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A Study to Evaluate the Impact of Health Education on Awareness of Long-term Complications of Hypertension Among Hypertensive Patients in A Selected Hospital, Bengaluru

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Abstract

The rising burden of non-communicable diseases, particularly hypertension, poses significant public health challenges, especially in developing nations. This study aimed to assess the effectiveness of a health education program focused on lifestyle modifications to prevent hypertension-related complications among patients at selected hospitals in Bengaluru. Employing a quasi-experimental design, we recruited 60 hypertensive patients through purposive sampling. Initial knowledge was evaluated using a structured questionnaire, followed by an educational intervention provided on the same day. A post-test was conducted eight days later using the same instrument. Results indicated a mean pre-test knowledge score of 13.0%, which increased to 42.65% post-intervention, reflecting a 29.65% gain and a 69.5% overall improvement in knowledge. Statistical analysis, including a paired t-test, demonstrated a t-value of 37.71 and a p-value less than 0.01, confirming the effectiveness of the health education program in enhancing knowledge about hypertension and its long-term complications. These findings reveal a significant knowledge gap among hypertensive patients prior to the intervention, highlighting the necessity for targeted educational efforts. The health education materials, developed by the WHO, effectively communicated critical information, leading to improved patient understanding and engagement in self-management strategies. In conclusion, the study emphasizes the importance of structured health education in empowering hypertensive patients to manage their condition more effectively, thereby reducing the risk of long-term complications associated with hypertension. This approach is essential in addressing the growing prevalence of non-communicable diseases in developing contexts.

Keywords: Hypertension; hypertensive patients; placard, knowledge, long-term complications.

INTRODUCTION

"Education is the Most Powerful Weapon which you can use to Change the World"

- (NELSON MANDELA 1990)

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Health is a prevalent theme across various cultures, with every community possessing its own understanding of health as an integral part of their cultural beliefs. Health is frequently taken for granted, and its importance is often recognized only when it is at risk. The health may be affected due to communicable or non-communicable diseases, until and unless the individuals have the conscious about the health. That leads into chronic unhealthy conditions [1].

Chronic non-communicable diseases are

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becoming increasingly significant among adults in both developed and developing nations. The prevalence of these diseases is rising in most countries, and this trend is expected to continue for several reasons. One factor is the rising life expectancy, leading to more people living longer and thus facing a higher risk of various chronic diseases. Additionally, changing lifestyle and behavioral patterns are contributing to the onset of these conditions. Modern medical advancements are helping many people survive chronic diseases, but the impact remains severe, affecting individuals through loss of life, disability, family hardship, poverty, and economic loss to countries. Developing countries are advised to take proactive measures to prevent a potential "epidemic" of non-communicable diseases linked to socio-economic and health developments [2]. Hypertension is a major preventable factor contributing to early health problems and deaths worldwide. It poses a significant public health challenge, causing approximately 7.5 million deaths each year, which accounts for about 12.8% of all global fatalities. Estimates indicate that by 2025, around 1.56 billion adults will be affected by hypertension. Elevated blood pressure is a major risk factor for several chronic diseases, including heart disease, stroke, chronic kidney disease, and hypertensive crises. Additional complications may involve peripheral vascular disease, retinal hemorrhage, and vision loss. High blood pressure is closely associated with various risk factors [3]. Individuals with hypertension often reside in developing countries where healthcare resources are scarce and awareness of the condition is low. Consequently, increasing knowledge about hypertension and encouraging effective patient practices can significantly improve blood pressure management. According to the study, the self-management education model demonstrated significantly greater effectiveness. Although lifestyle changes are often viewed as challenging to implement, self-management education interventions frequently show limited success in lowering behavioral risk factors. In 2010, the World Health Organization identified "Urbanization and Health" as the theme for World Health Day. Urbanization is acknowledged as an important health determinant and a significant factor contributing to non-communicable diseases, especially in low- and middle-income nations. People living in urban areas face a higher risk of these diseases compared to those in rural regions. The National Family Health Survey indicates that in urban Uttar Pradesh, the prevalence rates of hypertension, obesity, and high blood glucose levels are 10.5%, 23.9%, and 9.9%, respectively. The rapid pace of urbanization, combined with an aging population, increased mechanization, sedentary lifestyles, and changes in diet, creates a complex array of risk factors leading to various chronic illnesses. Identifying these risk factors is vital for crafting effective prevention strategies. In response, the World Health Organization launched the Global Action Plan for the Prevention and Control of Non-Communicable Diseases (2013–2020), aiming to eliminate the avoidable burden of these diseases, enhance health and well-being for current and future generations, and mitigate the human, social, and financial impacts of non-communicable diseases. Hypertension continues to be a major cause of death in numerous developing nations. According to World Health Organization about 40% of populations aged 28 years and above had hypertension in 2008, and statistical report estimate up to 4.5 million deaths, but 57% of stroke deaths and 24% of coronary heart diseases in India is caused due to hypertension. In 2020 cardiovascular diseases was the largest cause of death in India, until recently hypertension is not given importance in most part of India [4]. The condition of hypertension is now reported because it is the major cause for cardiovascular diseases. In late decades, it has turned out to be progressively certain that the improvement of stroke, ischemic coronary illness, and renal failure has been credited by hypertension. India, home to a vast population, is seeing an increase in hypertension rates in both rural and urban regions. A significant number of individuals with hypertension are unaware of their condition, and there is a general lack of understanding regarding how to manage and prevent the associated risk factors. Additionally, hypertension is notably more prevalent in urban areas compared to rural regions. Studies have shown significant regional variations in risk factors across India. For example, cardiovascular events and strokes are often observed on Mondays, particularly among non-hospitalized, active working individuals under 65 years old, and these events tend to occur in the morning. Given that hypertension is a major cardiovascular risk factor, researchers have investigated whether blood pressure levels are elevated on Monday mornings, especially during work hours [5].

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The World Health Organization (WHO) recognizes hypertension, or high blood pressure, as the primary cause of deaths related to cardiovascular disease. The World Health League (WHL), which includes 85 national hypertension organizations, reports that more than 50% of individuals with hypertension worldwide are unaware of their condition. In response, the WHL initiated a global awareness campaign in 2005 and designated May 17 as World Hypertension Day (WHD). [6].

Information, Education, and Communication (IEC) strategies aim to inform and encourage individuals to adopt and maintain healthy behaviors and life skills. The aim is to enable individuals to make informed choices regarding safe health practices. Educational initiatives are vital for preventing hypertension by encouraging effective health management. Community education serves as a primary approach for spreading knowledge and promoting healthier lifestyles. Additionally, these educational programs should incorporate motivational elements, as health promotion and disease prevention can be economically beneficial. However, the benefits are often less visible, making it challenging for policymakers to allocate funding, especially in communities where communicable diseases are on the rise. The success of health promotion and disease prevention initiatives largely depends on the dedication of individuals, communities, and organizations. Furthermore, nursing research is essential for developing, defining, and enhancing the field of nursing knowledge. Nurses are key in preventing hypertension by raising awareness and significantly reducing its prevalence. Given that hypertension is increasingly becoming the most widespread health issue globally, leading to substantial morbidity and mortality, it is essential for new interventions to focus on improving public knowledge and attitudes. Such efforts will enable nurses to implement more effective healthcare strategies for preventing hypertension and managing its risk factors. Nurses should follow patients with hypertension, to find out rudimentary knowledge of the adverse effects of hypertension in disadvantaged population is alarming and merits broadly targeted public health intervention to improve knowledge in communities in India, such poor knowledge attributable to an overburdened health system. Improving the knowledge leads to adoption of healthy behavioral changes and subsequent reduction in the burden of hypertension and prevention of long-term complications [7].

NEED FOR THE STUDY

Hypertension is a major global public health issue, contributing to about 4.5% of the overall disease burden. It is a critical health concern in both developing and developed nations, significantly raising the risk of cardiovascular, cerebrovascular, renal, and other diseases, and is a leading cause of premature mortality worldwide [8]. Approximately 1.28 billion adults aged 30–79 years globally are affected by hypertension, with about two-thirds living in low- and middle-income countries. Often referred to as a “silent killer,” nearly 46% of those with hypertension are unaware of their condition. Only around 21% of adults manage to control their hypertension effectively. A key global goal for addressing non-communicable diseases is to reduce the prevalence of hypertension by 33% from 2010 to 2030. According to WHO estimates from 2008, the prevalence of elevated blood pressure in India was 33.2% among men and 31.7% among women, with only about 25.6% of those receiving treatment managing to keep their blood pressure under control. Recent studies have shown that hypertension is more prevalent among individuals with lower educational levels compared to those with higher education, and it is also more common in urban areas than in rural ones. In eastern India, both rural and urban regions demonstrated high prevalence rates, with 31.7% in rural areas and 34.5% in urban areas [9]. A cross-sectional study conducted in Malda, West Bengal, found that 40.9% of participants had systolic hypertension, while 29.3% had diastolic hypertension, characterized by blood pressure readings of 140/90 mm Hg or higher. The study highlighted a significant rise in systolic hypertension among men over 50 and stressed the necessity for a comprehensive national strategy to tackle hypertension in India and other similar developing nations [10].

Another survey in Karnataka assessed the risk factors for diabetes and hypertension among women. The findings indicated that overweight women (20.6%) were more likely to suffer from hypertension compared to those of normal weight (8.9%) and underweight women (5.0%). The study highlighted the need for increased health education by health workers to improve awareness and management of

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diabetes and hypertension [11].

In Karnataka, one of the largest states in southern India, hypertension rates are significantly elevated, with Kerala having the highest prevalence among southern states—32.8% in men and 30.9% in women. A cross-sectional study in Korangrapady, Udupi district, found that the prevalence of high blood pressure was lower compared to other rural areas in India. The study suggested that targeted interventions are needed to address the risk factors in this region and to improve overall population health [12].

Additionally, a study on the prevalence of hypertension among adults in urban slums of Bangalore examined the determinants of risk factors and identified opportunities for control [13]. The study results revealed that f 21.5% for hypertension and 30.4% were co-morbid with both the diseases. The study concluded that implementing effective health education Program, changes at the level of healthcare system need to be adopted [14]. A cross-sectional study at TN Medical College, Mumbai, assessed knowledge, attitudes, practices, risk factors, and co-morbidities among hypertensive patients [15]. The findings indicated that 83.42% of patients had limited knowledge about their condition, emphasizing the necessity for improved health services and education to tackle hypertension-related complications. A study conducted in Delhi over the past two decades found that the prevalence of high blood pressure increased from 11.2% to 28% in rural areas and from 23% to 42.2% in urban areas. Hypertension is acknowledged as a significant risk factor for cardiovascular diseases, contributing to both illness and death. However, rural areas in India report lower prevalence rates of high blood pressure compared to urban regions, highlighting the necessity for additional research to explore the distribution and determinants of hypertension. Many people are unaware of their high blood pressure, and most do not show any symptoms. A sedentary lifestyle has been identified as a significant contributor to elevated blood pressure, worsened by inadequate practices stemming from a lack of knowledge about hypertension [16–21]. There is a pressing need to enhance health services and education focused on the risk factors for hypertension. Health education initiatives that focus on patient health and lifestyle changes are essential for lowering blood pressure and preventing long-term complications. A multicenter study in Bangladesh and India found a hypertension prevalence rate of 65% among the elderly, examining awareness, treatment, and control of the condition. The study identified higher body mass index, higher education level, and existing diabetes mellitus as key factors associated with hypertension. It recommended implementing effective, low-cost management strategies for hypertension complications. A randomized controlled trial in Greater Belfast evaluated health promotion in general practice for high cardiovascular risk patients. Results showed that, after two years, 44% of the intervention group reported engaging in daily physical exercise compared to 24% in the control group. The study found that personal health education resulted in slight decreases in systolic blood pressure and more substantial reductions in diastolic blood pressure. Enhanced education on personal health was found to be effective in increasing exercise, improving dietary habits, and reducing activity restrictions, thereby justifying further health education efforts [22]. A systematic review and meta-analysis that included both intervention trials and observational studies investigated the impact of chronic hypertension on pregnancy outcomes. The findings from a US national dataset highlighted thatwomen with chronic hypertension face significantly higher risks, with relative risks of 7.7 (95% confidence interval: 5.7 to 10.1). The study recommended that women with chronic hypertension should receive health education focused on managing their condition and preventing associated complications. A serial cross-sectional study investigated trends in blood pressure and hypertension among children and adolescents in the United States from 1999 to 2018 [23–27]. The study found a 29% reduction in systolic blood pressure and a 12% reduction in diastolic blood pressure over this period. Despite these reductions, blood pressure levels among children and adolescents have increased, partly due to a higher prevalence of overweight. The study suggested the need for increased awareness and health education regarding hypertension. In the Philippines, a quasi-experimental study assessed the impact of a health education and lifestyle program on managing blood pressure in patients with hypertension. The results

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showed a decrease in both systolic and diastolic blood pressure in the intervention group, indicating that health education should be further integrated into hypertension management strategies.

