

KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS ANTI-HYPERTENSIVE DRUGS AND ADHERENCE TO THERAPY AMONG HYPERTENSIVE PATIENTS

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ABSTRACT

Hypertension represents a worldwide public health issue, being one of the main risk factors for developing cardiovascular diseases. The poor compliance with the prescribed antihypertensive therapy represents a critical problem that hinders the adequate control of blood pressure, leads to a higher risk of comorbidities, hospitalizations, and healthcare expenses. This study aims to determine the level of knowledge, attitude, and practice related to the prescribed antihypertensive drugs and evaluate the medication adherence in hypertensive patients in a tertiary care hospital. The prospective, cross-sectional study design was employed with a structured questionnaire designed to assess the knowledge, attitude, and practice of the patients. The medication adherence was assessed by using a validated instrument designed to evaluate medication adherence. The collected data were analyzed by descriptive statistics and inferential statistics to establish the relation between patient characteristics, knowledge, attitude, practice, and adherence. The results show that a higher knowledge and a positive attitude towards hypertension and its treatment led to a good medication adherence and healthy self-care practices. Poor knowledge and a negative attitude contributed to low adherence and an unsatisfactory management of the disease. This study provides evidence of the vital role of patient education and ongoing counseling for improved antihypertensive treatment compliance. The role of pharmacist-led interventions (individualized counseling, frequent follow-up) for increased patients' knowledge of hypertension and adherence to the therapy is recommended to improve the clinical outcomes. Enhancing education and enhancing the compliance can be regarded as necessary tools for optimal control of hypertension.

KEYWORDS: Hypertension, Medication Adherence, Patient Education, Pharmacist-Led Counseling.

INTRODUCTION

Hypertension is a condition in which the pressure of the blood is highly elevated.^[1] Normal range of blood pressure is 120/80mmHg. There is greater prevalence of hypertension reported from different regions of India. Current studies have reported that hypertension is present in 25 - 30% urban and 10 - 15% of rural population in India.^[2] Hypertension is a major public health problem worldwide and one of the primary causes of cardiovascular diseases.^[3] Among the various disease conditions hypertension is considered as an important factor which leads to severe burden of diseases in South Asia.^[4] There is greater prevalence of hypertension reported from different regions of India. Current studies have reported that hypertension is present in 25 - 30% urban and 10 - 15% of rural population in India.^[2] Recent studies conducted in India estimate the presence of 66 million hypertensive patients, accounting for 25% of adults in urban areas, and 10% in rural areas. A total of 57% of all stroked and 24% of all the Coronary heart disease deaths in India are caused due to its complications.^[4]

In South India a survey shows that among 26,000 adults, the prevalence of hypertension was found to be 20%. It was also observed that the prevalence was comparatively higher in men (23%) than in women (17%). The rising cause of hypertension is mainly due to lack of understanding about the disease, inadequate patient education programs, poor economic status etc. which is leading to medication non-adherence. Uncontrolled hypertension often causes issues like higher morbidity and increased health care costs. This summons for urgent prevention and control measures for hypertension.^[3]

Medication taking behavior is extremely complex and requires multiple strategies to improve adherence. Patients have to understand the importance of taking their medication, refilling their prescription and having a better quality of life. Adherence to antihypertensive drugs is an important factor of achieving desirable blood pressure, however poor adherence to medication still remains a major problem among hypertensive patients.^[1] It's been known that non-adherence is one of the main causes of failure in achieving better therapeutic control over blood pressure. Influence of non-adherence to hypertension medication has important influence on therapeutic outcomes, re-admissions, regular visits through outpatient department, longer hospitalization, and additional financial burden to the community by increasing the cost of treatment and hospitalization.^[2]

Pharmacists can play an important role in achieving positive therapeutic outcomes by motivating patients to adhere to the treatment. Necessary information about the treatment and other aspects can be understood only when the patients are educated well.^[5]

A correct assessment and understanding of knowledge, attitude, and practice (KAP) factors are helpful in the cases of chronic conditions such as hypertension, for which prevention and control are very important along with the lifelong adoption of a healthy lifestyle.^[5]

Knowledge is a set of understandings whereas attitude is a way of being and is an intermediate variable between the situation and the response to this situation. Practices or behaviors are the observable actions of an individual in response to a stimulus.^[5]

Knowledge, Attitude and Practice (KAP) Questionnaire is mainly used to understand people's perception about disease, their feelings and behavior towards disease management. It includes awareness regarding medication names, lifestyle interventions, physical activity etc. Knowledge and awareness of hypertension, anti-hypertensive medications and their blood pressure helps in improving the outcome of patient's health. Knowledge influences the adherence, and therefore better adherence is associated towards better blood pressure control.

