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Original Article

Assessment of Knowledge and Practices Regarding Lifestyle Modification among Hypertensive Patients: A Cross-Sectional Study

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ABSTRACT

Background: Hypertension is a major public health problem and an important risk factor for cardiovascular morbidity and mortality. Lifestyle modification plays a vital role in the prevention and control of hypertension. Adequate knowledge and adherence to healthy lifestyle practices are essential for effective blood pressure management.

Aim: To assess the knowledge and practices regarding lifestyle modification among hypertensive patients attending selected Primary Health Centres in Tirunelveli district.

Methods: A facility-based cross-sectional study was conducted among 321 hypertensive patients attending selected Primary Health Centres in Tirunelveli district from February 2025 to April 2025. Participants aged above 30 years who had been on antihypertensive treatment for at least one year were included using simple random sampling. Data were collected through direct interviews using a semi-structured questionnaire and the Hypertension Evaluation of Lifestyle and Management Knowledge Scale (HELM scale). Information regarding sociodemographic profile, lifestyle practices, blood pressure, body mass index, and stress-related factors was obtained. Data were analyzed using SPSS software, and associations were assessed using the Chi-square test.

Results: Among the 321 participants, 61.68% had good knowledge regarding lifestyle modification, while 38.32% had poor knowledge. Dietary adherence was observed in 60.12% of participants, whereas adherence to physical exercise and weight management was low at 11.21% and 19.00%, respectively. Overall adherence to lifestyle modification practices was 42.17%. Better educational status, higher income, good knowledge levels, and absence of family, financial, and work-related stress showed positive associations with adherence to healthy lifestyle practices.

Conclusion: Although knowledge regarding lifestyle modification among hypertensive patients was satisfactory, adherence to recommended healthy lifestyle practices remained suboptimal. Strengthening health education and addressing psychosocial stressors may improve adherence and contribute to better hypertension control.

Keywords: *Hypertension; Lifestyle modification; Knowledge; Adherence; HELM scale; Primary Health Centre; Dietary practice; Physical exercise; Stress factors.*

INTRODUCTION

Hypertension is one of the most common non-communicable diseases and a major global public health concern. It is a leading risk factor for cardiovascular diseases, stroke, chronic kidney disease, and premature mortality. According to the World Health Organization, nearly 1.28 billion adults worldwide are affected by hypertension, with a large proportion living in low- and middle-income countries. Despite advances in medical treatment, the burden of hypertension continues

to rise due to urbanization, sedentary lifestyle, unhealthy dietary habits, obesity, stress, tobacco use, and alcohol consumption. Early identification and effective control of hypertension are therefore essential to reduce associated complications and healthcare costs[1]. In India, hypertension has emerged as a major contributor to morbidity and mortality. Community-based studies have shown that the prevalence of hypertension among adults ranges from 25% to 35%, with increasing incidence among younger age groups and rural populations[2]. The growing prevalence of hypertension in India has been linked to rapid socioeconomic transition, reduced physical activity, increased consumption of processed foods, and psychosocial stress.

Although pharmacological therapy remains important, lifestyle modification forms the cornerstone of hypertension prevention and management. Recommended lifestyle measures include regular physical activity, dietary modification with reduced salt intake, maintenance of healthy body weight, smoking cessation, moderation of alcohol intake, and stress reduction[3]. Several studies have demonstrated that appropriate lifestyle modification can significantly lower blood pressure and reduce cardiovascular risk. The Dietary Approaches to Stop Hypertension (DASH) trial showed that dietary interventions rich in fruits, vegetables, and low-fat dairy products effectively reduced blood pressure levels[4]. Similarly, physical activity and weight reduction have been associated with improved blood pressure control and reduced dependence on antihypertensive medications[5]. However, adherence to lifestyle modification practices among hypertensive patients remains inadequate in many developing countries due to poor awareness, financial limitations, lack of motivation, and psychosocial stressors. Previous studies conducted in different regions of India and other developing countries have reported varying levels of knowledge and adherence regarding lifestyle modification among hypertensive patients.