A 2008 survey conducted by Harris Interactive for the Preventive Cardiovascular Nurses Association evaluated the awareness, understanding, and treatment of previously diagnosed hypertension among Baby Boomers and seniors. The findings indicated that seniors were more vulnerable to risk factors, underscoring the ongoing difficulty in managing hypertension. The study highlighted the necessity for healthcare professionals to improve attitudes and knowledge about hypertension among these populations. A retrospective study involving hospitalized pediatric patients experiencing hypertensive crises found a male-to-female ratio of 2:1, with 47 boys and 23 girls. The main objective in treating hypertensive crises is to prevent or manage potentially life-threatening complications, and the study offered valuable insights into the clinical features of these crises in children [28, 29].

Additionally, a cross-sectional study examining the prevalence of hypertension and pre-hypertension among adolescents reported that 9.5% of participants had pre-hypertension, while 9.4% were diagnosed with hypertension. Both conditions were found to be more prevalent with increasing body mass index. The study recommended the implementation of effective primary and secondary prevention programs, including health education on lifestyle changes, to tackle hypertension in children and adolescents.

Based on clinical experience and literature, it is evident that many individuals with hypertension lack sufficient knowledge about their condition and its long-term complications. Health education is crucial for promoting health and preventing disease economically. Therefore, there is a need to assess and enhance knowledge about hypertension and its long-term effects [30].

OPERATIONAL DEFINITIONS

Effectiveness

It means change in the knowledge of patients regarding prevention of selected long-term complications which has been measured by comparing pre-test and post- test knowledge scores.

Health Education

It refers to systematically organized awareness design, developed to provide information, selected regarding long-term complications of hypertension among hypertensive patients.

Knowledge

It refers to the patient’s awareness regarding selected long-term complications of hypertension which will be assessed before and after intervention.

Hypertensive Patients

It refers to the patients who are medically diagnose as a hypertensive by a register physician.

Selected Long-term Complications

In this present study long-term complications of hypertension includes stroke, cardiovascular diseases, chronic kidney disease and hypertensive crisis.

Inclusion criteria:

- Hypertensive patients who are available and willing to participate in the study.
- Hypertensive patients who can communicate in Kannada or English.
- Patients diagnosed with hypertension within the past five years.

Exclusion Criteria

1. Hypertensive patients who are unwell during the data collection period.
2. Hypertensive patients who had attended previous health education program on hypertension.
3. Who already developed complications such as stroke, cardiovascular disease, chronic kidney

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failure and hypertensive crisis.

HYPOTHESES

H1: There is a notable difference between the average pre-test and post-test knowledge scores regarding specific long-term complications of hypertension among hypertensive patients.

H2: There is a notable relationship between pre-test knowledge scores and specific socio-demographic factors among hypertensive patients.

Research Variables:

1. *Independent variable:* A structured educational program focused on the specific long-term complications of hypertension.
2. *Dependent variable:* Knowledge regarding selected long-term complications of hypertension among hypertensive patients.
3. *Attribute variables:* Age, Gender, Religion, dietary pattern, Marital status, qualification, occupation, duration of hypertension, preexisting diseases habits, contraceptives in women, Source of information on hypertension.

DELIMITATIONS

The study is limited to:

1. Only 60 newly diagnosed hypertensive patients with in 5 years.
2. Study assesses only the knowledge regarding selected long-term complications of hypertension.

CONCEPTUAL FRAMEWORK

The conceptual model selected for this study is based on Roy adoption model this designed to assess the knowledge regarding the long-term complications of hypertension among hypertensive patients. The Modified Roy's Adaptation Model (1979) highlights that adaptation is a dynamic equilibrium influenced by both high and low responses triggered by various stimuli. Roy describes this process as an open system where external stimuli enter from the environment, prompting behavioral changes in individuals to help them adjust to new conditions (Figure 1).

Input: The inputs for this study encompass stimuli that arise from both external environments and internal factors. Specifically, these inputs encompass demographic variables such as age, sex, religion, education, occupation, marital status, monthly income, place of residence, family type, dietary habits, duration of hypertension, pre-existing health conditions, contraceptive use among women, sources of information about hypertension, and the level of knowledge regarding specific long-term complications of hypertension.

Throughput: Throughput involves the individual's processors and effectors. Processors are the control mechanisms that a person utilizes within their adaptive system. In this study, a structured teaching program acts as a control mechanism to help individuals adapt to various stimuli. Effectors, on the other hand, represent the adaptive responses. Adaptation encompasses various elements, such as physiological functions, self-identity, role functions, and interdependence.

Physiologic Function: It addresses the fundamental needs of the patient, focusing on dietary changes, regular physical activity, alternative therapies, and the prevention of long-term complications related to hypertension. Self-Concept: Self-concepts relate to individuals' beliefs and feelings regarding how their bodies function. It involves controlling blood pressure and preventing selected long-term complication.

Interdependence: Interdependence pertains to the engagement and interaction between individuals and researchers or healthcare professionals to obtain information on preventing specific long-term complications of hypertension.

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Role Function: This involves a person's behavior, which is influenced by their interactions with researchers and family members in various situations. In this context, patients engage with both researchers and their family members.

Output: Output refers to the results of the system. In this study, output pertains to the changes in knowledge related to the prevention of specific long-term complications of hypertension. By effectively adapting to the system, individuals can gain adequate knowledge. Conversely, if they fail to adapt, they may possess insufficient knowledge. If the patients have lack of knowledge after the health education the process is not reassessed again or redirected.

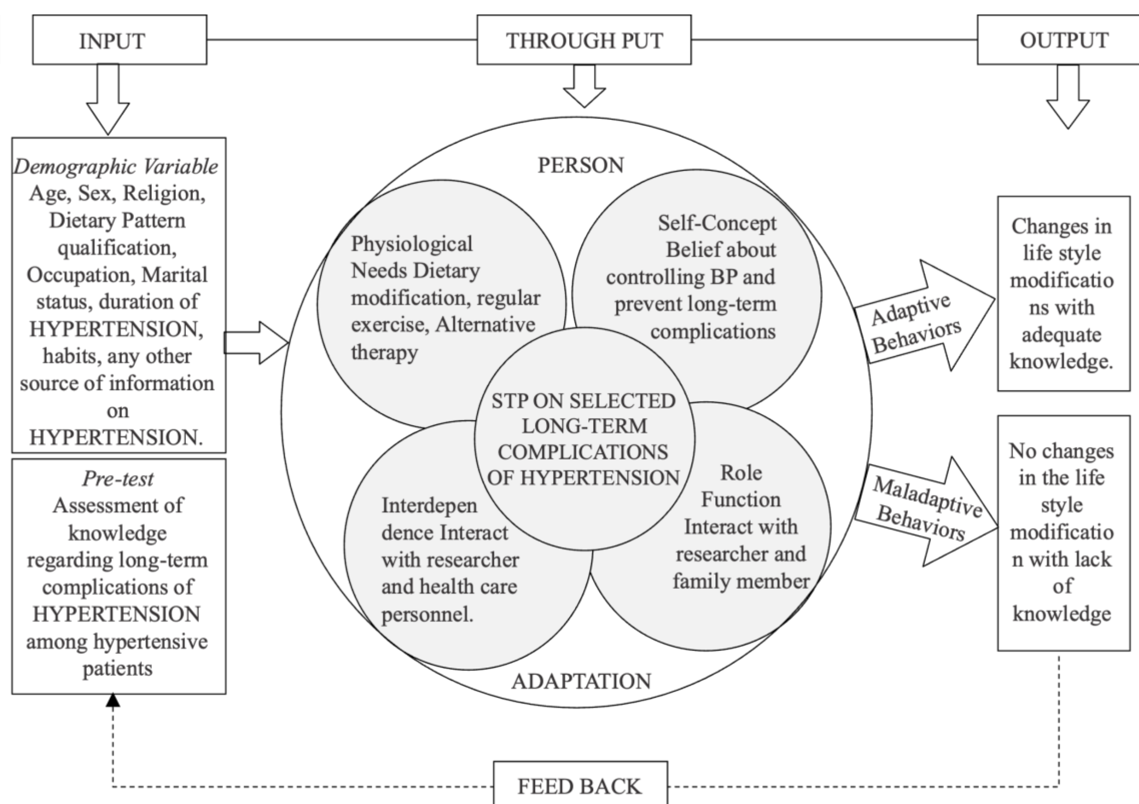

Figure 1. Modified Conceptual Framework Based on Roy Adaption Model (1992).

REVIEW OF LITERATURE

A literature review is an evaluate report of information found in the literature related to selected area of the study. A thorough literature review was conducted to provide insight into the chosen problem, ensuring a logical flow and clarity for better understanding.

Literature Review are Discussed under the Following Headings

- Reviews concerning knowledge about hypertension.
- Literature related to IEC towards prevention of selected long-term complication of hypertension.

Reviews Related to Knowledge Regarding the Hypertension

Several surveys conducted on World Hypertension Day (WHD) by the World Hypertension League (WHL) encompassed 250 million individuals globally. Results revealed that 1.5 billion people across 85 nations are affected by elevated blood pressure. The findings suggest that more countries are participating in WHD's efforts to empower the public to monitor their blood pressure at home and to enhance awareness, prevention, and management of hypertension and its associated risk factors. In a quantitative one-group pre-test post-test study focused on preventing hypertension through Information, Education, and Communication (IEC) activities, 40 women were selected using systematic random

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sampling. Data was gathered through a structured questionnaire designed to assess knowledge. The results revealed that 65% of participants had inadequate knowledge during the pre-test phase. Following the IEC intervention, 25% of the women demonstrated improved knowledge, scoring above average, while 67.5% achieved an average score. The mean post-test knowledge score of 31.00 regarding modifiable risk factors was significantly higher than the pre-test mean score of 16.00, resulting in a mean difference of 15.00. The study concluded that the IEC program effectively improved knowledge and practices related to hypertension prevention among women.

A cross-sectional descriptive study conducted in Khartoum state in 2020 aimed to evaluate knowledge and practices related to therapeutic lifestyle changes for hypertension management. A total of 112 participants were selected using a non-probability sampling method, and data were gathered through structured interviews with a questionnaire [31].

