Research Article

Assessment of Antihypertensive Medication Adherence in a Rural Indian Population

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Background: Hypertension is a leading non-communicable disease and a major contributor to cardiovascular morbidity and mortality in India. Medication adherence plays a crucial role in achieving optimal blood pressure control; however, adherence remains suboptimal, particularly in rural populations due to various socioeconomic and healthcare-related barriers. This study aimed to assess antihypertensive medication adherence and identify factors associated with adherence in a rural population.
Methods: A community-based cross-sectional study was conducted among 366 hypertensive patients aged ≥18 years residing in the rural locality around the Primary Health Center of Medavakkam, Chennai. Participants with a diagnosis of hypertension for more than one year were included. Medication adherence was assessed using the Morisky Medication Adherence Scale-8 (MMAS-8). Sociodemographic and clinical data were collected through door-to-door surveys using a structured questionnaire. Data were analyzed using SPSS version 24. Descriptive statistics were used to summarize variables, and the Chi-square test and ANOVA were applied to assess associations between adherence and independent variables. A p-value <0.05 was considered statistically significant.
Results: Among the 366 participants, 28.1% demonstrated high adherence, 50.5% showed medium adherence, and 21.3% had low adherence to antihypertensive medication. Female participants exhibited significantly higher adherence compared to males (p = 0.01). Patients receiving fewer antihypertensive medications had better adherence than those on multiple medications (p = 0.04). Age showed a borderline association with adherence (p = 0.07), while education level, occupation, and duration of hypertension were not significantly associated with adherence.
Conclusion: The study found that a substantial proportion of hypertensive patients in this rural population exhibited only moderate adherence to antihypertensive therapy. Gender and medication regimen complexity were significant determinants of adherence. These findings highlight the need for targeted interventions such as patient education, simplified treatment regimens, and community-based strategies to improve medication adherence and strengthen hypertension management in rural settings.

Access this article online

Website: www.cijmr.com

DOI: 10.58999/cijmr.v5i01.363

Keywords: Antihypertensive, Rural Indian Population, Morbidity, Mortality

Introduction

Hypertension is a major public health concern in India, with increasing prevalence in both urban and rural populations. Clinically, hypertension is defined as a persistent elevation of systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg, measured on at least two separate occasions. A substantial proportion remains undiagnosed or inadequately treated.[1] The situation is more concerning in rural areas where awareness, accessibility, and healthcare resources are limited.[2] Timely treatment of hypertension is crucial to prevent complications such as stroke, myocardial infarction, heart failure, and kidney disease [3] Medication adherence plays a pivotal role in blood pressure control. Medication adherence refers to the extent to which a patient's medication-taking behavior corresponds with agreed recommendations from a healthcare provider. Poor adherence can lead to uncontrolled hypertension, increased risk of target organ damage, and higher healthcare costs. Identifying and addressing non-adherence is therefore essential for effective management. Globally, suboptimal adherence to antihypertensive therapy has been recognized as a major barrier to effective blood pressure control. Factors influencing adherence include patient-related, therapy-related, healthcare system-related, and socioeconomic determinants, many of which are more pronounced in resource-limited settings.

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Submitted: 01/03/2026 Revision: 15/03/2026
Accepted: 30/03/2026 Published: 20/04/2026

How to cite this article: Felicia JP, Adalarasan S, Banumathi G. Assessment of Antihypertensive Medication Adherence in a Rural Indian Population. Central India Journal of Medical Research. 2026;5(1):10-15.

Table 1: Demographic characteristics of the study population

S. No.	*Variable*	*Frequency/Mean*	*Proportion*
1	Age (years)	44.21 ± 10.52	—
2	Female	168	45.9%
3	Male	198	54.1%
4	Primary to <8th grade	65	17.8%
5	Completed 8th grade	161	44.0%
6	Completed 12th grade	103	28.1%
7	Degree and above	37	10.1%
8	Housewives	160	43.7%
9	Service sector	105	28.7%
10	Duration of hypertension (years)	5.93 ± 3.58	—
11	Number of antihypertensive drugs consumed by participant	3.64 ± 1.95	—

Table 2: The prevalence of various adherence levels in the study population

Adherence Level	*Frequency*	*Percentage*
High adherence	103	28.1%
Medium adherence	185	50.5%
Low adherence	78	21.3%
Total	366	100%