A study by Buda et al. reported that although many patients possessed basic knowledge regarding hypertension, only a limited proportion practiced recommended lifestyle changes consistently.[6] Another study by Rahimi et al. found that educational status, income, and awareness significantly influenced adherence to lifestyle modification practices among hypertensive individuals[7]. In rural and semi-urban regions such as Tirunelveli district, limited healthcare accessibility, low educational status, and socioeconomic challenges may influence patients' understanding and practice of healthy lifestyle behaviors. Assessing the level of knowledge and adherence among hypertensive patients is important for planning targeted health education and community-based interventions. Therefore, the present study was undertaken to evaluate the knowledge and practices regarding lifestyle modification among hypertensive patients attending selected Primary Health Centres in Tirunelveli district.

Aim

To assess the knowledge and practices related to lifestyle modification among patients with hypertension.

Objectives

1. To evaluate the level of knowledge regarding lifestyle modifications among hypertensive patients.
2. To assess the lifestyle modification practices followed by hypertensive patients in their daily life.
3. To determine the association between knowledge and lifestyle modification practices with selected sociodemographic and clinical variables among hypertensive patients.

MATERIALS AND METHODS

Study Design

A facility-based cross-sectional study was conducted to assess the knowledge and practices regarding lifestyle modification among hypertensive patients attending selected primary health centres in Tirunelveli district.

Study Area

The study was carried out in the outpatient departments of selected primary health centres located in Tirunelveli district, Tamil Nadu. The selected centres included Pattamadai, Manur, Reddiyarpatti, Kallidaikurichi, Munneerpallam, Kallur, Burkittmanagaram, Rajavallipuram, Mukkudal, Samathanapuram, KTC Nagar, and Palayamkottai Primary Health Centres.

Study Population

The study population comprised all known hypertensive patients aged above 30 years who attended the outpatient departments of the selected primary health centres during the study period.

Study Duration

The study was conducted over a period of three months from February 2025 to April 2025.

Inclusion Criteria

Patients fulfilling the following criteria were included in the study:

- Individuals aged more than 30 years.
- Patients diagnosed with hypertension and receiving treatment for at least one year.

- Patients on regular follow-up visits to the selected primary health centres.
- Patients who provided informed written consent to participate in the study.

Exclusion Criteria
The following patients were excluded from the study:
- Pregnant women.
- Patients with endocrine disorders.
- Patients diagnosed with chronic kidney disease.
- Patients with cerebrovascular thrombosis or stroke.
- Non-residents of Tirunelveli district.

Sampling Technique
Simple random sampling technique was employed to select the study participants from the eligible hypertensive patients attending the outpatient departments during the study period.

Sample Size
The sample size was calculated using Cochran's formula for estimating proportions:

$$n = \frac{Z^2 \times p \times q}{e^2}$$

Where:
- n= Required sample size
- Z= Standard normal deviate at 95% confidence interval = 1.96
- p= Estimated prevalence = 25% = 0.25
- q= 1 − p = 0.75
- e= Allowable error = 5% = 0.05

Substituting the values:

$$n = \frac{(1.96)^2 \times 0.25 \times 0.75}{(0.05)^2}$$
$$n = \frac{3.84 \times 0.1875}{0.0025}$$
$$n = \frac{0.72}{0.0025}$$
$$n = 288$$

After rounding off and accounting for possible incomplete data, the final sample size was considered as 300 participants.

Operational Definitions
Knowledge Regarding Lifestyle Modification
Knowledge regarding lifestyle modification was assessed using the Hypertension Evaluation of Lifestyle and Management Knowledge Scale (HELM Scale). Each item in the scale was scored, and the mean score for each participant was calculated. A mean HELM score of 10 or above was considered as good knowledge, whereas a score below 10 was categorized as poor knowledge.