The results showed that only 31.3% of participants had above-average knowledge about blood pressure. Males exhibited greater knowledge than females (p = 0.021), and individuals with higher educational attainment had significantly better knowledge scores than those with lower educational levels (p = 0.001). The study emphasized that hypertension is a critical public health issue and highlighted the importance of educating patients to motivate them to apply their knowledge of therapeutic lifestyle changes [8].

A cross-sectional study was conducted to find out the effect of knowledge about hypertension on the control of high Blood Pressure, department of Cardiology, Yozgat, Turkey. The Samples (n= 485) were selected using random cluster sampling method and data were collected by using structured knowledge questionnaire. The study found that knowledge levels about hypertension among participants were distributed as follows: 31.3% had low knowledge, 62.1% had moderate knowledge, and 6.6% had high knowledge. The rise in cardiovascular disease-related deaths in recent years has shifted focus towards preventing and managing high blood pressure, a major cause of such diseases. The study suggests that nurses should monitor patients with hypertension more closely, address gaps in their knowledge, encourage behavioral changes, and develop educational programs for patients [32].

A population-based study conducted in Iran, as part of the Lifestyle Promotion Project, examined the prevalence and contributing factors of prehypertension and hypertension. The study, involving 2,818 participants selected through multistage stratified cluster sampling, used structured questionnaires for data collection. The average age and BMI of participants were 39.71 ± 12.91 years and 26.99 ± 5.26 kg/m², respectively. Of the participants, 48.6% lived in urban areas and 51.4% in regional areas. The prevalence of prehypertension (48.9% in urban vs. 45.8% in regional) and hypertension (24.7% in urban vs. 20.5% in regional) was significantly higher in urban areas (p = 0.001). The study emphasized that prehypertension and hypertension are major health issues in Iran, highlighting the importance of identifying risk factors, maintaining regular medication, ensuring good nutrition, engaging in physical activity, and adopting lifestyle changes. A descriptive survey aimed at assessing knowledge of hypertension risk factors among adults in the rural Rishi Valley of India included 641 participants selected through random sampling. Data were collected using a structured questionnaire. Results showed that 218 participants were unaware of their hypertension status, and 48% lacked knowledge about any risk factors. The study concluded that screening and targeted educational programs are needed to enhance health behaviors and mitigate the impact of hypertension in this population [33–37].

A serial cross-sectional analysis examined trends in blood pressure and hypertension among U.S. children and adolescents from 1999 to 2018. The study, involving 19,273 participants selected through purposive sampling, found that systolic blood pressure had decreased by 29% and diastolic blood pressure by 12%. Despite this reduction, blood pressure levels among children and adolescents have risen over the past decade, partially due to increased overweight prevalence. The study underscores the need for health education to address these trends and improve blood pressure levels [38, 21].

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Literature related to Lifestyle Modification Towards Prevention of Long-term *Complication of Hypertension*

A cross-sectional survey done on Hypertension and associated risk factors in someselected rural areas of Bangladesh. The samples (n= 212) were selected using purposive sampling technique and the data collected by interview method using knowledge structured questionnaire. The study results revealed that 15.6% of the participants were suffered from systolic hypertension and 12.3% from diastolic pressure. Significant association was observed with development of hypertension with heart disease (P <0.05). Based on the findings of the study the followings are recommended; i) regular periodical health check-up specially including blood pressure monitoring should be suggested to all the people of age more than 30 years; ii) restriction of taking extra salt should be suggested and promoted. Further nationwide study should be conducted. the study concluded that tendency of increase systolic pressure was observed among those who take extra salt, this was proved true in this study [39, 15]. A survey was done on Management of Hypertension among Patients with Coronary Heart Disease in north America along Asia, Africa and with 52 countries. The samples(n=65 million) were selected using random sampling technique and the data were collected using observational method. The study findings indicated that a 20/10 mm Hg increase in blood pressure doubles the risk of fatal coronary events. It emphasized that the primary objective of treatment should be to lower the morbidity and mortality linked to both hypertension and coronary heart disease (CHD). Additionally, a randomized controlled trial assessed the long-term effects of reduced dietary sodium on cardiovascular disease outcomes, using observational follow-up data from the Trials of Hypertension Prevention (TOHP). The study included two groups: TOHPI with 2,182 participants and TOHP II with 2,382 participants, all randomly assigned. Results showed that 77% of participants experienced morbidity, with 200 reporting cardiovascular events. Those in the intervention group had a 25% lower risk of cardiovascular events compared to the control group (relative risk 0.75, 95% confidence interval 0.57 to 0.99, P=0.04). After adjusting for initial sodium excretion and weight, this risk reduction rose to 30% (relative risk 0.70, 95% confidence interval 0.53 to 0.94). Secondary analyses found that 67 participants died, but the difference in mortality risk was not statistically significant (relative risk 0.80, 95% confidence interval 0.51 to 1.26, P=0.34). The study concluded that reducing sodium intake, which has been shown to lower blood pressure, may also help diminish the long-term risk of cardiovascular events.

In a population-based study conducted in a rural area of Bangalore District, India, researchers assessed stroke awareness among elderly hypertensive individuals. The study included 144 participants selected through purposive sampling, utilizing a structured questionnaire for data collection. Findings revealed that 40% of participants had never heard the term “stroke,” and only 22% recognized the brain as the affected organ. While 51% could identify at least one symptom, 45% of males and 24% of females believed their hypertension increased their stroke risk. Additionally, 56% could not name any risk factors, and only 37% of males and 18% of females demonstrated good overall awareness. The study highlighted the necessity of enhancing stroke education across all levels of care. A hospital-based survey carried out in Northwest India evaluated public awareness regarding stroke warning signs, risk factors, and available treatment options. The research included 1,255 participants and gathered data through interviews. Findings revealed that 55% of participants were unaware that the brain is the organ impacted by stroke. Multivariate analysis showed that higher education (P<0.001; odds ratio 2.6; 95% confidence interval 1.8 to 3.8) and upper socioeconomic status (P<0.005; odds ratio 1.6; 95% confidence interval 1.1 to 2.2) were associated with better knowledge of stroke. The study highlighted the need for increased public education on stroke warning signs and risk factors to improve awareness and treatment understanding.

A cross-sectional survey on age-related disparities in stroke knowledge among community-dwelling older adults included 466 participants selected through randomized sampling. Data were collected via face-to-face interviews. The study found that the oldest old were significantly less aware of acute stroke therapy (odds ratio 0.11, 95% confidence interval 0.02–0.48) and less likely to call emergency medical

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services (odds ratio 0.30, 95% confidence interval 0.12–0.70) compared to younger older adults. The study concluded that significant disparities in stroke knowledge exist between older and oldest old individuals, suggesting that educational campaigns should specifically target the oldest old [40].

A cross-sectional study at Felege Hiwot Referral Hospital in Northwest Ethiopia assessed hypertensive patients' knowledge of stroke risk factors and warning signs. The study involved 278 participants selected through purposive sampling, with data collected via an interviewer-administered questionnaire. The results revealed that 77% of participants did not identify any stroke risk factors and 72.3% did not recognize any warning signs. Only 18.3% had good knowledge about stroke. The study concluded that there is a need for enhanced stroke education through public and social media, particularly targeting low-income and high-risk groups. A descriptive study on hypertensive crises in Visakhapatnam, Andhra Pradesh, India, was conducted from April 1, 2018, to May 31, 2020. The study included 55 patients selected through purposive sampling, with data collected via observation and structured interviews. The findings showed that 88% of the patients were known hypertensives, and 7 patients died before discharge, all due to intracerebral hemorrhage and acute left ventricular failure. The study concluded that males are at higher risk for hypertensive emergencies compared to females and that known hypertensives are more likely to experience acute target organ damage.

A prospective study on survival rates among treated hypertensives, following up over two decades, included 686 participants selected through random sampling. The study revealed that hypertensive men experienced a higher mortality rate from cardiovascular diseases compared to their non-hypertensive counterparts (27.6% vs. 14.2%), with coronary heart disease identified as the leading cause of death (20.1% vs. 10.3%; odds ratio 1.9, 95% confidence interval 1.6 to 2.3). Stroke mortality was also higher among hypertensives (4.4% vs. 1.8%; odds ratio 2.1, 95% confidence interval 1.4 to 2.7). The study concluded that hypertensive men have significantly higher long-term mortality from cardiovascular diseases despite treatment. A prospective cross-sectional study at Yekatit 12 General Hospital in Ethiopia investigated knowledge, attitudes, and practices related to lifestyle modification among hypertensive patients. The study involved 405 participants selected through proportionate allocation. The results showed that 67.7% of participants were knowledgeable about lifestyle modification (95% confidence interval 65.32%–70.08%), and 54.0% had a favorable attitude towards such modifications (95% confidence interval 51.34%–56.6%). However, only 38% of respondents demonstrated good practices (95% confidence interval 19.91%–57.49%). The study recommended promoting knowledge and favorable attitudes toward lifestyle changes, as practices were found to be low [41–43].

A cross-sectional study on hypertension awareness, treatment, and control among adults with chronic kidney disease (CKD) included 3,612 participants, with data collected using structured questionnaires. The study found that 85.7% of participants had hypertension, 98.9% were aware of their condition, and 98.3% were receiving treatment. However, only 67.1% and 46.1% of participants achieved blood pressure control to <140/90 mmHg and <130/80 mmHg, respectively. The study highlighted the need for improved control rates and better understanding of hypertension management among CKD patients. A large multicenter study conducted across China examined the prevalence, awareness, treatment, and management of hypertension among non-dialysis CKD patients, involving 8,927 participants selected through random sampling. Data was gathered through structured questionnaires. The findings revealed that 85.8% of participants were aware of their hypertension, and 81.0% were receiving treatment. However, only 33.1% and 14.1% successfully maintained blood pressure levels below 140/90 mmHg and 130/80 mmHg, respectively. The study concluded that while awareness and treatment rates are high, control of hypertension remains poor, and efforts are needed to improve management as CKD progresses [44].

METHODOLOGY

This article describes the research methodology employed by the investigator. Methodology denotes the structured approach used to address research problems, providing a detailed framework for the study. It covers the entire process from identifying the problem to drawing final conclusions, detailing

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how data will be collected, organized, and analyzed to ensure both validity and reliability. The study aimed to evaluate the effectiveness of health education in enhancing knowledge about particular long-term complications of hypertension among hypertensive patients.

The methodology involved several key steps, including:

1. *Research Approach:* The overall strategy for investigating the research question.
2. *Research Design:* The framework for how the study was structured and conducted.
3. *Setting:* The location where the research was carried out.
4. *Population:* The population from which the sample was drawn.
5. *Sample and Sampling Techniques:* Methods for selecting participants from the population.
6. *Criteria for Sample Selection:* Guidelines for choosing who was included in the study.
7. *Development and Description of Tools:* Creation and explanation of instruments used for data collection.
8. *Pilot Study:* An initial assessment of the study instruments and methods.
9. *Data Collection:* The process of gathering information from participants.
10. *Plan for Data Analysis:* The approach for evaluating the gathered data. These steps collectively ensure a comprehensive and systematic approach to researching the effectiveness of health education on hypertension-related knowledge (Table 1).

