



ORIGINAL RESEARCH PAPER

Community Medicine

IMPACT OF HEALTH LITERACY AND SOCIAL SUPPORT ON MEDICATION ADHERENCE IN PATIENTS WITH HYPERTENSION: A CROSS-SECTIONAL STUDY

KEY WORDS: Hypertension, medication adherence, health literacy, social support, MMAS-8, hospital-based study

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ABSTRACT

Background: Hypertension is a leading cause of cardiovascular morbidity and mortality worldwide. Poor medication adherence significantly contributes to uncontrolled blood pressure, increased healthcare costs, and reduced quality of life. Health literacy and social support are increasingly recognized as modifiable determinants of adherence behaviour. **Objectives:** To determine the prevalence of medication adherence and its association with health literacy, social support, and sociodemographic factors in hypertensive patients. **Methods:** A hospital-based cross-sectional study was conducted among the patients attending a tertiary care hospital in Gwalior. Four hundred adult hypertensive patients were enrolled. Medication adherence was assessed using the Morisky Medication Adherence Scale (MMAS-8), health literacy using HLS-IND-HIN-Q16, and social support using MSPSS-Hindi. Data were analysed using ANOVA and Kruskal-Wallis test. **Results:** Of 400 participants, 46.3% had low adherence, 40.7% medium, and 13% high adherence. Significant associations were found between adherence and duration of hypertension ($p < 0.001$), education level ($p = 0.004$), and health literacy ($p < 0.001$). Social support scores showed no statistically significant difference across adherence groups ($p = 0.238$). **Conclusions:** Medication non-adherence remains high among hypertensive patients. Targeted interventions addressing health literacy, particularly for newly diagnosed and long-term patients, are warranted

INTRODUCTION

Hypertension is one of the most common chronic conditions and a leading cause of cardiovascular morbidity and all-cause mortality worldwide. According to the World Health Organization (WHO), approximately 1.4 billion adults aged 30–79 years are living with hypertension globally, yet only about 320 million have their blood pressure adequately controlled.¹ Hypertension affects approximately 30% of adults in India, and projections indicate that the number of individuals with hypertension will continue to increase over the coming decades.² Uncontrolled hypertension substantially increases the risk of myocardial infarction, heart failure, stroke, chronic kidney disease, dementia, and premature mortality, resulting in considerable socioeconomic burden.^{1, 3}

In India, an estimated 210 million adults aged 30–79 years have hypertension, of whom only a small proportion achieve adequate blood pressure control.¹ Pharmacological treatment is recommended for most patients when lifestyle modification alone is insufficient to achieve target blood pressure. Effective antihypertensive therapy has consistently been shown to reduce cardiovascular morbidity and mortality; however, medication adherence remains a major challenge. Studies suggest that nearly half of patients with hypertension do not take their medications as prescribed, contributing significantly to poor blood pressure control and preventable cardiovascular events.^{4, 5}

The World Health Organization defines adherence as "the extent to which a person's behaviour—taking medication, following a diet, and/or executing lifestyle changes—corresponds with agreed recommendations from a health-care provider."⁶ Optimal adherence to antihypertensive therapy is strongly associated with improved blood pressure control and reduced cardiovascular complications, whereas poor adherence is a well-recognized contributor to treatment failure.^{4, 5}

Understanding the determinants of medication adherence is essential for designing effective interventions. The WHO categorizes factors influencing adherence into five dimensions: patient-related, socioeconomic, therapy-related, condition-related, and health system-related factors.⁶ Among these, health literacy and social support have emerged as important yet relatively underexplored determinants of adherence behaviour.

Health literacy refers to an individual's ability to access, understand, appraise and use health information and services to make appropriate health decisions.⁷ Individuals with adequate health literacy are more likely to understand their disease, correctly follow treatment instructions, recognize the importance of long-term medication use, and actively participate in self-management. Conversely, inadequate health literacy has been associated with poor disease knowledge, misunderstanding of prescriptions, reduced self-efficacy, and lower adherence to antihypertensive medications.⁸

The American Psychological Association defines social support as the provision of assistance or comfort through interpersonal relationships that help individuals cope with biological, psychological and social stressors. Adequate social support may facilitate medication adherence by providing emotional encouragement, practical assistance, and reinforcement of healthy behaviours. Several studies have reported a positive association between social support and adherence among patients with hypertension, whereas others have found no significant relationship, suggesting that the quality and type of support may be more important than its quantity.^{8, 9}

There is an increasing need to identify modifiable factors that improve medication adherence in patients with hypertension to reduce cardiovascular complications, healthcare costs, and improve quality of life. Although previous studies have examined the relationships between medication adherence, health literacy and social support, evidence from Indian populations remains limited. Therefore, the present study aimed to determine the association between medication adherence, health literacy, social support and selected sociodemographic characteristics among patients with hypertension attending a tertiary care hospital in central India.

