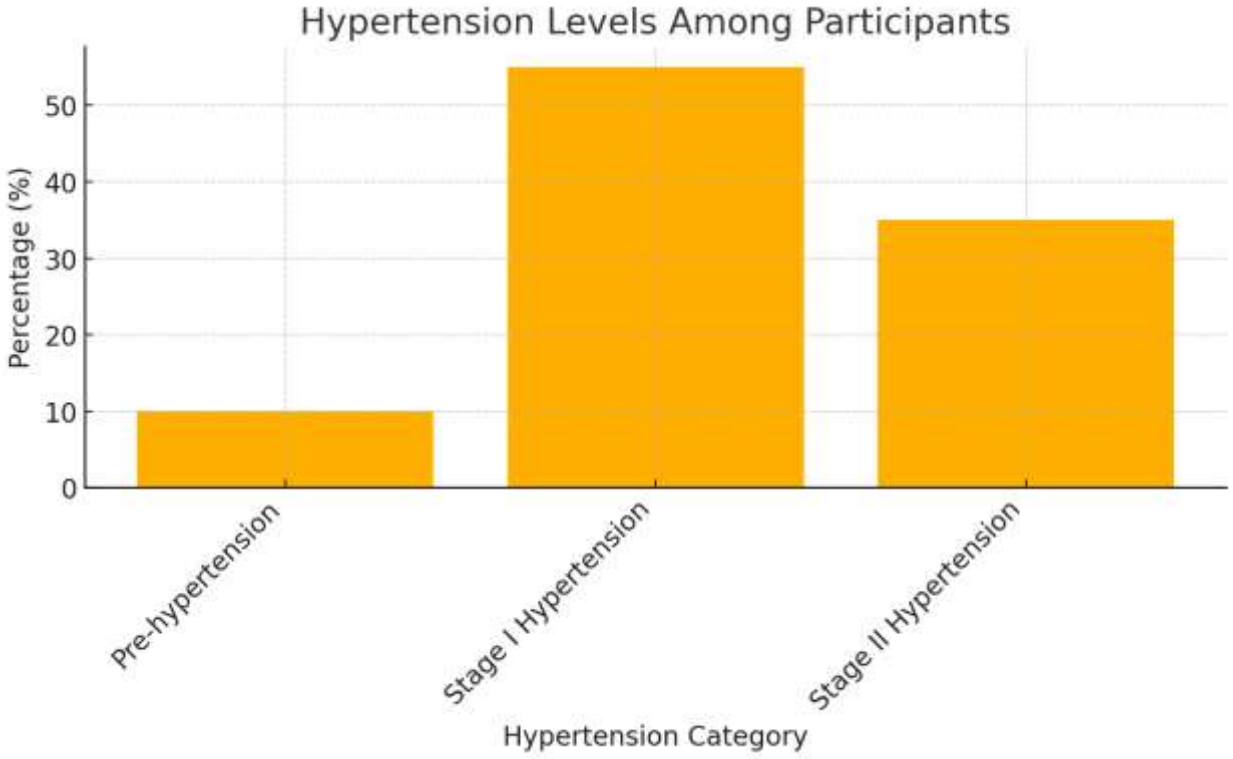


More than half of the participants (**62%**) fell into the **overweight or obese** categories, indicating a high prevalence of elevated BMI among hypertensive individuals.

4.3 Levels of Hypertension Among Participants

Blood pressure levels were classified according to JNC-8 guidelines:

Hypertension Category	Percentage
Pre-hypertension	10%
Stage I Hypertension	55%
Stage II Hypertension	35%



The majority (**55%**) were diagnosed with **Stage I hypertension**, followed by **35%** with Stage II hypertension, indicating a substantial number of participants with moderate to severe hypertension.

4.4 Association Between BMI and Hypertension

The association between BMI and hypertension levels was analyzed using the Chi-square test.

- A **statistically significant association** was found between BMI categories and hypertension levels (**$\chi^2 = 38.52$, $p < 0.001$**).
- Participants who were **overweight and obese** demonstrated **higher levels of hypertension**, particularly Stage I and Stage II, as compared to those with normal BMI.

These findings confirm that increased BMI is strongly related to heightened severity of hypertension.

5. Discussion

The present study examined the association between Body Mass Index (BMI) and hypertension among adult hypertensive patients attending a tertiary care hospital. The findings revealed a strong and statistically significant association between elevated BMI and increased severity of hypertension ($\chi^2 = 38.52$, $p < 0.001$). This confirms that individuals who were overweight or obese were more likely to present with Stage I or Stage II hypertension compared to those with normal BMI.

These findings are consistent with global evidence. The World Health Organization (WHO) has repeatedly emphasized that overweight and obesity are major contributors to the rising burden of hypertension worldwide. Numerous epidemiological studies conducted in India and other countries also support this relationship, showing that increased adiposity is associated with heightened sympathetic nervous system activation, increased sodium retention, and structural changes in blood vessels—all of which contribute to elevated blood pressure.