Table 1. Systematic Research Approach

Group	Pre-test	Intervention	Post-test
Experimental Group	O1	X	O2

Key:

- *O1:* Pre-test: for assessing the knowledge regarding long-term complications of hypertension among hypertensive patients; before administering health education Structured knowledge questionnaire.
- *X:* Health education on knowledge regarding long-term complications of hypertension among hypertensive patients.
- *O2:* Post-test: for reassessing knowledge regarding long-term complications of hypertension among hypertensive patients; after administering health education

DESIGN

One group pre-test and post-test quasi experimental study.

Purpose: To evaluate the effectiveness of health education on long-term complications of hypertension among hypertensive patients.

Study Setting

Kempegowda Institute of Medical Sciences hospital and Research center Bengaluru

Figure 2 shows the framework for how the study was structured and conducted and schematic representation of research plan.

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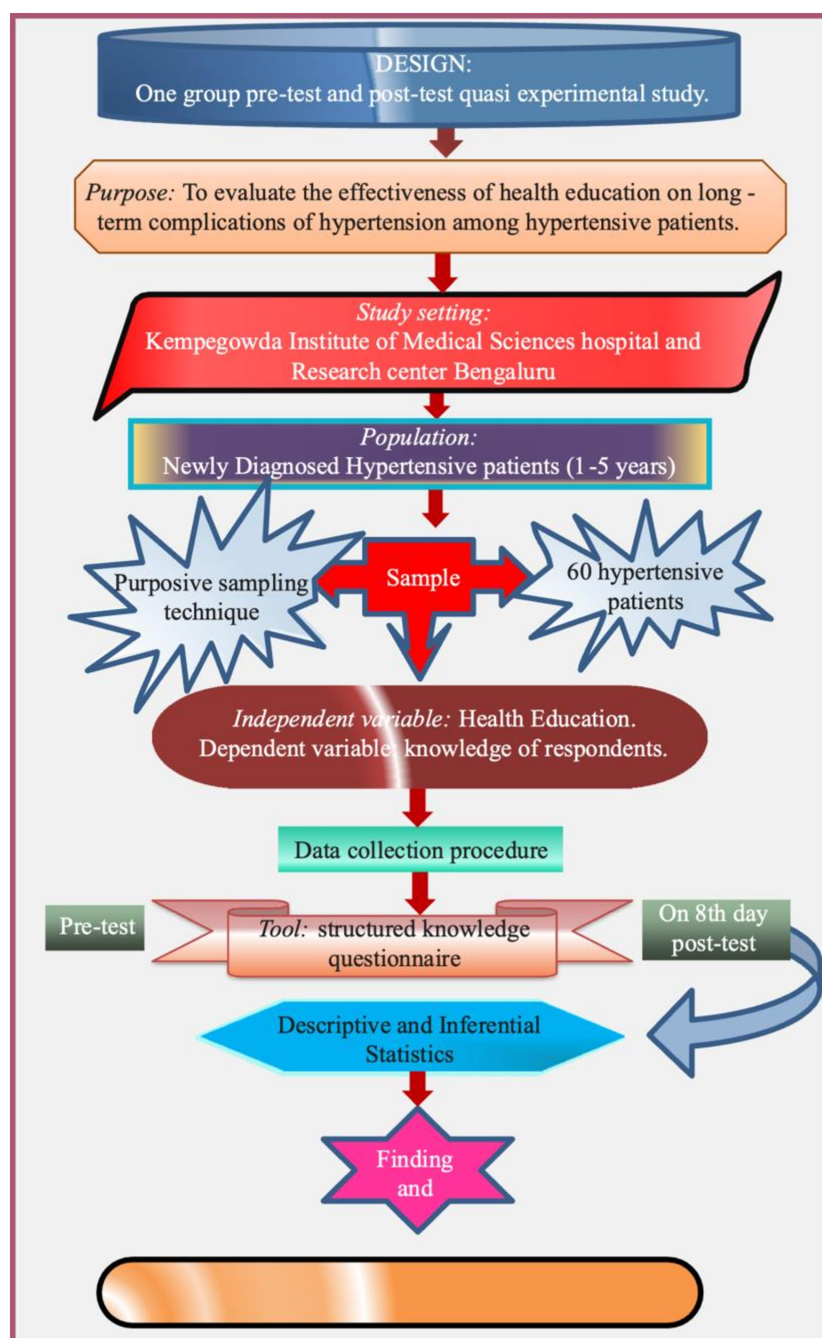

Figure 2. Schematic Representation of Research Plan.

Setting of the Study

This study conducted in Kempegowda Institute of Medical Sciences hospital and Research center Bengaluru. Conducted between 30/05/2022 to 30/06/2022. The criteria for selecting the setting include the accessibility of participants and the practicality of carrying out the study.

Target Population

The focus of this study was on patients newly diagnosed with hypertension within the past 1 to 5 years.

Sample Size

Sample size refers to the number of participants needed for the study. In this research, the total sample size comprises 60 hypertensive patients from the Kempegowda Institute of Medical Sciences Hospital

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and Research Center in Bengaluru.

Sample and Sampling Technique

Sample size refers to the number of participants needed for the study. In this research, the total sample size comprises 60 hypertensive patients from the Kempegowda Institute of Medical Sciences Hospital and Research Center in Bengaluru. The purposive sampling method was used based on the idea that the researcher's understanding of the population and its characteristics allows for the deliberate selection of specific cases to be included in the sample. It is also said that it is a type of probability sampling method in which the researcher selects the subjects based on personal judgement, and which will be the most representative or productive for the study.

Development of a Health Education

The Health Education Placard (WHO) was created based on the objectives, a literature review, and consultations with experts. The steps adopted to development of health education program

PREPARATION OF HEALTH EDUCATION PROGRAMME

Preparation of First Draft of Health Education

The initial draft of the health education program was created with careful consideration of the objectives, a criteria checklist, reviewed literature, and expert opinions. Key factors considered in the development included the professional qualifications of the subjects, the training methods to be used, the simplicity of the language, and the relevance of the teaching aids.

Development of Criteria Checklist to Evaluate the Self-instructional Module

- *Identification and Definition of Objectives:* Objectives were established in behavioral terms.
- *Content Selection*: The content on hypertension was chosen through a literature review and in consultation with experts.
    i. *Content Validity of the Health Education Program:* The initial draft of the structured teaching program, along with the evaluation tool, was reviewed by field experts. Their suggestions were integrated into both the program and the tool.
    ii. *Preparation of the Final Draft of Health Education:* The final version of the health education material was developed after incorporating expert feedback. The teaching plan was refined based on the guide's recommendations.
    iii. *Selection of Teaching Method:* The lecture and discussion method was chosen as the most suitable approach for educating hypertensive patients, with training planned for small groups.
    iv. *Choosing and Preparing Suitable Audio-Visual Aids:* Tools like placards and flashcards were considered effective in improving the teaching experience.
    v. *Organizing the Implementation of the Structured Teaching Program:* The timetable for implementing the structured teaching program was coordinated with the Medical Superintendent/Director and the Nursing Superintendent of the respective hospitals.
    vi. *Determining the Method of Evaluating the health education Program:* The evaluation of structured teaching program was planned through conducting post-test on 8th day after implementation of health education program.
    vii. *Description of health education Program:* The health education was titled “HYPERTENSION: ACT NOW!”. The health education for one session, which was prepared to enhance knowledge regarding of hypertension and its long-term complications of hypertension among hypertensive patients.

It consisted of the following content area:

- What is hypertension?
- How many people have high BP?
- What are the risk factors?
- What are the consequences?
- How to prevent hypertension?

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- How to detect hypertension?
- How to control hypertension?
- (HEARTS)- Healthy lifestyle, Evidence-based treatment protocols, Access to essential medicines and technology, Team-based care, Systems for monitoring.

Selection and Development of Tool

A structured knowledge questionnaire was chosen for the study as it was the most suitable instrument for gathering responses from participants.

Development of the Tool

A structured knowledge questionnaire was designed to evaluate awareness of selected long-term complications of hypertension among hypertensive patients. The steps taken in creating the tool included:

- Conducting a literature review.
- Developing a blueprint.
- Consulting with the guide, statistician, and subject matter expert in medical-surgical nursing.
- Establishing the validity and reliability of the tool.

Description of the Tool

In this study, the following tools were utilized.

Part-I: Consisted of 14 items related to socio-demographic data of the subjects such as Age, Gender, Religion, Marital status, Professional Educational qualification, income, any previous health education attended on hypertension, preexisting diseases, use of contraceptives in female.

Part-II: consisted of 46 items related to hypertension and long-term complications of hypertension.

Scoring of the Items:

Each correct answer was given a score of ‘one’ mark and wrong answers ‘zero’ score.

Content Validity of the Tool

The initial blueprint of the tool, along with the study objectives, was reviewed by 11 experts for content validity, including one expert in English, one in Kannada, and one statistician. Their feedback was used to refine and adjust the tool. The final version of the tool was developed following these modifications and additional input from the guide.

Reliability of the Tool

Following the validation of the tool, it was tested for reliability. A structured knowledge questionnaire was given to 10 participants, and reliability was evaluated using Cronbach’s alpha coefficient. The results showed a Cronbach’s alpha value of 0.73 for the health education program questionnaires, indicating that the tool was reliable.

PILOT STUDY

A pilot study was carried out with 10 hypertensive patients at Shekhar Hospital in Bengaluru from October 15 to October 22, 2021. Participants were chosen through purposive sampling, and the reliability of the tool was evaluated during this pilot study.

A pre-test was first carried out using the structured knowledge questionnaire. Following this, participants took part in a 45-minute health education session that featured both a lecture and a discussion.

On the eighth day, a post-test was given using the same structured knowledge questionnaire to evaluate the effectiveness of the health education program.

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Significant Result of the Pilot Study was as Follows

The data from the Table 2 indicates that a majority (60.0%) of hypertensive patients possessed adequate knowledge about the long-term complications of hypertension, while 40.0% demonstrated moderately adequate knowledge. There were no study participants having inadequate knowledge after health education program. The Cronbach's alpha between health education program questionnaires was found to be 0.73, indicating that the tool was reliable.

Table 2. Comparison of knowledge on selected long-term complications of hypertension among respondents.

S.N.	Level of knowledge	Pre-test		Post-test	
		Frequency	***%***	***Frequency***	***%***
1.	Inadequate	03	30.0	00	00
2.	Moderately Adequate	07	70.0	04	40.0
3.	Adequate	00	00	06	60.0
	Total	10	100.0	10	100.0

Table 3. Paired-t test for comparing knowledge on selected long- term complications of hypertension among respondents.

Paired Differences			't'	df	P-value
Mean	***Std. Deviation***	***SE Mean***			
11.30	4.64	1.46	7.69	9	**<0.000(S)**
't'-table value at 5% loss = 1.83			't'-value =7.69 > 't'-table =1.83 H0 is rejected in favor of H1		

Table 3 reveals that the mean paired difference in knowledge score was 11.30 with **'t'-**value=7.69 with < 0.0001 p-value indicates that health education program on long-term complications of hypertension among respondents was effective in enhancing the knowledge. The findings of the pilot study revealed that the study was feasible.

DATA COLLECTION PROCEDURE

Permission from the Concerned Authority

Formal permission was obtained from the Medical Superintendent of Shekhar Hospital Bengaluru.

Period of Data Collection

The data was collected from 15-10-2021 to 22-10-2021

Plan of Data Analysis

The data obtained was analyzed in terms of achieving the objectives of the study using descriptive and inferential statistics.

Descriptive Statistics

- Frequencies and percentage distribution were used for analysis of socio–demographic characteristics and the level of knowledge regarding hypertension.
- Mean, mean percentage and standard deviation were used for analyzing pre-test and post-test scores.