Methods

Study Design and Setting

A hospital-based cross-sectional study was conducted at Jaya Arogya Group of Hospitals, a tertiary care teaching hospital affiliated with Gajra Raja Medical College, Gwalior, Madhya Pradesh, India. Cross-sectional studies are appropriate for estimating the prevalence of health-related outcomes and examining associations between variables at a single point in

time.¹⁰ The study was carried out over a three-month period from January 2025 to March 2025.

Study Participants

Adults aged ≥20 years with a physician diagnosis of hypertension or receiving antihypertensive treatment for at least six months were eligible for inclusion. Patients with severe chronic illnesses that could interfere with participation and pregnant or lactating women were excluded from the study.

Sample Size and Sampling Technique

As no previous local study with similar objectives assessing the relationship between medication adherence, health literacy, and social support among hypertensive patients was available, the anticipated prevalence was assumed to be 50%, providing the maximum sample size. Using the formula: $n = Z^2PQ/d^2$

where $P=50\%$, $Q=50\%$, $Z=1.96$ at the 95% confidence level, and $d=5\%$, the calculated sample size was 384. To compensate for possible incomplete responses, the sample size was rounded to 400 participants.¹¹

Participants were selected using systematic random sampling from eligible hypertensive patients attending the outpatient department during the study period.

Data Collection

After obtaining written informed consent, participants were interviewed using a predesigned and pretested questionnaire. Information collected included sociodemographic characteristics, duration of hypertension, educational status, socioeconomic status, medication adherence, health literacy, and perceived social support.

Study Instruments

Medication adherence was assessed using the **8-item Morisky Medication Adherence Scale (MMAS-8)**, a widely validated instrument for evaluating adherence among patients with chronic diseases, including hypertension. Scores classify adherence as high, medium, or low.¹²

Health literacy was measured using the **HLS-IND-HIN-Q16**, the Hindi adaptation of the European Health Literacy Survey Questionnaire (HLS-EU-Q16), which assesses an individual's ability to access, understand, evaluate, and apply health information.¹³

Perceived social support was assessed using the **Hindi version of the Multidimensional Scale of Perceived Social Support (MSPSS-Hindi)**. The MSPSS evaluates perceived support from family, friends, and significant others and has demonstrated satisfactory psychometric properties in Indian populations.¹⁴

Socioeconomic status was classified according to the **modified B.G. Prasad socioeconomic classification**, updated using the current Consumer Price Index.¹⁵

Statistical Analysis

Data were entered into Microsoft Excel and analysed using **Jamovi version 2.3.28**. Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were summarized as frequencies and percentages.

Normality of continuous variables was assessed before analysis. One-way Analysis of Variance (ANOVA) was used to compare normally distributed continuous variables across medication adherence groups, whereas the Kruskal–Wallis test was used for non-normally distributed variables or ordinal data. Associations between categorical variables were assessed using the Chi-square test. A two-tailed p value <0.05 was considered statistically significant.¹⁶

Ethical Considerations

The study protocol was approved by the Institutional Ethics Committee of Gajra Raja Medical College, Gwalior, before commencement of the study. Written informed consent was obtained from all participants before enrolment. Confidentiality of participant information was maintained throughout the study in accordance with the ethical principles outlined in the Declaration of Helsinki.¹⁷

RESULTS

Medication Adherence

Of the 400 participants enrolled, 185 (46.3%) demonstrated low medication adherence, 163 (40.7%) showed medium adherence, and 52 (13%) achieved high adherence. The overall prevalence of non-adherence (low + medium) was 87%. Sociodemographic Characteristics and Adherence