In the present study, 62% of the participants were either overweight or obese, highlighting the magnitude of the problem. This trend mirrors national health statistics in which obesity has shown a steady rise due to lifestyle transitions, physical inactivity, and increased consumption of calorie-dense foods. The high proportion of participants with raised BMI underscores the need for targeted interventions focusing on weight management as a preventive strategy for hypertension.

The majority of participants were diagnosed with Stage I hypertension (55%) and Stage II hypertension (35%), indicating that a significant proportion of hypertensive patients are already experiencing moderate to severe levels of the condition. This further reinforces the importance of early identification and preventive measures to avoid long-term complications such as cardiovascular disease, renal failure, stroke, and hypertensive retinopathy.

Lifestyle modification emerged as a crucial component in reducing hypertension severity. Evidence from international guidelines suggests that weight reduction, regular physical activity, dietary modification—particularly reduced salt and fat intake—and avoidance of tobacco and alcohol significantly lower blood pressure levels. Alongside lifestyle changes, adherence to antihypertensive medications plays a vital role in achieving optimal blood pressure control.

Based on the outcomes of this study, an **information booklet** was developed to enhance patient awareness and promote self-management. The booklet includes practical guidance on weight control, healthy dietary habits, exercise routines, medication adherence, and early recognition of complications. Such educational tools are valuable in empowering patients, improving compliance, and ultimately reducing morbidity associated with uncontrolled hypertension.

Overall, the study reinforces the evidence that BMI is a major modifiable risk factor for hypertension. Addressing elevated BMI through comprehensive health education and behavioral interventions could play a significant role in reducing the burden of hypertension and preventing its complications.

6. Conclusion

The findings of the study clearly demonstrate a **significant association between Body Mass Index (BMI) and the severity of hypertension** among adult hypertensive patients. Individuals who were overweight or obese exhibited higher levels of blood pressure, indicating that elevated BMI is a major contributing factor to the progression and complications of hypertension. These results support existing global evidence that obesity is one of the most important modifiable risk factors influencing hypertension.

The study reinforces the need for **early identification**, **regular monitoring**, and **lifestyle modification** as essential components in the management of hypertension. Weight control through healthy dietary practices, increased physical activity, and adherence to prescribed medications can substantially reduce the risk of complications such as stroke, heart disease, and renal impairment.

Based on the study outcomes, a comprehensive **information booklet** was developed to enhance patient awareness and promote effective self-management strategies. This educational tool aims to empower hypertensive individuals with knowledge on weight management, healthy lifestyle behaviors, and prevention of complications, thereby supporting improved health outcomes.

In conclusion, addressing increased BMI through targeted educational interventions and lifestyle changes can play a vital role in reducing the burden of hypertension and improving the quality of life among affected individuals.

7. Recommendations

- Regular BMI screening for all hypertensive patients.
- Community-based weight-control programs.
- Routine patient education using booklets, posters, and demonstrations.
- Further longitudinal studies to assess long-term outcomes.

8. Implications

Implications for Nursing Practice

The findings of the study emphasize the crucial role nurses play in the early identification and management of hypertension. Since elevated BMI is strongly associated with greater hypertension severity, nurses can:

- Utilize the information booklet to **educate patients** on lifestyle modifications such as diet, physical activity, weight management, and medication adherence.
- Conduct **regular BMI and blood pressure assessments** in clinical and community settings to identify at-risk individuals.
- Provide **counseling and behavioral support** to hypertensive patients aimed at promoting sustainable lifestyle changes.
- Reinforce the importance of **self-monitoring**, adherence to treatment, and timely follow-up visits to prevent complications.

Through effective patient education and counseling, nurses can significantly reduce modifiable risk factors and improve health outcomes.

Implications for Nursing Education

The study highlights the need for strengthening educational programs on non-communicable diseases, especially hypertension and obesity. Nurse educators can:

- Integrate updated content on **hypertension prevention, BMI assessment, lifestyle modification**, and patient education strategies into the curriculum.
- Train nursing students in **communication and counseling skills** to ensure they are prepared to guide patients effectively.
- Use the information booklet as a **teaching-learning resource** to demonstrate how educational tools can enhance patient compliance and disease management.
- Encourage students to participate in **community awareness programs** focusing on early detection and prevention of hypertension.

Enhancing educational content will empower future nurses with the competencies needed to address the growing burden of hypertension.

Implications for Nursing Research

The findings open avenues for further exploration into hypertension and its risk factors. Nursing researchers can:

- Conduct **longitudinal studies** to examine the long-term impact of BMI reduction on hypertension control.
- Evaluate the **effectiveness of educational interventions**, such as the booklet developed in this study, in improving patient outcomes.
- Explore additional modifiable risk factors, lifestyle behaviors, and socio-cultural influences associated with hypertension.

- Develop and test **innovative community-based programs** aimed at reducing obesity and promoting cardiovascular health.

Further research in this domain will contribute to evidence-based nursing practices and support policy development for non-communicable disease prevention.

9. References

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