Inferential statistics:

- Application of paired 't'-test to ascertain whether there is significant difference inthe mean knowledge score of pre-test and post-test values.
- Application of one-way ANOVA to find the association between socio- demographic variables with knowledge scores.

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SAMPLE SIZE ESTIMATION

The sample size estimated by using Yamane formula

$n = N/1+N(e)^2$

N = Population size

e = acceptable sampling error

The population size was considered as sixty. The investigator assumed 5% expected error i.e., 0.05 at 95% confidence level.

$n= N/1+N(e)^2$

$n= 63/1+63(0.05)^2$

n= 63/1+150(0.0025)

n= 63/1+0.375

n= 63/1.375

n= 54.42

The obtained sample size for the study was 54.42. As per the guide suggestion the investigator decided to take a sample of 60 for the study.

RESULTS

This article centers on the analysis and interpretation of data collected to evaluate the effectiveness of health education in improving respondents' understanding of hypertension and its long-term complications. The analysis is derived from data obtained through a structured knowledge questionnaire given to hypertensive patients (n=60).

Presentation of Data

The data were compiled in a master sheet for tabulation and statistical analysis. To examine relationships, the data were organized under the following sections:

Section I: Demographic characteristics of the respondents.

Section II: Overall knowledge scores of the respondents.

Section III: Analysis of the association between demographic variables and pre-test knowledge scores.

Section- I: Demographic Characteristics of Respondents

Data were gathered from a sample of 60 hypertensive patients chosen from the Kempegowda Institute of Medical Sciences Hospital and Research Center in Bengaluru. Analysis of demographic data of the sample is described in terms of Age, Gender, Religion, dietary pattern, Marital status, Qualification, Occupation, Duration of hypertension, Pre-existing diseases, Use of contraceptives in women, Source of Information on hypertension and Habits (Table 4).

Table 4.: Data of respondents according to their demographic characteristics.

S.N.	Demographic Characteristics	Category	Respondents	
			Number	***Percentage***

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1.	Age (in years)	24–31 years	32	53.3
		31–37 years	18	30.0
		38–44 years	10	16.7
2.	Gender	Male	42	70.0
		Female	18	30.0
3.	Religion	Hindu	33	55.0
		Muslim	21	35.0
		Christian	06	10.0
4.	Diet	Vegetarian	38	63.3
		Mixed	22	36.7
5.	Qualification	Non-Formal	07	11.7
		Primary	11	18.3
		Secondary	12	20.0
		Degree & above	30	50.0
6.	Occupation	Government Sector	09	15.0
		Private Sector	34	56.7
		Self-Employee	17	28.3
7.	Marital status	Married	28	46.7
		Unmarried	22	36.6
		Widow/Widower	07	11.7
		Divorced	03	5.0
8.	Residence	Rural	27	45.0
		Urban	33	55.0
9.	Income	< Rs. 15000	21	35.0
		Rs.15000–Rs.2000	31	51.7
		≥ Rs.20000	08	13.3
10.	Suffering with any Pre-existing Disease	Yes	00	00
		No	60	100.0
11.	Learnt importance of diet in hypertension	Yes	00	00
		No	60	00.0
12.	Women have taken any oral contraceptives	Yes	18	100.0
		No	00	00
13.	Attended healt hawareness program	Yes	00	00
		No	60	100.0
14.	*Habits*			
	1. Smoking	Yes	12	20.0
		No	48	80.0
	2. Alcohol	Yes	09	15.0
		No	51	85.0
	3. Drugs	Yes	00	00
		No	60	100.0

Table 5 shows that majority (53.3%) of respondents were between 24–31 years of age, followed by 30.0% between 31–37 years of age and only 16.7% were between 38–44 years of age (Figure 3).

Table 5. Distribution of respondents according to their age.

S.N.	Age	Frequency	Percentage
1	24–31	32	53.3

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2	31–37	18	30.0
3	38–44	10	16.7
Total		*60*	*100.0*

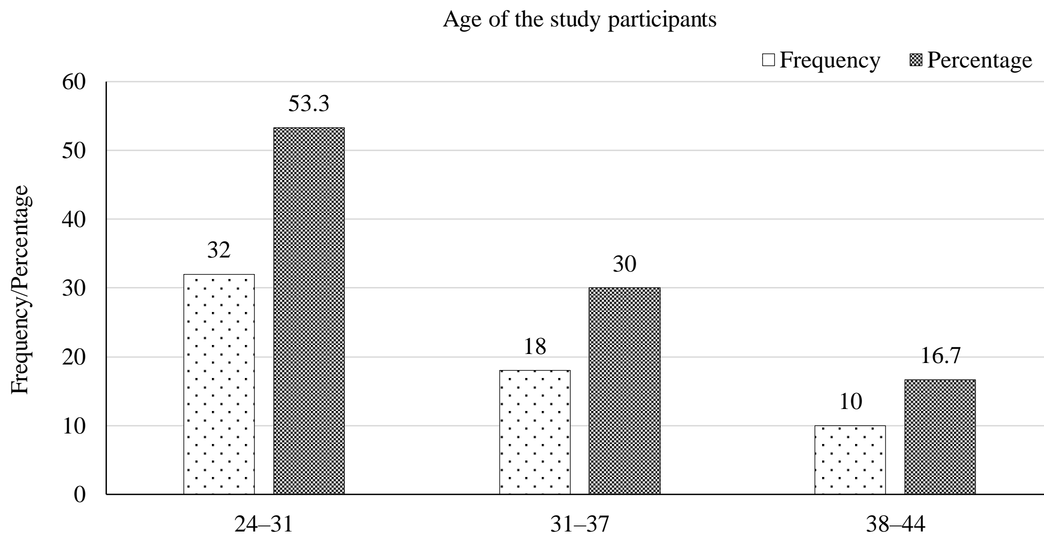

Figure 3. Distribution of hypertensive respondents according to their age.

It is evident from Table 6 that majority (70.0%) of the respondents were male and remaining 30.0% were females (Figure 4).

Table 6. Distribution of respondents according to their gender

S.N.	Gender	Frequency	Percentage
1	Male	42	70.0
2	Female	18	30.0
Total		*60*	*100.0*

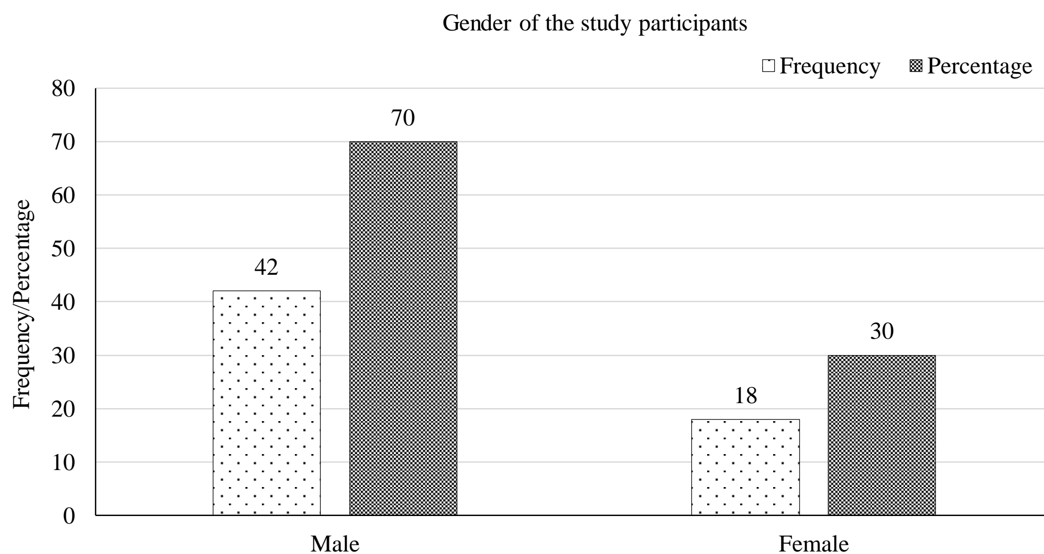

Figure 4. Distribution of respondents according to their gender.

From the Table 7, it is observed that, majority (55.0%) of the study participants were Hindu, 35.0% were Muslims, and remaining 10.0% were Christians (Figure 5).

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Table 7. Distribution of respondents according to their Religion.

S.N.	Religion	Frequency	Percentage
1	Hindu	33	55.0
2	Muslim	21	35.0
3	Christian	06	10.0
Total		*60*	*100.0*

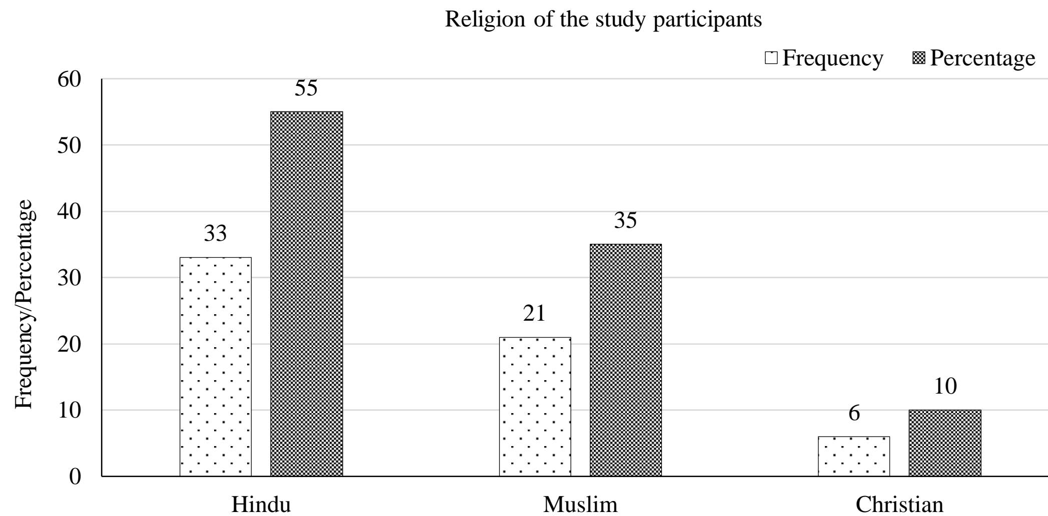

Figure 5. Distribution of respondents according to their Religion.

Table 8 depicts that majority (63.3%) vegetarians and 36.7% were on mixed diet (Figure 6).

Table 8. Distribution of respondents according to their Diet.

S.No.	Diet	Frequency	Percentage
1	Vegetarian	38	63.3
2	Mixed	22	36.7
Total		*60*	*100.0*

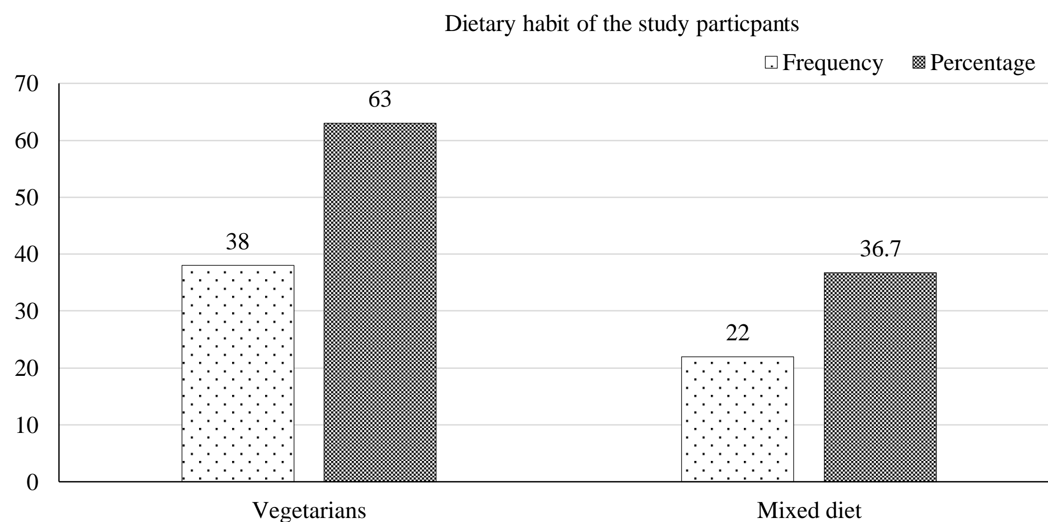

Figure 6. Distribution of respondents according to their Diet.