Table 1: Characteristics of 400 participants based on Medication Adherence

Variables	Total (N=400)	Medication adherence			P value
		Low (n=185)	Medium (163)	High (52)	
Age	59±9.29	60.83±9.24	59.83±9.35	58.21±9.08	0.689
Gender					
Male	183 (45.75%)	93 (50.7%)	70 (42.9%)	20 (38.5%)	0.322
Female	217 (54.25%)	92 (49.7%)	93 (57.1%)	32 (61.5%)	
Marital status					
Married	295 (73.75%)	141 (76.2 %)	118 (72.4 %)	36 (69.2%)	0.385
Single/Divorced	105 (26.25%)	44 (23.8 %)	45 (27.6 %)	16 (30.8%)	
Education					
Illiterate	98 (24.5)	48 (25.9)	43 (26.4)	7 (13.5)	0.004 *
Primary	90 (22.5)	36 (19.4)	33 (20.3)	21 (40.4)	
Middle School	97 (24.3)	46 (24.8)	40 (24.5)	11 (21.2)	
Secondary	84 (21%)	39 (21.1)	36 (22.1)	9 (17.3)	
Higher Secondary	23 (5.7)	12 (6.5)	10 (6.1)	1 (1.9)	
Graduate & Above	8 (2%)	4 (2.1)	1 (0.6)	3 (5.7)	
Duration of hypertension					
< 2 years	112 (28.0%)	29 (15.6)	59 (36.1)	24 (46.2)	<0.001*
2–5 years	94 (23.5%)	43 (23.2)	39 (23.9)	12 (23.1)	
5–10 years	93 (23.25%)	56 (30.2)	30 (18.4)	7 (13.4)	
> 10 years	101 (25.25%)	57 (30.8%)	35 (21.4)	9 (17.3)	

Table 1 presents the distribution of participants as per sociodemographic characteristics and medication adherence, the overall mean age was 59.0 ± 9.29 years. Of the participants, 185 (46.3%) had low medication adherence, 163 (40.8%) had medium adherence, and 52 (13.0%) had high adherence. The mean age was comparable across the low, medium, and high medication adherence groups (60.83 ± 9.24, 59.83 ± 9.35, and 58.21 ± 9.08 years, respectively), with no statistically significant difference ($p = 0.689$). Similarly, medication adherence did not differ significantly by gender ($p = 0.322$) or marital status ($p = 0.385$). The distribution of participants by education level and adherence category, statistically significant association was found between educational attainment and adherence ($p=0.004$). Illiteracy was most prevalent in the low adherence group (25.8%), while primary education was notably higher in the high adherence group (41%). Interestingly, higher secondary and graduate-level education was sparsely represented in all groups. Income classification using the BG Prasad scale showed no statistically significant association with adherence levels

($p=0.859$), suggesting that socioeconomic class alone does not determine adherence behaviour in this population. A highly significant association was noted between duration of hypertension and adherence ($p<0.001$). Newly diagnosed patients (duration <2 years) showed markedly higher adherence, with 46.2% classified in the high adherence group compared to only 17.9% of those with more than 10 years of disease. Conversely, those with longer disease duration were disproportionately represented in the low adherence group.

Health Literacy and Adherence

Table 2: Distribution by Health Literacy and Medication Adherence

Health Literacy	Total N (%)	Medication adherence			p-value
		Low (n=185)	Medium (n=163)	High (52)	
Inadequate	181 (45.3)	96 (51.8)	66 (40.4)	19 (36.5)	* <0.001
Problematic	132 (33.0)	70 (38.1)	43 (26.3)	19 (36.5)	
Sufficient	87 (21.7)	19 (10.1)	54 (33.3)	14 (27.0)	

Health literacy was significantly associated with medication adherence ($p<0.001$). Among those with low adherence, 51.8% had inadequate health literacy, compared to only 10.1% with sufficient health literacy. Conversely, sufficient health literacy was associated with higher proportions of medium (33.3 %) and high (27.0 %) adherence, underscoring the importance of health understanding in adherence behaviour.

Social Support and Adherence

Table 3: Social Support Scores (Mean ± SD) by Medication Adherence Group

Social Support Domain	Medication adherence			p-value
	Low (n=185)	Medium (n=163)	High (52)	
Support from Friends	17.71 ± 5.91	18.67 ± 6.86	18.18 ± 6.45	0.646
Support from Family	17.20 ± 6.17	17.69 ± 6.98	17.17 ± 6.75	0.898
Support from Significant Others	17.03 ± 6.46	19.05 ± 5.99	17.33 ± 6.15	0.212
Total Score	51.95 ± 11.07	55.41 ± 12.10	52.69 ± 10.98	0.238

Social support scores across all three subdomains — family, friends, and significant others — did not differ significantly between adherence groups (total score $p=0.238$). This suggests that, in this cohort, the quantity of perceived social support alone may not be a strong predictor of medication adherence behaviour.