Patient information leaflets (PIL) Patient information leaflets serve as a valuable tool to enhance patient knowledge. Their primary purpose is to bridge knowledge gaps and support patients in improving their understanding of their disease, medications, and related health information at their own convenience.^[6]

Written patient information is often provided to support patients and complement the communication they receive from doctors. It helps bridge the communication gap between patients and physicians while highlighting important warnings and instructions. Such information can capture patients' attention, encourage medication adherence, and promote positive lifestyle changes.^[7]

1.1 Lifestyle modifications recommended by JNC-8^[4]

Modifications	Recommendations	Avg, sbp, reduction range
Weight reduction	Maintain normal body weight [BMI 18.5 – 24.9 kg/m ²]	5-20 mmHg/10 kg
DASH Therapy	Minimise the quantity of saturated fat and should consume food rich in low fat dairy products	8-14 mmHg
Dietary sodium retention	Minimise dietary Sodium consumption to 6 g Sodium	2-8 mmHg
Aerobic physical activity	Daily aerobic physical activity for atleast half an hour per day	4-9 mmHg
Moderation of alcohol consumption	Men: limit to <2 drinks per day Women and lighter weight persons: limit to <1 drink per day	2-4 mmHg

MATERIALS AND METHOD

Study Design

A prospective cross-sectional study was conducted to evaluate the knowledge, attitude, and practice (KAP) towards antihypertensive drugs and adherence to therapy among hypertensive patients.

Study Site

The study was carried out at the Department of General Medicine, S.S. Institute of Medical Sciences and Research Centre, Davangere, Karnataka.

Duration of Study

The study was conducted over a period of six months.

Sample Size Calculation

Sample size was calculated based on a study by Selladurai Pirasath et al., which reported that 58.8% of hypertensive patients demonstrated good adherence to prescribed medications. At a 5% level of significance and an absolute precision of 6%, the estimated sample size was **258**. Considering a 5% dropout rate, the final sample size was **271**.

Sampling Methods

Patients were selected using convenience sampling based on inclusion and exclusion criteria.

Study Criteria

Inclusion Criteria: patient aged 18 years and above, patient who are on antihypertensive medications, patient willing to participate and able to read either Kannada or English.

Exclusion Criteria: pregnant and lactating women, patients diagnosed with cancer or psychiatric conditions, and patients were not taking antihypertensive medication.

Source of Data

Data were collected from outpatient and inpatient case sheets as well as through direct patient interviews.

Ethical Considerations

Prior to the study, approval was obtained from the Institutional Ethics Committee Ref: IERB No: 242- 2025. All participants were provided with informed consent form, and confidentiality of patient data was maintained.

Study Procedure

Eligible patients were enrolled after obtaining informed consent. A structured KAP pre-test questionnaire was administered to assess baseline knowledge, attitude, and practices. Patients received a PIL validated by 5 general physicians, 1 head nurse, 1 teaching pharmacist from ssims and rc, along with structured counseling. Readability of PIL was assessed using Flesch Reading Ease (FRE) and Flesch-Kincaid Grade Level (FKGL). The score of FRE and FKGL of PIL was found to be 61.6 and 7.2 respectively. A post-test questionnaire was administered after 30 minutes to evaluate changes in knowledge, attitude, and practice. Data were collected and analyzed accordingly.

Statistical Analysis

Statistical analysis was performed using SPSS version 20.0 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp). Descriptive statistics were expressed as mean and standard deviation. Categorical variables were presented as frequency and percentage. Pre–post comparisons of knowledge, attitude, and practice were conducted using paired t-test. A p-value <0.05 was considered statistically significant.

5. RESULTS

A total of 271 patients diagnosed with hypertension in a tertiary care teaching hospital were included in the study. All the patients were assessed to determine the Knowledge, Attitude, Practice towards hypertensive drugs.

5.1. Distribution of subjects based on demographic details:

A total of 271 patients with hypertension were included in the study. Out of which notably there were 146 males (54%) and 125 females (46%).

Sex Distribution of Study Participants

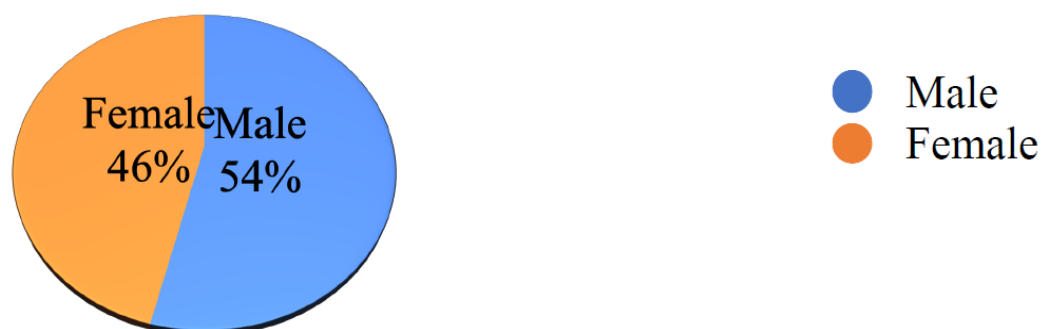


Fig 5.1.1 Sex Distribution of study participants.