Table 9 it was clear that, 50.0% of the respondents had completed degree, 20.0% had completed secondary education, 18.3% with primary education and remaining 11.7% had non-formal education (Figure 7).

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Table 9. Distribution of respondents according to their qualification.

S.N.	Qualification	Frequency	Percentage
1	Non-Formal	07	11.7
2	Primary	11	18.3
3	Secondary	12	20.0
4	Degree & above	30	50.0
Total		60	100.0

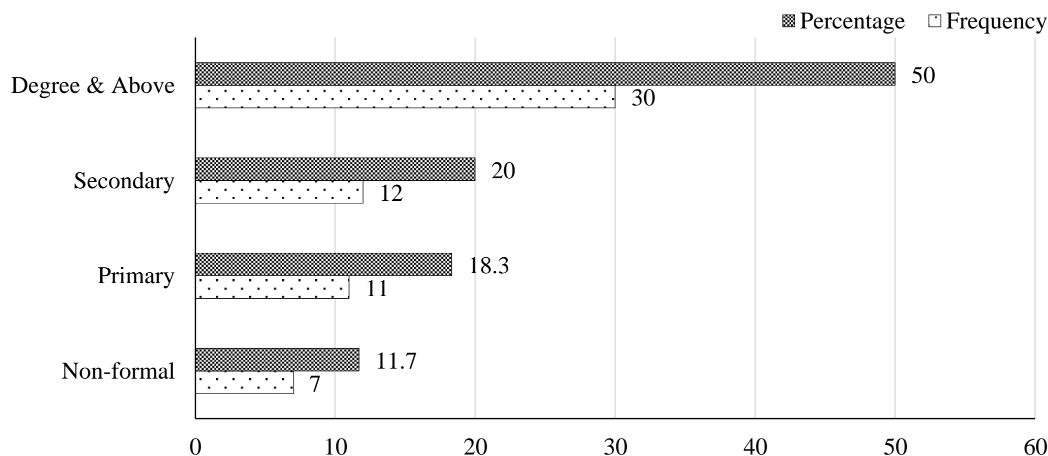

Figure 7. Distribution of respondents according to their qualification.

Table 10 revealed that, majority (56.7%) of respondents were working in private sector followed by, 28.3% were self-employed and remaining 15.0% were working in government sector (Figure 8).

Table 10. Distribution of respondents according to their Occupation.

S.N.	Occupation	Frequency	Percentage
1	Government Sector	09	15.0
2	Private Sector	34	56.7
3	Self-Employee	17	28.3
Total		*60*	*100.0*

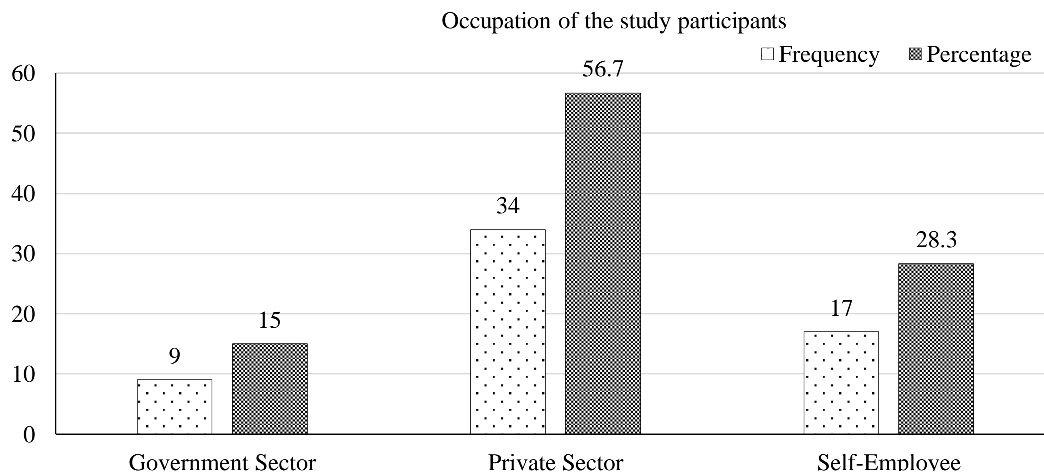

Figure 8. Distribution of respondents according to their Occupation.

Table 11 showed that 46.7% of respondents were married, 36.6% were unmarried, 11.7% were widow/widower and remaining 5.0% were divorced (Figure 9).

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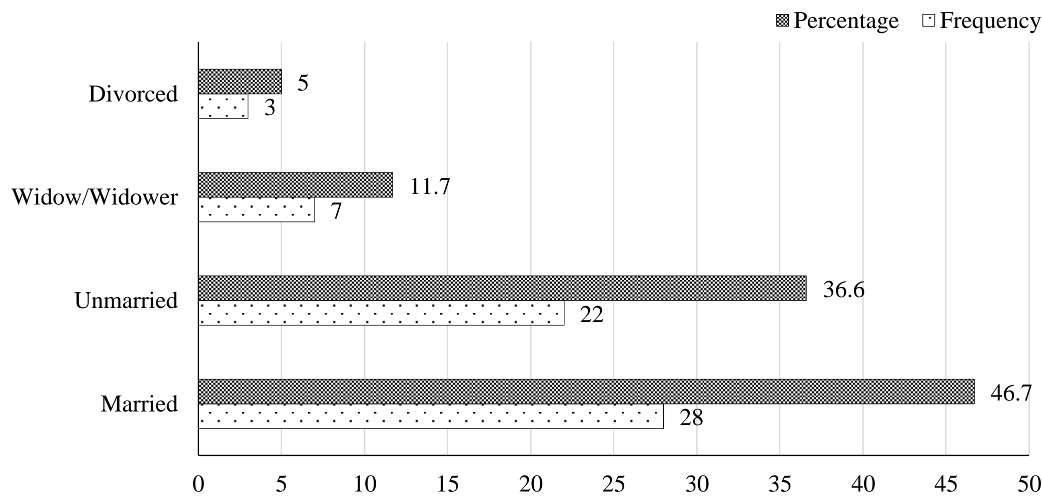

Figure 9. Distribution of respondents according to their marital status.

Table 11. Distribution of respondents according to their marital status

S.N.	Marital status	Frequency	Percentage
1	Married	28	46.7
2	Unmarried	22	36.6
3	Widow/Widower	07	11.7
4	Divorced	03	5.0
Total		*60*	*100.0*

Table 12 it shows that confirmed majority (55.0%) of the respondents were living in urban and remaining 45.0% were living in rural Bengaluru (Figure 10).

Table 12. Distribution of respondents according to their Residence.

S.N.	Residence	Frequency	Percentage
1	Rural	27	45.0
2	Urban	33	55.0
Total		*60*	*100.0*

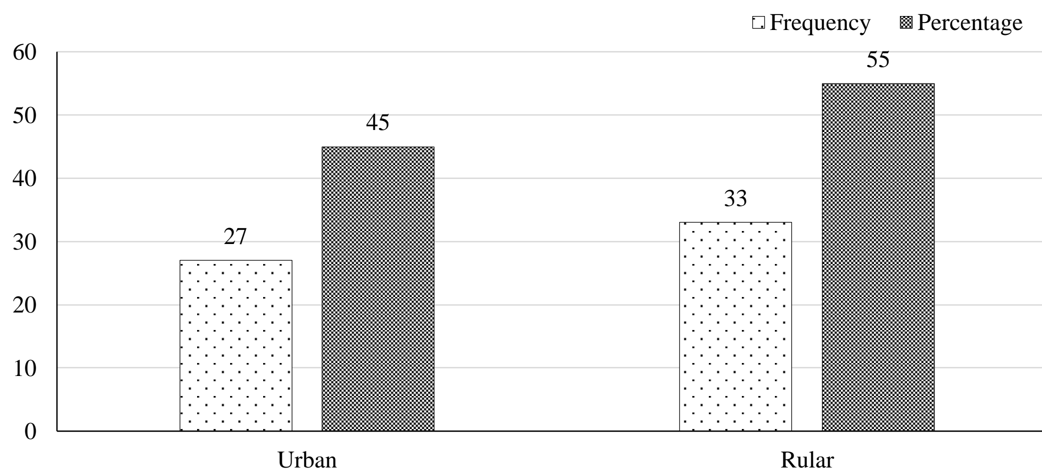

Figure 10. Distribution of respondents according to their Residence.

Table 13 revealed that out of 60 hypertensive patients, 51.7% had family income between 15000–2000Rs, 35.0% had family income < 15000Rs and remaining 13.3% had family income ≥ 20000Rs (Figure 11).

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Table 13. Distribution of hypertensive patient according to their income.

S.N.	Family income	Frequency	Percentage
1	< Rs. 15000	21	35.0
2	Rs 15000–2000	31	51.7
3	≥ Rs 20000	08	13.3
Total		*60*	*100.0*

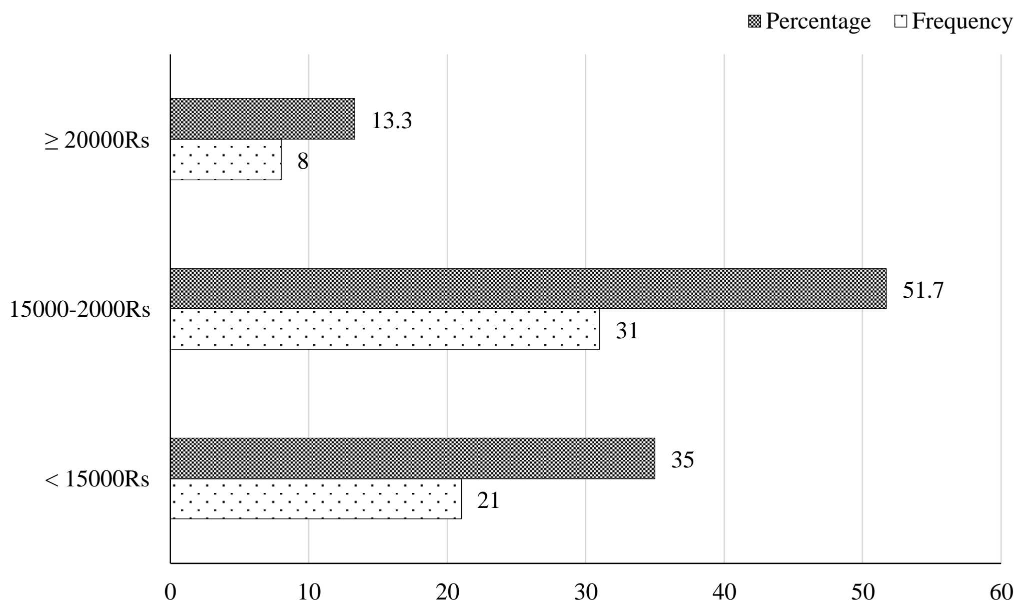

Figure 11. Data of respondents according to their Family income.