DISCUSSION

This study provides important insights into the determinants of medication adherence among hypertensive patients attending a tertiary care hospital in central India. The overall prevalence of non-adherence (low and medium adherence combined) was 87%, indicating that medication adherence remains a major challenge despite the availability of effective antihypertensive therapies. Similar findings have been reported in both Indian and international studies, where poor adherence has been identified as one of the principal barriers to achieving optimal blood pressure control and reducing cardiovascular morbidity and mortality.¹⁸⁻²⁰

A significant association was observed between the duration of hypertension and medication adherence. Patients diagnosed within the previous two years demonstrated

significantly better adherence than those living with hypertension for longer periods. Similar observations have been reported by Burnier and Egan, who suggested that adherence tends to decline over time because of treatment fatigue, reduced motivation, asymptomatic disease progression, and increasing medication burden.⁵ Long-term therapy may also lead patients to underestimate the importance of continued medication once symptoms are controlled, resulting in poorer adherence.²¹ These findings emphasize the need for continuous patient education, regular follow-up, and reinforcement of adherence throughout the disease course rather than only at the time of diagnosis.

Health literacy emerged as one of the strongest determinants of medication adherence in the present study. Participants with sufficient health literacy demonstrated significantly better adherence compared with those having inadequate or problematic health literacy. These findings are consistent with those of Guo et al., who reported that higher health literacy was independently associated with better medication adherence among community-dwelling patients with hypertension.⁸ Similar results have been reported in systematic reviews demonstrating that patients with adequate health literacy possess better knowledge of hypertension, greater self-efficacy, and improved ability to understand prescription instructions, ultimately leading to better adherence and blood pressure control.^{22, 23}

The relationship between educational attainment and medication adherence observed in the present study further supports the importance of patient understanding in long-term disease management. Although education and health literacy are related constructs, they are not synonymous. Individuals with limited formal education may still possess adequate functional health literacy through effective counselling by healthcare providers. Nevertheless, several studies have reported that lower educational status is associated with poorer medication adherence and reduced awareness regarding hypertension and its complications.^{24, 25} Contrary to our initial hypothesis, perceived social support was not significantly associated with medication adherence. Although several previous studies have demonstrated that family support and social networks improve adherence among patients with chronic diseases, the evidence remains inconsistent.^{26, 27} In Indian communities, social support may primarily provide emotional or financial assistance rather than direct support for medication-taking behaviour. Furthermore, family members may occasionally promote alternative treatments or encourage discontinuation of medicines after symptomatic improvement, thereby diminishing any beneficial effect of social support on adherence. These contextual factors may explain the absence of a statistically significant association observed in the present study.

Socioeconomic status did not demonstrate a significant association with medication adherence. Similar findings have been reported from several low- and middle-income countries where the availability of low-cost generic antihypertensive medicines through public health programmes reduces financial barriers to treatment.²⁸ However, non-financial factors such as inadequate knowledge, forgetfulness, poor patient-provider communication, complex treatment regimens, and low motivation continue to adversely affect adherence despite affordable medication availability.⁶

The present study has several strengths. Standardized and validated instruments were used to assess medication adherence, health literacy, and perceived social support. Systematic random sampling minimized selection bias, and the relatively large sample size improved the reliability of the findings. Nevertheless, certain limitations should be

acknowledged. The cross-sectional design precludes establishing causal relationships between health literacy, social support, and medication adherence. Medication adherence was assessed using a self-reported questionnaire, which is susceptible to recall and social desirability bias. Additionally, the study was conducted at a single tertiary care centre, limiting the generalizability of the findings to other settings, particularly primary care and community populations. Future longitudinal multicentre studies are needed to establish causal pathways and evaluate interventions aimed at improving health literacy and long-term adherence among patients with hypertension.

CONCLUSIONS

Medication non-adherence is highly prevalent among hypertensive patients attending a tertiary care hospital in Gwalior, with nearly half exhibiting low adherence. Health literacy and duration of hypertension are significant determinants of adherence, while perceived social support and income did not demonstrate significant associations in this setting. Targeted public health interventions focusing on improving health literacy — particularly through patient education at primary health centres, community awareness campaigns, and simplified medication counselling — are urgently needed. Long-term hypertensive patients require enhanced monitoring and adherence support strategies such as reminder systems, simplified regimens, and periodic motivational counselling to prevent treatment fatigue and its associated cardiovascular consequences.

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