A total of 271 patients with hypertension or included in the study. Out of which notably there were 0 (0.0%) patients from age group of 0-18, 6(2.2%) patients from age group of 19-30, 68(25.09%), patients from age group of 31-45, 124(45.76%) patients from age group 46-60, 64(23.62%) patients from age group of 61-75, 9(3.32%) patients or above 76 years of age. Majority of patients belong to the age group of 31 to 45 and 46 to 60. This is depicted in table 5.1 and figure 5.1.2.

Table 5.1: Distribution of subjects based on age.

AGE	NO. OF SUBJECTS	PERCENTAGE
0-18	0	0.00
19-30	6	2.21
31-45	68	25.09
46-60	124	45.76
61-75	64	23.62
76	9	3.32

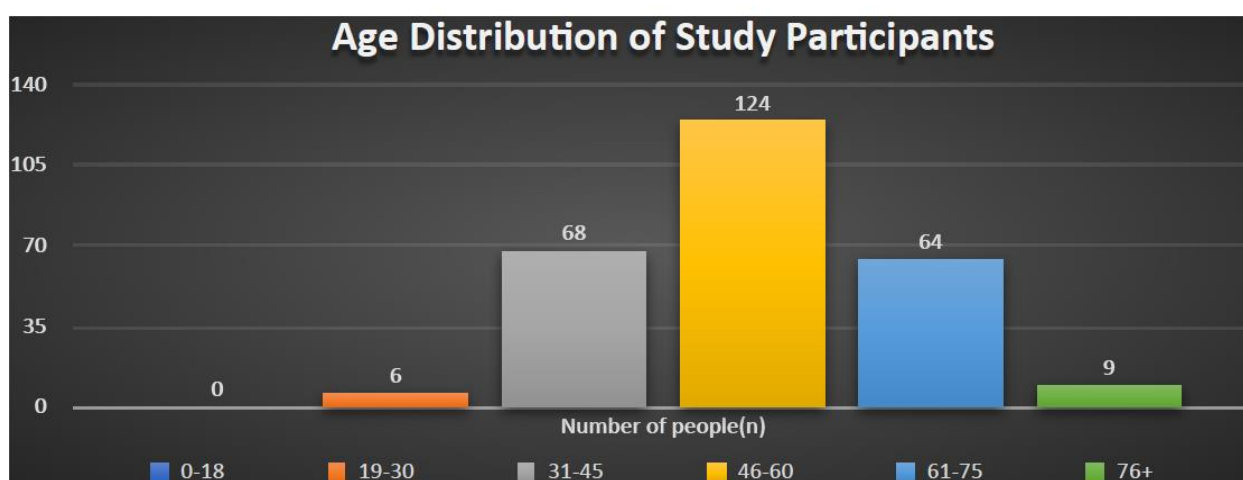


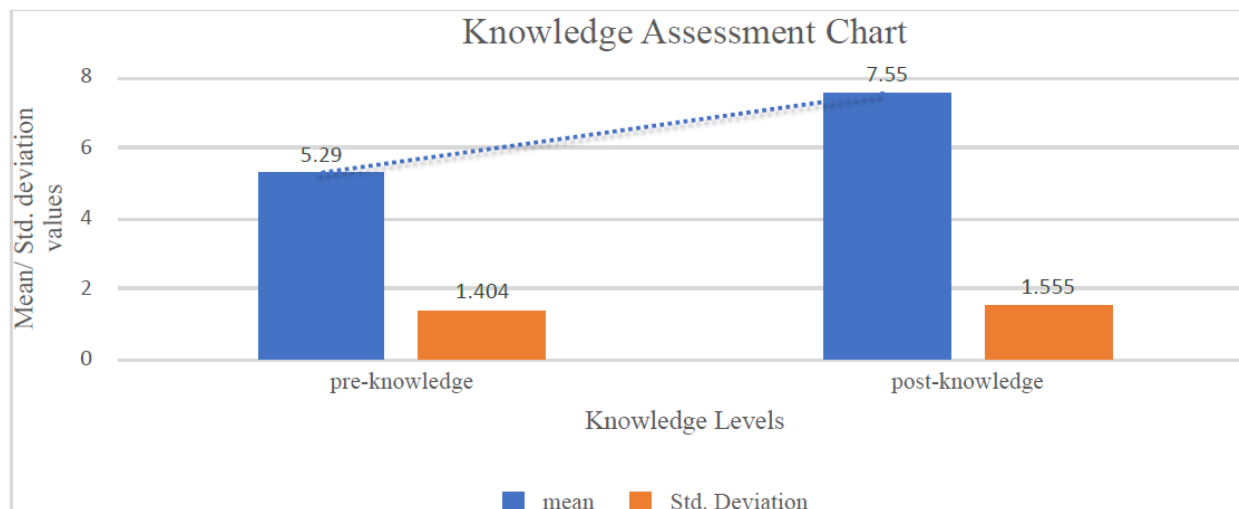
Fig. 5.1.2: Age distribution of study participants.