Table 3: Factors associated with medication adherance

S No	*Variables*	*Category*	*High*	*Medium*	*Low*	*P value*
1	Age	<45 years	60 (35.9%)	82 (49.1%)	25 (15.0%)	0.07
		≥45 years	43 (21.6%)	103 (51.8%)	53 (26.6%)	
2	Gender	Male	44 (22.2%)	96 (48.5%)	58 (29.3%)	0.01
		Female	59 (35.1%)	89 (53.0%)	20 (11.9%)	
3	Education	≤8th grade	71 (31.4%)	114 (50.4%)	41 (18.1%)	0.32
		>8th grade	32 (22.9%)	71 (50.7%)	37 (26.4%)	
4	Occupation	Housewives	47 (29.4%)	82 (51.3%)	31 (19.4%)	0.41
		Other occupations	56 (27.2%)	103 (50.0%)	47 (22.8%)	
5	HTN duration	<6 years	55 (30.1%)	92 (50.3%)	36 (19.7%)	0.28
		≥6 years	48 (26.2%)	93 (50.8%)	42 (23.0%)	
6	Antihypertensive drugs	≤3 drugs	63 (39.6%)	78 (49.1%)	18 (11.3%)	0.04
		>3 drugs	40 (19.3%)	107 (51.7%)	60 (29.0%)	

This study aims to assess medication adherence among hypertensive patients in a rural population using the Morisky Medication Adherence Scale-8 (MMAS-8)—a validated, widely used tool that categorizes adherence as high, medium, or low[4] Through this field-based cross-sectional study, we aim to quantify adherence levels and identify key influencing factors. While multiple studies have explored adherence in hospital settings,[5–7] there is a notable lack of field-based data from rural India. Understanding adherence in these communities is critical due to the unique socioeconomic and cultural barriers that may affect long-term compliance. This study seeks to bridge that gap and provide evidence that can inform the development of context-specific interventions and contribute to rural health policy formulation.

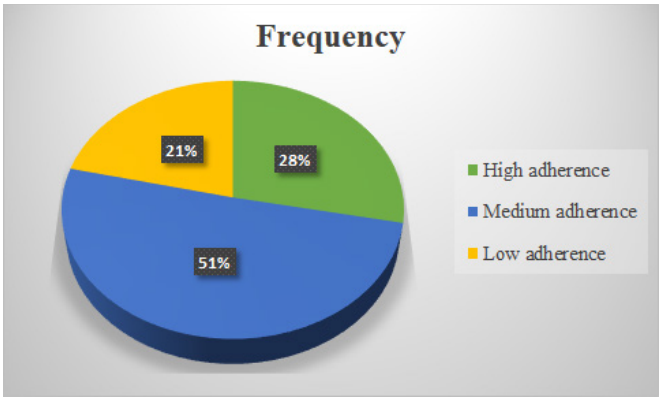

Figure 1: Frequency

Methods

Objectives

This study aims to

- Assess the level of medication adherence among hypertensive patients in a rural population using the MMAS-8 questionnaire.
- Identify key factors influencing adherence, including demographic, socioeconomic, and treatment-related variables.

Study Design and Setting

This study is a community-based cross-sectional observational study conducted in the locality around the primary health center (PHC) of Medavakkam, a rural area of Chennai, India. A cross-sectional design was chosen as it allows the assessment of medication adherence and its associated factors at a single point in time within a real-world rural community setting.

Sampling Technique

A systematic random sampling method was employed to select participants from the eligible hypertensive population in the study area. Households were visited sequentially, and every nth eligible individual meeting the inclusion criteria was enrolled until the required sample size was achieved (Table 1).

Sample Population

The study population consisted of individuals aged 18 years and above who had been previously diagnosed with hypertension for more than one year. Patients with at least one year since diagnosis were included to ensure sufficient exposure to antihypertensive therapy and the development of an identifiable medication adherence pattern.[7]

Sample Size

The required sample size was calculated using the standard formula for cross-sectional studies. Assuming a reported prevalence of medication adherence of 38.9%, a 95% confidence level, and a margin of error of 5%, the minimum sample size was estimated to be 366 participants based on the prevalence formula.[8]

Inclusion and Exclusion Criteria

All hypertensive individuals aged ≥18 years who had been diagnosed with hypertension for more than one year and who were willing to provide informed consent were included in the study. Individuals with cognitive impairment, severe debilitating illness, or any condition that prevented them from understanding or responding to the questionnaire were excluded. Participants who declined to provide consent were also excluded.