Lifestyle Modification Practices
Lifestyle modification practices were assessed using practice-related questions included in the questionnaire. A mean practice score was calculated for each participant. A score of 7 or above indicated good lifestyle modification practices, while scores below 7 were considered poor lifestyle modification practices.

Data Collection Procedure
Data were collected using a semi-structured questionnaire administered through direct face-to-face interviews. The questionnaire was adapted appropriately to suit the local clinical and sociocultural context. It consisted of sections related to:
- Sociodemographic characteristics such as age, gender, marital status, educational status, occupation, monthly family income, and duration of hypertension.
- Knowledge regarding lifestyle modification assessed using the HELM Scale.
- Sources of information related to lifestyle modification.
- Lifestyle modification practices and factors influencing their implementation.

Blood pressure measurements were obtained using a calibrated electronic blood pressure monitor. Participants were instructed to remain seated comfortably with their back supported and arms positioned at heart level during the measurement. Each participant was allowed to rest for at least 30 minutes prior to blood pressure recording. Three blood pressure readings were reviewed, including two previous readings obtained from medical records and one reading measured during the current follow-up visit. The highest recorded value among the three readings was considered for analysis.

Body mass index (BMI) was calculated using the following formula:

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

Where:

- Weight is measured in kilograms (kg)
- Height is measured in meters (m)
- BMI is expressed in kg/m²

Data Analysis

The collected data were compiled using Google Forms and entered into Microsoft Excel for tabulation and cleaning. Statistical analysis was performed using SPSS software. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize the data. The association between categorical variables was assessed using the Chi-square test. A p-value of less than 0.25 was considered statistically significant for the study.

Data Quality Assurance

To ensure the quality and reliability of the data, the questionnaire was initially prepared in English, translated into Tamil, and then back-translated into English to maintain consistency and accuracy. The collected data were checked regularly for completeness, accuracy, and clarity throughout the study period.

Ethical Considerations

Ethical approval for the study was obtained from the Institutional Ethics Committee prior to commencement of the study. Informed written consent was obtained from all participants before data collection. Confidentiality and anonymity of the participants were strictly maintained throughout the study, and no identifying information was disclosed in the study records or reports.

RESULTS

A total of 321 hypertensive patients attending selected Primary Health Centres in Tirunelveli district were included in the study. The majority of the participants were males (58.3%), and most belonged to the age group of 45–60 years. Good knowledge regarding lifestyle modification was observed among 61.7% of participants, whereas overall adherence to recommended lifestyle modification practices was comparatively low.

Table 1: Demographic and Socioeconomic Characteristics of the Study Participants (n = 321)

Variable	Category	Frequency (n)	Percentage (%)
Sex	Male	187	58.25
	Female	134	41.74
Age	30–45 years	74	22.36
	45–60 years	225	70.09
	>60 years	91	28.35
Marital Status	Unmarried	50	15.60
	Married	231	72.00
	Widowed/Divorced	40	12.50
Educational Status	Illiterate	69	21.50
	School education	163	50.77
	College education	89	27.72
Occupational Status	Unemployed	78	24.30
	Semiskilled	107	33.30
	Skilled	63	19.50
	Professional	73	22.70
Monthly Income	<₹10,000	103	33.60
	₹10,000–25,000	130	40.49
	₹25,000–50,000	55	17.13

	>₹50,000	19	5.92
Duration of Hypertension	1–5 years	175	54.50
	5–10 years	96	29.90
	>10 years	50	15.60

The mean age of the participants was 56 years. More than half of the respondents had school-level education, and approximately one-third belonged to the semiskilled occupational group.