5.2. Pre-Post comparison of Knowledge among Study Participants:

In this study Mean score improved from 5.29 (pre) to 7.55 (post). The difference of about +2.26 points was statistically highly significant ($t(270) = -16.43$, $p < 0.001$). Patients showed better awareness and understanding after counselling.

Table 5.2: Values of Knowledge pre and post counseling.

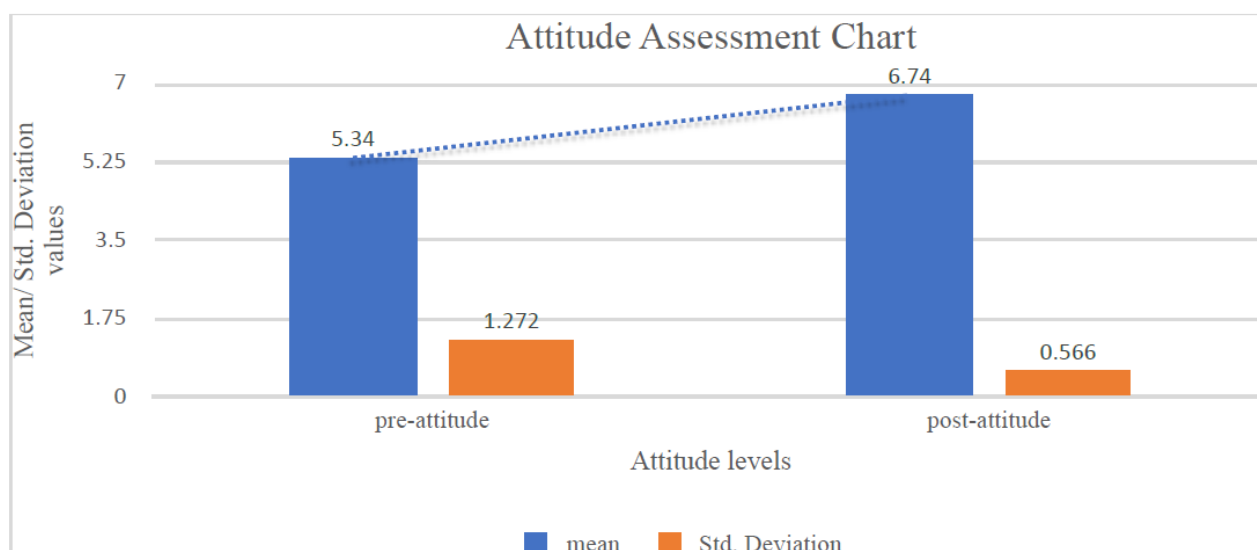
Paired Samples Statistics				
		Mean	Std. Deviation	P-value
Knowledge	Pre_Knowledge	5.29	1.404	0.001
	Post_Knowledge	7.55	1.555	0.001

**Fig. 5.2: Knowledge assessment chart.****5.3. Pre-Post comparison of attitude among study participants:**

Mean score increased from 5.34 (pre) to 6.74 (post). The difference of +1.40 points was also highly significant ($t(270) = -18.27, p < 0.001$). Counselling helped develop a more positive outlook toward disease management.

Table 5.3 Values of attitude pre and post counseling.

Paired Samples Statistics				
		Mean	Std. Deviation	P-value
Attitude	Pre_Attitude	5.34	1.272	0.001
	Post_Attitude	6.74	.566	0.001

**Fig. 5.3: Attitude assessment chart.**

5.4. Pre-Post comparison of Practice among study participants:

Mean practice scores rose from 27.11 (pre) to 29.95 (post). The difference of +2.84 points was highly significant ($t(270) = -17.50$, $p < 0.001$). Patients translated knowledge and attitude into healthier daily practices.

Table 5.4: Values of practice pre and post counseling.