Table 14 revealed that majority (91.7%) of respondents had inadequate knowledge on long-term complications of hypertension and only 8.3% had moderately adequate knowledge. There were no respondents having adequate knowledge (Figure 12).

From the Table 15 it is observed after health education program majority (91.7%) had adequate knowledge regarding long-term complications of hypertension, 8.3% had moderately adequate knowledge and 5.0% remained with inadequate knowledge (Figure 13).

Tables 16 & 17 showed that mean paired difference in knowledge score was 29.65 with't'-value=37.71 < 0.01 indicates that health education program on long-term complications of hypertension among respondents was effective in enhancing the knowledge (Figure 14).

Table 14. Assessment of pre-test knowledge regarding selected long- term complications of hypertension among respondents.

S.N.	Level of knowledge	Frequency	Percentage
1	Inadequate	55	91.7
2	Moderately Adequate	05	8.3
3	Adequate	00	00
	Total	*60*	*100.0*

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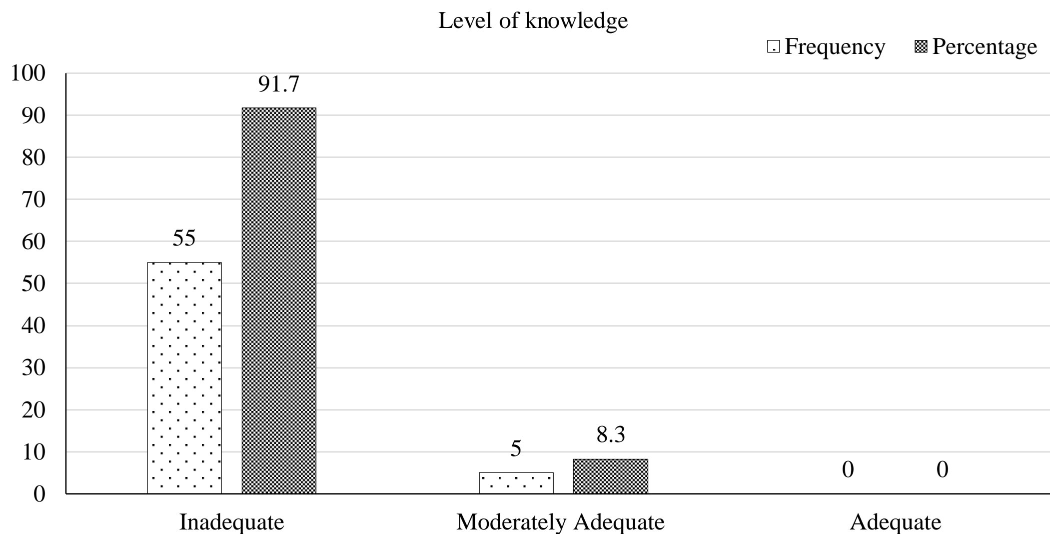

Figure 12. Assessment of pretest knowledge regarding selected long-term complications of hypertension among respondents.

Table 15. Comparison of pre-test & post-test knowledge on selected long-term complications of hypertension among respondents.

S.N.	Level of knowledge	Pre-test		Post-test	
		Frequency	*%*	*Frequency*	*%*
1	Inadequate	55	91.7	03	5.0
2	Moderately Adequate	05	8.3	02	3.3
3	Adequate	00	00	55	91.7
Total		*60*	*100.0*	*60*	*100.0*

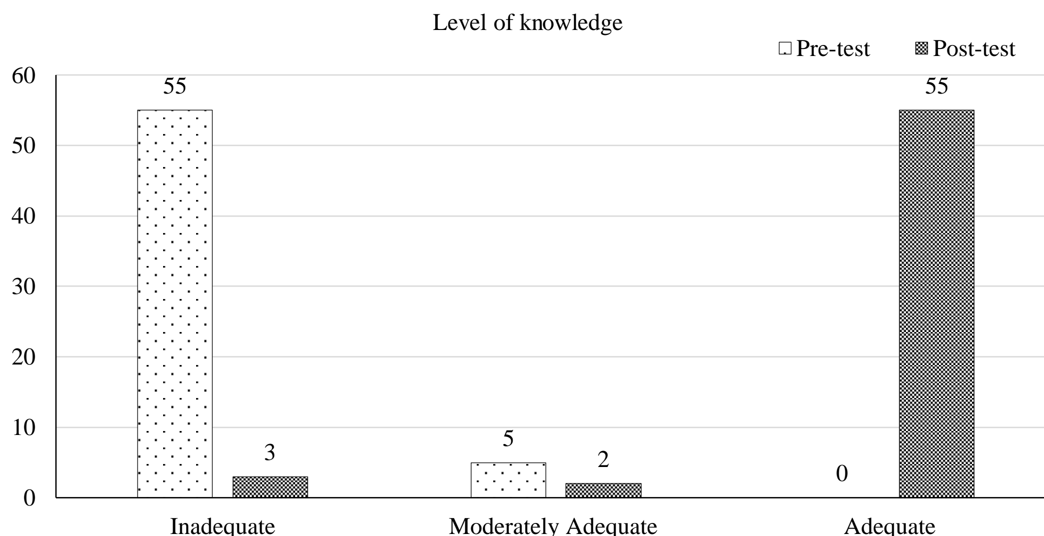

Figure 13. Comparison of pre-test & post-test knowledge on selected long-term complications of hypertension among respondents.

Table 16. Paired Samples Statistics of knowledge on long-term complications of hypertension among hypertensive patients.

	Mean	N	Std. Deviation	Std. Error Mean
Pre-test	13.0000	60	3.43462	0.44341
Post-test	42.6500	60	5.31651	0.68636

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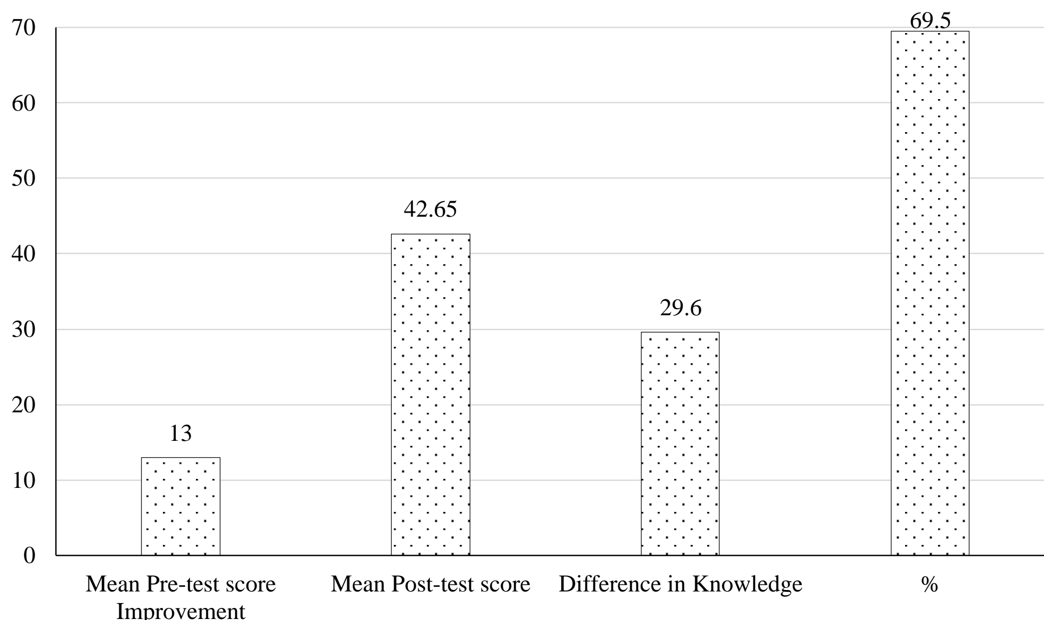

Figure 14. Comparison of knowledge on long-term complications of hypertension among representatives.

Table 17. Paired 't'-test for comparing overall knowledge on selected long-term complications of hypertension among respondents.

Paired Differences			**'t'**	**df**	**P-value**
Mean	***Std. Deviation***	***SE Mean***			
29.65	6.08	0.78	37.71	59	**<0.000(S)**
't'-table value at 5% loss =1.67			't'-calculated value =37.71 > 't'-table =1.67 H0 is rejected in favor of H1		

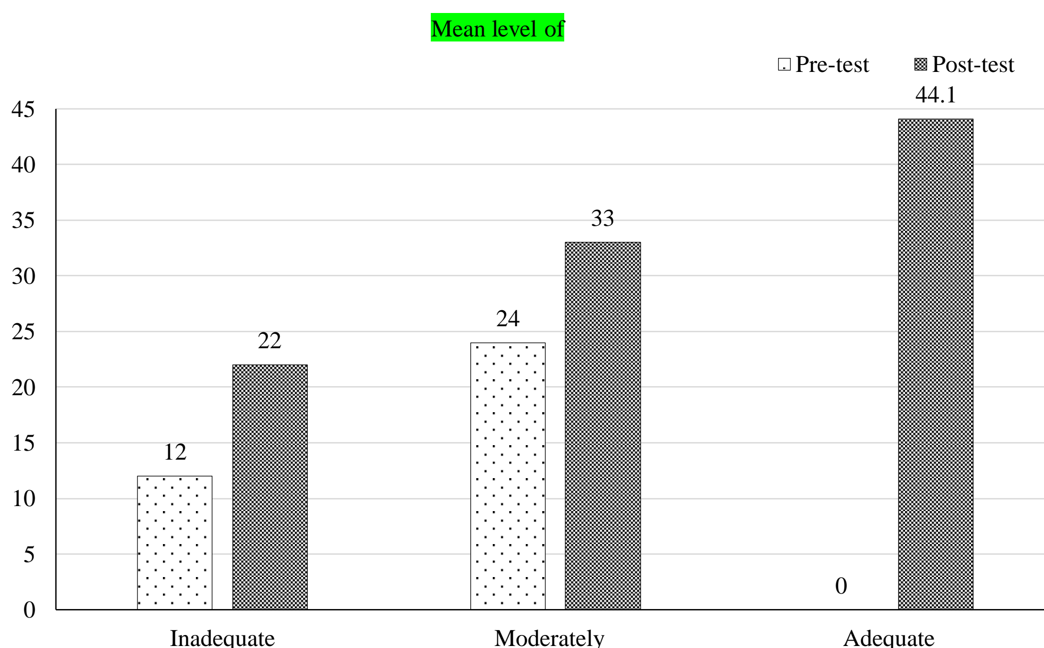

Figure 15. Level of knowledge on long-term complications of hypertension.

From Figure 15, it was seen that mean level of knowledge has increased significantly in all levels.