Data Collection Procedure

Data collection was carried out after obtaining approval from the Institutional Ethics Committee. Eligible participants were identified through door-to-door visits conducted by trained investigators in the selected rural area. The purpose and nature of the study were explained to the participants, and written informed consent was obtained prior to enrollment. Medication adherence was assessed using the Morisky Medication Adherence Scale-8 (MMAS-8), a validated and widely used questionnaire designed to evaluate medication-taking behavior. The questionnaire consists of eight items addressing factors such as forgetfulness, carelessness, and intentional discontinuation of medication. Based on standard scoring criteria, adherence levels were categorized as high (score = 8), medium (score = 6–7), and low (score <6). To ensure participant comprehension, the questionnaire was administered in the local language by the investigators. Completed questionnaires were reviewed daily to identify incomplete or inconsistent responses.

Data Management and Statistical Analysis

Data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 24. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize variables. Inferential statistical analysis was performed to assess associations between medication adherence and independent variables. The Chi-square test was used for categorical variables, and Welch's one-way analysis of variance (ANOVA) was applied for continuous variables where appropriate. The p-values were

calculated based on these statistical tests, and a p-value of <0.05 was considered statistically significant. To account for potential confounding factors such as age, gender, and number of medications, stratified analysis was performed during interpretation of results.

Ethical Considerations

Ethical approval for the study was obtained from the Institutional Ethics Committee of Madras Medical College (Approval no.: 101052025). Participation was voluntary, and written informed consent was obtained from all participants. Confidentiality was maintained by removing identifying details during data entry and analysis. All collected data were stored in password-protected Google Sheets file with restricted access.

Results

Demographic Characteristics

A total of 366 hypertensive patients participated in the study. The mean age of the participants was 44.21 ± 10.52 years. Among them, 168 (45.9%) were females and 198 (54.1%) were males. All participants had completed at least primary education. Based on the highest level of education attained, 65 (17.8%) had education from primary to below 8th grade, 161 (44.0%) had completed 8th grade, 103 (28.1%) had completed 12th grade, and 37 (10.1%) possessed a college degree. Regarding occupation, 160 participants (43.7%) were housewives, while 105 (28.7%) were employed in the service sector, with the remaining participants engaged in other forms of employment. The mean duration of hypertension among participants was 5.93 ± 3.58 years, and the average number of antihypertensive medications taken was 3.64 ± 1.95 drugs.

Majority of the study population fell under the medium adherence level (185 participants (50.5%)). 103 participants (28.1%) were classified as high adherence level. 78 participants (21.3%) were graded as having a low adherence level (Table 2 and Figure 1).

Factors Associated with Medication Adherence

Table 3 presents the distribution of medication adherence levels across different demographic and clinical variables. A higher proportion of younger participants (<45 years) demonstrated high adherence compared to older individuals. Female participants showed better adherence across all categories compared to males. Participants with fewer antihypertensive medications (≤3 drugs) had a higher proportion of high adherence and lower proportion of low adherence. Although variations were observed across education level, occupation, and duration of hypertension, these differences were not statistically significant.

Discussion

Hypertension remains a major public health challenge in India, particularly in rural populations where healthcare access, awareness, and long-term disease monitoring may be limited. Effective control of hypertension relies heavily on sustained adherence to antihypertensive medication. However, multiple patient-related, socioeconomic, and treatment-related factors can influence medication-taking behavior. Identifying the level of adherence and the determinants of non-adherence in rural communities is therefore essential to guide targeted interventions and improve long-term cardiovascular outcomes. The present study aimed to assess antihypertensive medication adherence among hypertensive individuals in a rural population using the Morisky Medication Adherence Scale-8 and to evaluate the factors associated with adherence.

In the present study, the majority of participants demonstrated medium medication adherence (50.5%), while 28.1% showed high adherence and 21.3% exhibited low adherence. These findings indicate that although a considerable proportion of patients adhere to therapy, optimal adherence remains suboptimal in this rural population. Statistically significant associations were observed between medication adherence and gender as well as the number of antihypertensive medications. Female participants demonstrated significantly higher adherence compared to males. In addition, patients receiving fewer antihypertensive medications showed better adherence, suggesting that regimen complexity may negatively influence long-term compliance. Age showed a borderline association with adherence, with relatively lower adherence observed among older participants. However, no statistically significant associations were identified between adherence and education level, occupation, or duration of hypertension.