Paired Samples Statistics				
		Mean	Std. Deviation	P-value
Practice	Pre_Practice	27.11	2.743	0.001
	Post_Practice	29.95	2.707	0.001

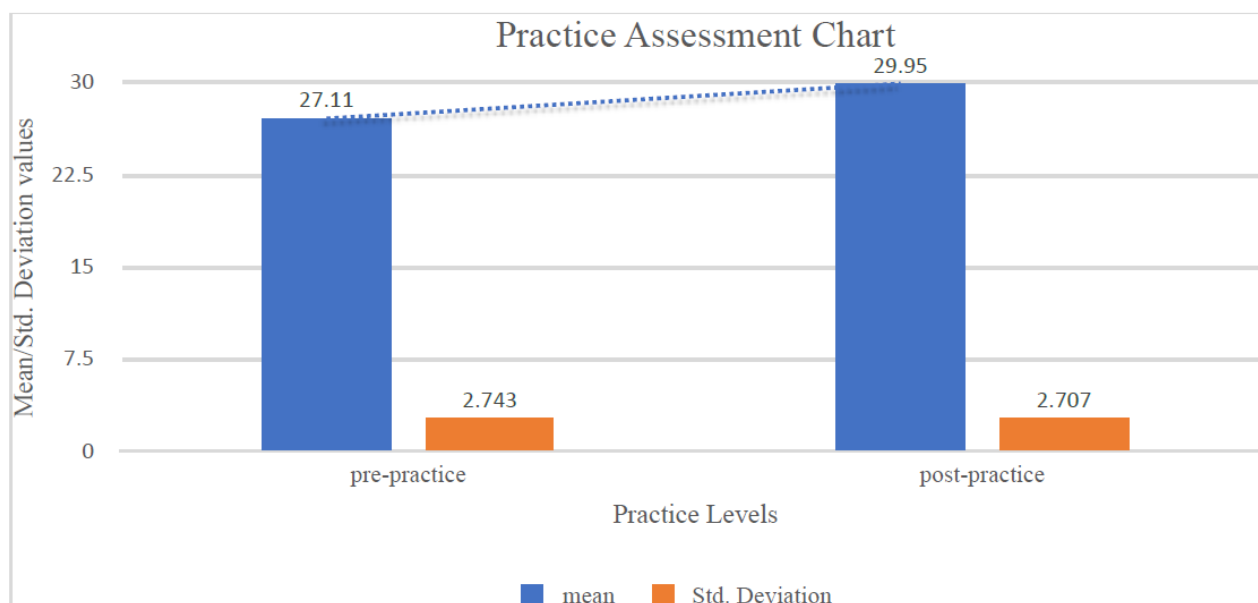


Fig. 5.4: Practice assessment chart.

Overall Conclusion

The paired samples t-test revealed statistically highly significant improvements across all three domains of KAP after counselling ($p < 0.001$). This indicates that counselling was effective in:

- Increasing knowledge (awareness),
- Improving attitudes (mindset), and
- Strengthening practices (behavior).

Thus, structured patient counselling can play a crucial role in improving self-care and management.

5.5. Distribution of Knowledge before and after counselling.

In study subjects before counseling there were 67(24.7%) of poor knowledge, 148(54.6%) of fair knowledge, 56(20.7%) of good knowledge and 0 of excellent knowledge. After patient counseling with patient information leaflet there is a decrease in poor knowledge to 6(2.2%), decrease in fair knowledge 73(26.9%), increase in good knowledge 78(28.8%) and drastic improvement in excellent knowledge of patients 114(42.1%) Table 5.5 Distribution of Knowledge before and after counselling