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Table 18. Association between knowledge on long-term complications of hypertension among respondents with their selected demographic variables

Demographic Variables	Pre-test Knowledge		Chi- square	Df	p-value	Result
	≤*M*	>*M*				
Age						
24–31	22	10	1.727	2	0.422	NS
31–37	9	9				
38–44	6	4				
Gender						
Male	28	14	1.481(b)	1	.224	NS
Female	9	9				
Religion						
Hindu	22	11	10.848	2	0.004	S
Muslim	15	6				
Christian	0	6				
Dietary Pattern						
Vegetarian	26	12	2.00	1	0.157	NS
Mixed	11	11				
Education						
Non-Formal	4	3	1.298	3	0.730	NS
Primary	7	4				
Secondary	9	3				
Degree & Above	17	13				
Occupation						
Government Sector	7	2	2.656	2	0.265	NS
Private Sector	18	16				
Self-Employee	12	5				
Marital status						
Married	20	8	7.039	3	0.071	NS
Unmarried	14	8				
Widow/Widower	3	4				
Divorced	0	3				
Residence						
Rural	17	10	0.035	1	0.852	NS
Urban	20	13				
Family income						
< 15000Rs	14	7	0.685	2	0.710	NS
15000–20000Rs	19	12				
>=20000Rs	4	4				
Smoking						
Yes	10	2	2.979	1	0.084	NS
No	27	21				
Alcohol						
Yes	8	1	3.319	1	0.068	NS
No	29	22				

Table 18 shows that there was no association between knowledge on long-term complications of hypertension among respondents with their selected demographic variables such as age, gender, occupation, marital status, residence, habits and with low chi-square value, but it was highly associated with religion with smaller chi-square p- value < 0.05.

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DISCUSSION ON FINDINGS

The result obtained are discussed in different section as follows:

Section I: Demographic characteristics of respondents under study.

Section II: Overall knowledge scores of respondents.

Section III: Analysis of the relationship between demographic variables and pre-test knowledge scores.

Section I: Demographic Characteristics of Respondents Under Study

Majority of respondents were (53.3%) in the age group of 24–31 years, (70.0%) were males, (33%) were Hindus, (63.3%) were on vegetarian diet, (50.0%) were qualification of degree and above, (56.7%) were private sector workers, (46.7%) were married, (55.0%) were of urban residence, (51.7%) were having monthly family income of Rs.15000–20000, (20.0%) were smokers, (15.0%) were alcoholic, (100%) of women respondents have taken contraceptives.

Section II: Overall Knowledge Scores of Respondents

Findings Related to Effectiveness of Health Education Program

Distribution of respondents according to their pre-test and post-test knowledge scores. In this study, the respondents meeting the inclusion criteria were given 46 items of structured knowledge questionnaire to assess the level of knowledge. Using a structured knowledge questionnaire, knowledge level of 60 respondents was assessed and finding revealed that:

- The mean percentage knowledge score of the pretest level were maximum in the area of general information and about hypertension (13.0%) and the mean percentage knowledge score of post-test level were maximum in the area of general information and about hypertension and long-term complications of hypertension (69.5%.)
- The pre-test knowledge of majority (91.7%) respondents was inadequate, (8.3%) respondents were moderately adequate. were as post-test level of knowledge of (91.7%) of respondents had adequate knowledge, (3.3%) respondents had moderate, (5.0%) had inadequate.

Computed t-value ($t_{60} = 37.71$) < 0.01 which represents the significant gain in knowledge through health education program.

Hence the H1 was accepted. Therefore, it is suggested that the health education program was effective in enhancing the respondents' knowledge.

Section III

Analysis of association between demographic variables with pre-test knowledge scores.

In the present study there was no association between knowledge on long-term complications of hypertension among respondents with their selected demographic variables such as age, gender, occupation, marital status, residence, smoking habit and with low chi-square value, but it was highly associated with religion with smaller chi- square p-value < 0.05.

Objective of the study is to assess the pre-test knowledge regarding long- term complications of hypertension among hypertensive patients

The study's findings are supported by research conducted by Urinder Kaur, Kumari Devi, and Rashmi, which focused on preventing hypertension through modifiable lifestyle changes using Information, Education, and Communication (IEC). This study involved 40 hypertensive patients aged between 18 and 40 years (SD=9.82). Of these, 25 participants (62.5%) demonstrated average practices, while 10% exhibited poor practices. Following the IEC intervention, 16 women (40%) showed

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improvements in their practices, achieving good scores, while another 16 (40%) maintained average scores. The computed coefficient of correlation (r) was 0.731, which is greater than the table value of 0.304 at df (38). This indicates a significant positive correlation between post-test knowledge and post-test practice scores at the 0.05 level of significance.

Objective is to assess the effectiveness of health education on knowledge regarding hypertension and its long-term complications of hypertension among hypertensive patients

In the current study, the average post-test knowledge score was 42.65, which was significantly higher than the mean pre-test score. The mean paired difference in knowledge scores was 29.65, with a standard deviation of 6.08, and a t-value of 37.71, exceeding the table value ($t60 = 1.67$), while the p-value was less than 0.01. The comparison of pre-test and post-test scores indicated that 91.7% of participants had inadequate knowledge, while 8.3% had moderately adequate knowledge. This demonstrates that the health education program on selected long-term complications of hypertension was effective in improving respondents' knowledge.

The findings of the study were reinforced by research conducted which evaluated the effectiveness of a health education program aimed at managing hypertension among hypertensive clients in Khan Ahmedpur village, Ambala district, Haryana. A total of 30 participants were selected using purposive sampling, and data were collected through a structured knowledge interview schedule. The results revealed that the mean pre-test knowledge scores (11.83) were lower than mean post-test knowledge score (19.97) with a mean difference of 8.14 and computed 't'-value comes out to be 15.83 which is significant at 0.05 level of significance.

Objective is to find out the association between pre-test knowledge score and post-test knowledge scores of hypertensive patients.

The study's findings were corroborated by research conducted by Shikha Singh, Ravi Shankar, and Gyan Prakash Singh, which focused on the prevalence and associated risk factors of hypertension in urban Varanasi. This cross-sectional study explored different aspects of hypertension in the region. The sample consisted of 640 participants, with approximately 96% identifying as Hindu, and the majority belonging to the general category. The significance test indicated a p-value of 0.087.

$df = 4\ \chi 2 = 8.12.$

This cross-sectional study explored different aspects of hypertension in the region. The sample consisted of 640 participants, with approximately 96% identifying as Hindu, and the majority belonging to the general category. The significance test indicated a p-value of 0.087. In this rural study, 299 participants were chosen through a door-to-door survey. The results showed an overall prevalence of hypertension at 16.72% (95% confidence interval: 0.1292–0.2137), with a prevalence rate of 17.8% among females and 15.5% among males. The study found that participants with primary and secondary or no formal education had an odds ratio of 0.293 (95% CI: 0.082–1.045). Additionally, body mass index (BMI) was significantly linked to hypertension, with an odds ratio of 0.824 (95% CI: 0.692–0.982). The research identified education level, occupation, and family history of hypertension as key risk factors, concluding that there was a significant association between socio-demographic variables and hypertension, with the exception of religion.

In the current study findings related to association between pre-test knowledge score and selected socio-demographic variables respondents of.

Chi-square values were computed to examine the relationship between post-test knowledge levels and various socio-demographic variables, such as age, gender, religion, dietary habits, marital status, education, occupation, duration of hypertension, pre-existing conditions, and lifestyle choices. The results indicated that for age, gender, dietary habits, marital status, education, residence, family income, occupation, and lifestyle choices, the chi-square values were below the critical threshold, suggesting no significant relationship. However, the chi-square value for the variable “religion” exceeded the critical

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value at the 0.05 significance level, leading to the acceptance of the research hypothesis (H2) at this level of significance [45-48].

Summary

This article dealt with the discussion of the major findings of the present study andthe comparison with the other studies in accordance with the objectives of the study and hypothesis, hence confirmed that health education was effective in increasing the knowledge of respondents.

CONCLUSION

In this present study was to assess the knowledge of hypertensive patients regarding hypertension and its long-term complications of hypertension, as well as to provide information to them about the hypertension and its selected long-term complications of hypertension. Following the pre-test, where participants scored an average of 13.0%, health education was provided, resulting in a post-test average of 42.65%. This reflects a significant increase of 29.65%, indicating an improvement in knowledge of 69.5%.

The health education placard covered the following areas:

- Basic information about hypertension
- Awareness of the prevalence of high blood pressure
- Knowledge of risk factors
- Understanding the potential consequences
- Strategies for preventing hypertension
- Guidance for the early identification of hypertension
- Information on effective hypertension management
- The HEARTS initiative, which emphasizes a healthy lifestyle, evidence-based treatment protocols, access to essential medications and technology, collaborative care, and systems for tracking health outcomes.

The following conclusions were drawn from the study.

- Prior to the implementation of health education, respondents demonstrated insufficient knowledge.
- Following the introduction of health education, post-test results indicated a significant improvement in respondents' understanding of hypertension and its associated long-term complications.
- Health education has been shown to be an effective teaching method.
- This health education can provide a useful benchmark for future comparisons.
- It will be particularly beneficial for newly diagnosed hypertensive patients, helping them understand various treatment options for preventing selected long-term complications.

Implication

The findings of this study have important implications for nursing education, practice, administration, and research.

Nursing Education

Nurses should have a thorough knowledge regarding the various aspects of hypertension and its long-term complications to provide care to the society in case of emergencies. One of the important aspects of this study is to develop in depth knowledge regarding the hypertension and it’s selected long-term complications of hypertension, so that they can motivate the hypertensive patients and its complications, prevention practices. This can be achieved by incorporating education on different types of hypertension throughout all levels of the nursing curriculum. The study's findings will aid nurses in understanding the importance of health education related to hypertension and its long-term complications.

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Nursing Practice

Health education serves as a vital tool for healthcare agencies, being one of the most cost-effective methods to encourage healthy living. Nurses, whether in educational settings or community health, need to be well-informed about hypertension and its long-term effects. They should prioritize empowering newly diagnosed hypertensive patients with the essential skills and knowledge. As educators, nurses are uniquely positioned to positively impact health-related behaviors.

Nurses should organize training programs and can also integrate health education into college health curricula. Health education can be delivered in outpatient departments and colleges through various approaches, including lectures, pamphlets, structured teaching programs, and informational booklets.

Nursing Administration

Nurse administrators should take the lead in developing plans and policies for ongoing education programs aimed at staff nurses, particularly those involved in school and college health. Each session should include assessments of knowledge and skills before and after the program to evaluate its effectiveness and identify any challenges faced. Adequate planning for personnel, budget, resources, and time is essential for conducting a successful educational initiative.

Staff should be encouraged to create teaching materials and audio-visual aids on various health topics and display them in their respective work areas. Health administration needs to ensure that the education department is aware of the significance of hypertension and its long-term complications. Additionally, staff should be assigned to implement the planned teaching programs in hospitals, colleges, schools, and community settings.

Nursing Research

Emphasizing research and clinical studies is crucial for improving the quality of nursing care. This study acts as an initial exploration into educating hypertensive patients about hypertension and its long-term complications. Consequently, nurse researchers must be well-versed in these issues and their related complications. There is a considerable need for research that tackles the challenges faced by adults, along with training programs and strategies to enhance awareness of hypertension, which should be integrated into college curricula. This study illustrates that health education can be an effective teaching approach.

Limitations of the Study

- The study targeted a small, specific group of newly diagnosed hypertensive patients (1–5 years) at KIMS Hospital in Bengaluru, selected through purposive sampling. As a result, the findings may not be widely applicable outside this population, with a sample size restricted to 60 participants.
- External factors, such as media exposure, personal interactions, or any events occurring between the pre-test and post-test, were outside the investigator's control since no control group was utilized, potentially affecting internal validity.
- The teaching plan was developed based on literature reviews and the investigator's experience rather than tailored to the specific learning needs of the respondents in the study.
- There were no follow-up attempts to assess knowledge retention after the post-test was administered.

Recommendations

Based on study findings, following recommendations have been made for further study.

- A comparative study may be conducted between urban and rural hypertensive patients.
- An experimental study can be conducted.
- Similar study can be undertaken using other teaching strategies.
- A similar study may be replicated with increased period of time provide for training program with still elaborative and in-depth content like the workshop.

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