Table 2: Clinical Characteristics and Knowledge Status of the Study Participants (n = 321)

Variable	Category	Frequency (n)	Percentage (%)
Blood Pressure Status	Normal	62	19.31
	Elevated BP	66	20.56
	Stage 1 Hypertension	113	35.20
	Stage 2 Hypertension	75	23.36
	Hypertensive Crisis	6	1.80
Body Mass Index (BMI)	Underweight	38	11.80
	Normal BMI	144	44.90
	Obese	139	43.30
Comorbidities	Present	206	64.17
	Absent	115	35.82
Knowledge Regarding Lifestyle Modification	Good knowledge	198	61.68
	Poor knowledge	123	38.32

Among the participants, 35.2% had stage 1 hypertension and 43.3% were obese. Comorbid illnesses were present in 64.2% of the study population.

Table 3: Adherence to Recommended Lifestyle Modification Practices Among Hypertensive Patients (n = 321)

Variable	Category	Frequency (n)	Percentage (%)
Physical Exercise	Adherence	36	11.21
	Non-adherence	285	88.78
Dietary Modification	Adherence	193	60.12
	Non-adherence	128	39.87
Weight Management	Adherence	61	19.00
	Non-adherence	260	80.99
Smoking Status	Non-smoker	165	51.69
	Smoker	136	42.36
	Quit smoking	20	6.25
Alcohol Consumption	Non-alcoholic	174	54.20
	Alcoholic	120	37.38
	Quit alcohol	27	8.41

Dietary adherence was observed among 60.1% of participants, whereas adherence to regular physical exercise was very low (11.2%). Overall adherence to recommended lifestyle modification practices was 42.2%.

Table 4: Association between Knowledge Status and Lifestyle Modification Practices among Hypertensive Patients

Lifestyle Practice	Good Knowledge n (%)	Poor Knowledge n (%)	p-value
Physical Exercise	26 (13.1)	10 (8.1)	0.2307
Non-adherence	172 (86.9)	113 (91.9)	
Dietary Modification	125 (63.1)	68 (55.3)	0.2010
Non-adherence	73 (36.9)	55 (44.7)	
Weight Management	43 (21.7)	18 (14.6)	0.1538
Non-adherence	155 (78.3)	95 (85.4)	
Smoking Cessation	120 (60.6)	65 (52.8)	0.2106
Smoker	78 (39.4)	58 (47.2)	
Alcohol Moderation	130 (65.7)	71 (57.7)	0.1904
Alcoholic	68 (34.3)	52 (42.3)	

Participants with good knowledge demonstrated better adherence across all lifestyle modification domains compared to those with poor knowledge. Dietary adherence and alcohol moderation were notably higher among participants with good knowledge scores.

Table 5: Factors Associated with Lifestyle Modification Practices among Hypertensive Patients

Variable	Category	Good Adherence n	Poor Adherence n	Adjusted OR	p-value
Educational Status	College vs Illiterate	53	36	3.10	0.0001

Income Status	>₹50,000 vs <₹10,000	11	8	2.89	0.235
Knowledge Status	Good vs Poor	110	88	2.63	0.0001
Comorbidities	Present vs Absent	87	119	1.54	0.0055
Family Stress	No vs Yes	41	27	3.20	0.0001
Financial Stress	No vs Yes	53	35	3.19	0.0001
Work Stress	No vs Yes	76	51	3.14	0.0001

Higher educational status, better knowledge regarding hypertension, and absence of family, financial, and work-related stress were significantly associated with improved adherence to lifestyle modification practices among hypertensive patients.

DISCUSSION

The present study assessed the knowledge and practices regarding lifestyle modification among hypertensive patients attending selected Primary Health Centres in Tirunelveli district. The findings revealed that although a majority of participants possessed adequate knowledge regarding lifestyle modification, adherence to recommended healthy practices remained comparatively low. In the present study, the mean age of participants was 56 years, and the majority belonged to the 45–60 years age group. Similar findings were reported by Buda et al., where most hypertensive patients were middle-aged adults, indicating that hypertension predominantly affects economically productive age groups[8]. Male predominance observed in the current study (58.25%) was also consistent with studies conducted by Venkatachalam et al. and Ibrahim et al., which reported higher hypertension prevalence among males due to lifestyle-related risk factors such as smoking, alcohol use, and occupational stress[9,10].