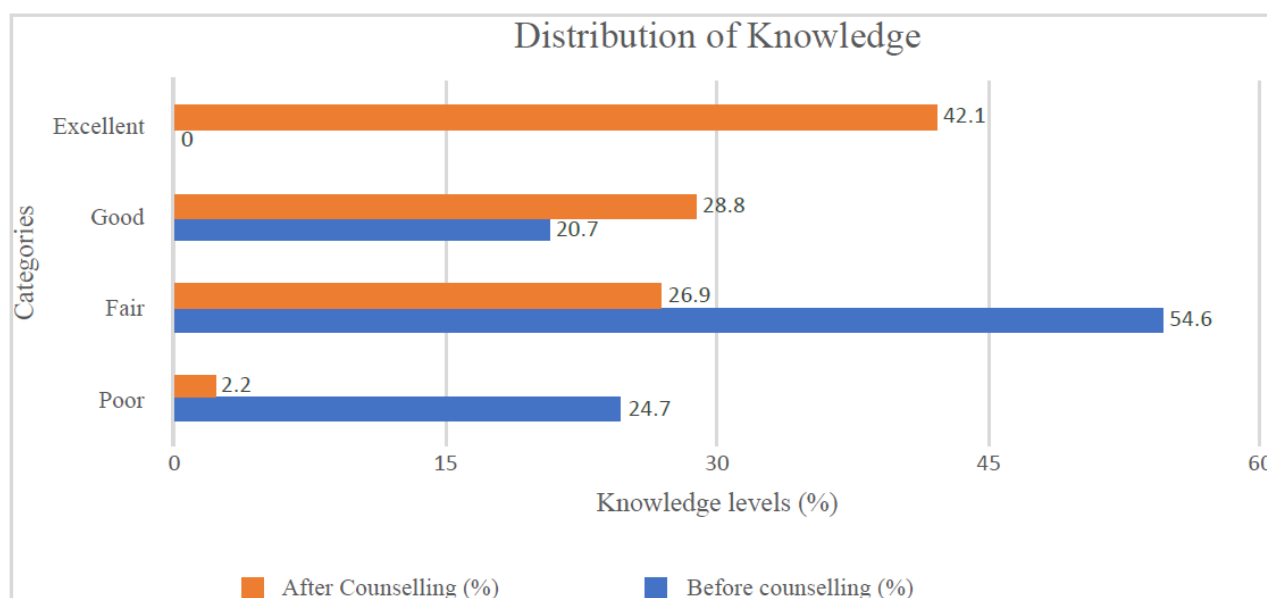


Fig. 5.5: Distribution of knowledge.

5.6. Distribution of Attitude before and after counselling

Distribution of attitude among study participants is as follows. Before counseling negative attitude was 7.4% (20) which decreased to 0%(0), neutral attitude was 73.8%(200) which decreased to 21.4%(58), positive attitude among patients was 18.8%(51) which improved to 78.6%(213).

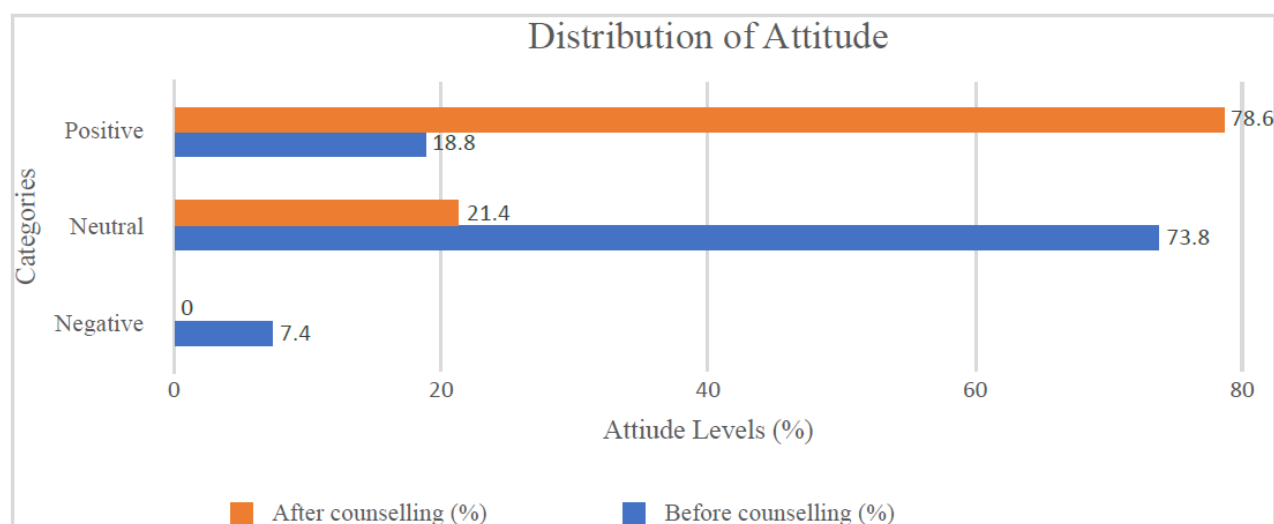


Fig. 5.6: Distribution of attitude.

5.7. Distribution of Practice before and after counselling

Distribution of practice among study participants is as follows. Before counseling inadequate practice was followed by one patient which decrease it to zero after counseling, adequate practice was 37.6% which decrease 213.7%, good practice was followed around 62.0% which improved to 86.3%.

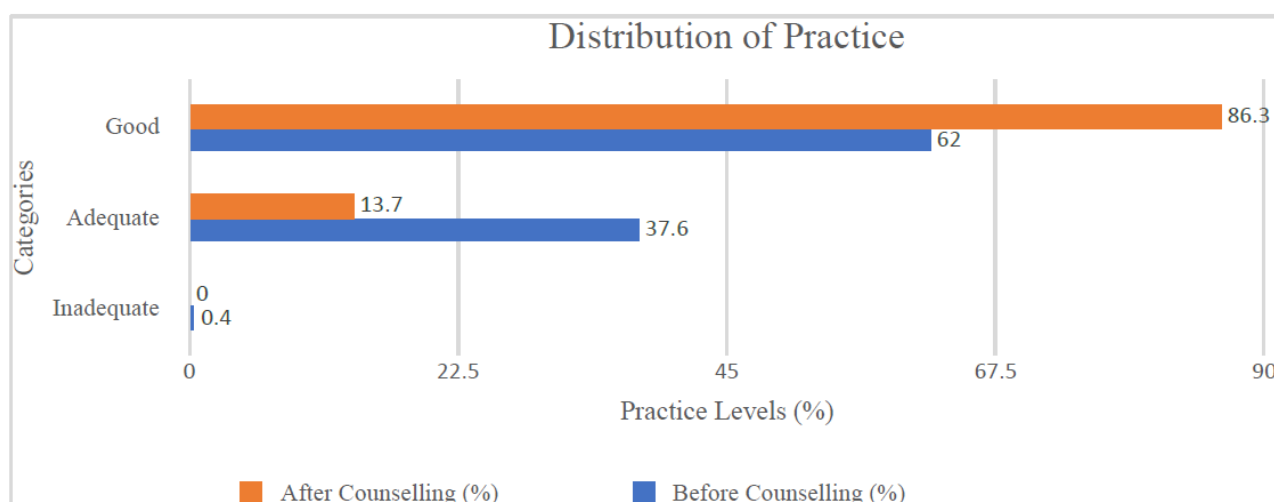


Fig. 5.7: Distribution of practice.

Good practices increased (62.0% → 86.3%), while Inadequate practices disappeared completely.

Overall, counselling led to **statistically significant improvements** in Knowledge, Attitude, and Practice.

DISCUSSION

Among the various disease conditions hypertension is considered as an important factor which leads to severe burden of diseases in South Asia. Hypertension is a condition in which the pressure of the blood is highly elevated. Normal range of blood pressure is 120/80mmHg. Hypertension is a major public health problem worldwide and one of the primary causes of cardiovascular diseases. There is greater prevalence of hypertension reported from different regions of India. Current studies have reported that hypertension is present in 25 - 30% urban and 10 - 15% of rural population in India. Recent studies conducted in India estimate the presence of 66 million hypertensive patients, accounting for 25% of adults in urban areas, and 10% in rural areas. A total of 57% of all stroked and 24% of all the Coronary heart disease deaths in India are caused due to its complications.

Medication taking behavior is extremely complex and requires multiple strategies to improve adherence. Patients have to understand the importance of taking their medication, refilling their prescription and having a better quality of life. Adherence to antihypertensive drugs is an important factor of achieving desirable blood pressure, however poor adherence to medication still remains a major problem among hypertensive patients¹. It's been known that non-adherence is one of the main causes of failure in achieving better therapeutic control over blood pressure. Influence of non-adherence to hypertension medication has important influence on therapeutic outcomes, re-admissions, regular visits through outpatient department, longer hospitalization, and additional financial burden to the community by increasing the cost of treatment and hospitalization.

The main purpose of this study is to assess the level of knowledge patients have about hypertension and its treatment. Evaluate their attitudes toward medication use and lifestyle changes. Understand their practices, such as medication adherence, follow-up visits, and self-monitoring of blood pressure. This study can help identify gaps in patient education, misconceptions, and behavioral patterns that hinder effective hypertension management. The findings can guide healthcare professionals in designing targeted educational interventions and counseling strategies to improve adherence and therapeutic outcomes.

Demographic analysis in our cohort revealed that the majority of participants belonged to the 31–60 age group (70.85%), with a slightly higher proportion of males (54%) compared to females (46%). These findings align with regional data showing similar distributions in hypertensive populations, as reported by **Rajappa et al.** and **Bhati et al.** in our literature review.

This study demonstrates that structured patient counselling in a tertiary care teaching hospital led to highly significant improvements in the domains of knowledge, attitude, and practice among patients diagnosed with hypertension. The post-intervention analysis showed a drastic increase in knowledge scores, a shift toward positive attitudes, and substantial improvement in daily practice of medication taking behavior. These findings are consistent with a growing body of evidence indicating that targeted patient education is essential for effective hypertension management.

Pre-counselling assessments revealed a majority of subjects had fair or poor knowledge (79.3%), neutral or negative attitudes (81.2%), and only 62% exhibited good self-care practices. Following counselling, poor/fair knowledge dropped to 29.1%, positive attitude improved from 18.8% to 78.6%, and good practices rose to 86.3%. These improvements reaffirm conclusions from several interventional studies, where patient-centered education and pharmacist-driven interventions have proven effective in enhancing both knowledge and compliance.

A review of literature further supports the efficacy of counselling. Studies by **Jain et al.**, **Rajappa et al.**, and **Pramath et al.**, highlighted in our literature review, similarly found that educational interventions consistently improve knowledge scores and positively shift both attitude and practice among hypertensive cohorts. Thomas et al. conducted a comparable prospective interventional study, noting marked improvement in quality of life and KAP scores among hypertensive patients after patient counselling, similar to our findings regarding increased awareness and enhanced self-management. A systematic review by **Vaghmaria et al.** confirmed that multifaceted approaches including behavioral counselling and pharmacist-driven education consistently boost medication adherence and blood pressure control.