Regarding educational status, nearly half of the participants had school-level education, while 21.5% were illiterate. The study demonstrated that higher educational attainment was associated with better adherence to lifestyle modification practices. Similar observations were made by Subburayan Y who reported that educated individuals had greater awareness regarding hypertension management and were more likely to practice healthy behaviors[11]. Education improves health literacy and facilitates understanding of disease prevention strategies.

The present study found that 61.68% of participants had good knowledge regarding lifestyle modification. Comparable findings were observed in a study by Buda et al., where 58.1% of hypertensive patients demonstrated good knowledge about lifestyle-related measures for blood pressure control[8]. However, despite adequate knowledge, overall adherence to lifestyle modification in the present study was only 42.17%, suggesting a considerable gap between awareness and actual practice. This finding is similar to reports by Tibebu et al., who noted that patients often fail to implement recommended behavioral changes due to lack of motivation, social barriers, and financial constraints[12].

Dietary adherence was observed among 60.12% of participants, which was comparatively higher than adherence to physical exercise (11.21%) and weight management (19%). Similar results were reported in study by Alefan et al., where dietary modifications were more commonly practiced than regular exercise among hypertensive individuals[13]. Physical inactivity in the present study may be related to occupational commitments, lack of awareness regarding exercise benefits, and limited opportunities for recreational activity. Smoking and alcohol use were also found among a substantial proportion of participants. Patients with better knowledge scores showed improved smoking cessation and alcohol moderation practices. This association between awareness and healthy behavioral choices has also been demonstrated in studies conducted by Warren-Findlow et al., which reported that increased knowledge positively influenced adherence to recommended lifestyle measures[14].

Stress-related factors played an important role in adherence patterns in the present study. Participants without family, financial, and work-related stress demonstrated significantly better adherence to lifestyle modifications compared to those experiencing stress. Similar observations were reported by Spruill et al., who highlighted the negative influence of psychosocial stress on blood pressure control and healthy lifestyle maintenance[15]. Stress may reduce motivation and impair the ability to follow dietary restrictions, exercise routines, and medication schedules. The present study also found that obesity and comorbidities were highly prevalent among hypertensive patients. Nearly 43.3% of participants were obese, which is consistent with findings from the National Family Health Survey and studies by Gupta et al., emphasizing obesity as a major contributor to hypertension and cardiovascular risk in India[16]. Overall, the findings of the present study indicate that knowledge regarding lifestyle modification among hypertensive patients was relatively satisfactory; however, adherence to healthy lifestyle practices remained inadequate. Educational status, income, knowledge level, and psychosocial stress significantly influenced adherence behavior. These findings highlight the need for continuous health education, counseling, and community-based interventions to improve long-term lifestyle modification practices among hypertensive patients.

Limitations

- As the study was cross-sectional in design, causal relationships between knowledge and lifestyle modification practices could not be established.
- The study was conducted only in selected Primary Health Centres in Tirunelveli district; therefore, the findings may not be generalizable to the entire population.
- Information regarding lifestyle practices was self-reported by participants and may be subject to recall bias and social desirability bias.
- Certain psychosocial and cultural factors influencing adherence may not have been fully explored.

CONCLUSION

The present study showed that although a majority of hypertensive patients possessed good knowledge regarding lifestyle modification, adherence to recommended healthy lifestyle practices remained inadequate, particularly in relation to physical exercise and weight management. Better educational status, higher income, good knowledge levels, and lower psychosocial stress were positively associated with improved adherence to lifestyle modifications. The findings emphasize the need for regular health education, behavioral counseling, and community-based interventions to improve lifestyle practices and achieve better blood pressure control among hypertensive patients.

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