Comparative studies also highlight that good self-care and medication adherence are critically dependent on patient knowledge and attitude. As shown in the work by **Thomas et al.**, pharmacy-driven education programs were associated with reduced rates of inadequate practice and increased adoption of healthy habits, supporting your observation. Our study's finding that good practice rose from 62% to 86.3%.

Several past interventions used paired samples and t-tests to validate their results, with highly significant p-values paralleling those in our study, further confirming the reliability and reproducibility of such interventions in different populations.

The findings of this study support the integration of regular, structured counselling sessions into routine hypertension management. By directly improving the knowledge, attitude, and behavior of patients, healthcare providers can expect not only improved adherence to therapy but also better clinical outcomes, medication management and quality of life. Future research should focus on sustaining these improvements over longer periods and constructing models to improve medication management.

In conclusion, this study reinforces the critical role of patient counselling in managing hypertension. Structured educational interventions yield improvements in knowledge, attitude, and practices, mirroring trends seen both in current local data and global research. The results underline the importance of patient-centered care, suggesting that

routine counselling should be a cornerstone of hypertension treatment programs to achieve sustainable improvement in patient outcomes.

CONCLUSION

In a tertiary care hospital, the study was carried out on 271 patients with hypertension. To check how structured patient counselling affects their Knowledge, Attitude, and Practice (KAP) about managing hypertension. After counselling, the patients showed a significant improvement in their understanding of the disease, developed a more positive attitude towards taking care of their health, and followed better daily practices related to medicine use and lifestyle changes. The results showed that counselling helped increase the number of patients with good knowledge, positive attitude, and healthy practices.

This study shows that simple counselling can make a real difference for people with hypertension. Importantly, the use of PIL's as a counselling aid played a major role in enhancing patients knowledge, attitude and practice towards their antihypertensive medications. They became more consistent in taking their medicines, eating healthy, exercising regularly, and monitoring their blood pressure. Counselling also helps improve their attitude, making them feel positive and motivated to take care of their health. Overall, it empowered patients to build healthier habits and take control of their well-being.

STRENGTHS AND LIMITATIONS

STRENGTHS OF THE STUDY

- The study clearly aims to assess knowledge, attitude, practice, and adherence related to antihypertensive drugs, providing focused and meaningful outcomes.
- Use of a Patient Information Leaflet (PIL) with simple text and pictograms helps improve patient understanding, especially for those with low literacy.
- The PIL and KAP questionnaire are validated by medical professionals, and their readability is tested to ensure patient-friendly communication.
- Ethical approval is obtained, and informed consent is secured, ensuring patient privacy and protection throughout the study.
- Data is collected from multiple sources (case sheets) and analysis is performed using appropriate statistical tests (paired t-test via SPSS) to ensure reliable results.
- The patient compliance was improved through this study.

LIMITATION OF THE STUDY

- The post-counseling assessment is done just 30 minutes after the intervention, which may not accurately reflect patients long-term understanding or sustained behavioral change.
- The study was limited to a single tertiary care facility, the ability to apply the findings to the broader population, especially across different regions or healthcare environments.
- The research did not include some patients who were pregnant/lactating women, cancer patients, and those who suffered from psychiatric disorders, but only included literate patients in this study.

FUTURE DIRECTIONS

- To enhance patients understanding of hypertension, medication adherence, and the importance of lifestyle changes, more awareness programs should be organized regularly. These programs must use simple, easy-to-understand language along with visual aids like charts, videos, and illustrations. Making health information simple and easy helps everyone take better care of themselves with confidence.
- Regular counselling should be a normal part of care for people with hypertension. It gives them a chance to ask questions, share concerns, and get helpful advice. This support helps them stay motivated, follow their treatment, and live healthier every day.
- Doctors, nurses, and pharmacists should get special training to help patients understand their diet, exercise, and medicines better.

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Authors Contribution

SDYT, KKM, SM, PS: Data collection, Investigation, Writing – original draft; **SDYT:** Conceptualization, validation, formal analysis and final draft, Statistical analysis; Investigation, Writing – original draft **SM:** Conceptualization, Data Validation, Statistical analysis **PS:** Conceptualization, Methodology, Validation, Supervision; **PD:** Conceptualization, Methodology, Validation, Formal analysis, Supervision, Writing – review and editing.

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Data Availability Statement

The datasets generated and analyzed during the current study are available from the corresponding authors upon reasonable request.

Ethics approval: This research was approved by the institutional ethics committee (Ref: IERB No: 242- 2025).

The eligible patients were initiated with the study after receiving the written and volunteer informed consent from them.

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