The findings of the present study are broadly consistent with previous research conducted in India. A systematic review reported that the pooled rate of medication adherence to antihypertensive therapy in India was approximately 15.8%, highlighting the widespread challenge of non-adherence in the country and identifying factors such as older age, complex medication regimens, lower socioeconomic status, and limited education as contributors to poor adherence.[9]

Similarly, another study reported adherence rates of approximately 20.83% among hypertensive patients, with carelessness identified as the most common reason for medication non-adherence.[10] In contrast, some studies have reported substantially higher adherence levels; for example, one community-based study observed adherence rates of more than 85% among hypertensive individuals, although forgetfulness and lack of symptoms were common reasons for missed medications.[11] Another investigation reported a prevalence of adherence of 24.1%, with healthier lifestyle behaviors such as regular physical activity, non-smoking, and abstinence from alcohol associated with better adherence[7] Studies evaluating behavioral interventions have also demonstrated that patient education and counseling can significantly improve adherence by addressing regimen complexity, beliefs regarding medication, recall barriers, and accessibility issues.[12] Additionally, research has identified factors such as poor knowledge of hypertension complications, asymptomatic disease presentation, and reliance on government pharmacy services as predictors of poor adherence.[13] Socioeconomic barriers including financial constraints, lack of insurance coverage, and limited awareness of hypertension have also been reported to influence adherence patterns, particularly among women in India [14] Taken together, these findings highlight that medication adherence is influenced by a complex interplay of clinical, behavioral, and socioeconomic factors.

This study has several limitations. The cross-sectional design limits the ability to establish causal relationships between identified factors and medication adherence. In addition, adherence was assessed using a self-reported questionnaire, which may be subject to recall and social desirability bias. The study was conducted in a single rural locality, which may limit the generalizability of the findings. Furthermore, important determinants such as healthcare accessibility, medication affordability, socioeconomic status, and patient beliefs regarding treatment were not assessed and may have influenced adherence outcomes. Cultural factors, reliance on alternative medicine, and irregular drug supply may also contribute to non-adherence. Future studies should consider longitudinal and multi-center designs, incorporate objective measures of adherence, and evaluate targeted interventions such as patient education, digital reminders, and simplified treatment regimens to improve adherence in rural populations.

Conclusion

Medication adherence remains a critical component in the effective management of hypertension, particularly in rural populations where healthcare access and awareness may be limited. The present study demonstrated that while a majority of patients exhibited moderate adherence to antihypertensive medications, a considerable proportion still had low adherence. Female gender and fewer prescribed medications were significantly associated with better adherence, suggesting that treatment complexity and patient-related factors play an important role in influencing medication-taking behavior.

These findings underscore the need for targeted community-based interventions aimed at improving adherence among hypertensive patients. Strategies such as patient education programs, simplified medication regimens, regular follow-up through primary healthcare services, and increased awareness regarding the complications of uncontrolled hypertension may help enhance adherence. Strengthening these approaches at the primary care level can contribute to better blood pressure control and reduce the long-term burden of cardiovascular disease in rural populations.

References

1. Gupta R, Gaur K, S. Ram CV. Emerging trends in hypertension epidemiology in India. Journal of human hypertension. 2019 Aug;33(8):575-87.
2. Thrift AG, Ragavan RS, Riddell MA, Joshi R, Thankappan KR, Chow C, Oldenburg B, Mahal AS, Kalyanram K, Kartik K, Suresh O. Hypertension in rural India: the contribution of socioeconomic position. Journal of the American Heart Association. 2020 Apr 9;9(7):e014486.
3. World Health Organization. Global report on hypertension: the race against a silent killer. World Health Organization; 2023 Sep 19.
4. Moharamzad Y, Saadat H, Shahraki BN, Rai A, Saadat Z, Aerab-Sheibani H, Naghizadeh MM, Morisky DE. Validation of the Persian version of the 8-item Morisky Medication Adherence Scale (MMAS-8) in Iranian hypertensive patients. Global journal of health science. 2014 Dec 31;7(4):173.
5. Ramanath KV, Balaji DB, Nagakishore CH, Kumar SM, Bhanuprakash M. A study on impact of clinical pharmacist interventions on medication adherence and quality of life in rural hypertensive patients. Journal of Young Pharmacists. 2012 Apr 1;4(2):95-100.
6. Das B, Neupane D, Singh Gill S, Bir Singh G. Factors affecting non-adherence to medical appointments among patients with hypertension at public health facilities in Punjab, India. The Journal of Clinical Hypertension. 2021 Apr;23(4):713-9.
7. Venkatachalam J, Abrahm SB, Singh Z, Stalin P, Sathya GR. Determinants of patient's adherence to hypertension medications in a rural population of Kancheepuram District in Tamil Nadu, South India. Indian Journal of Community Medicine. 2015 Jan 1;40(1):33-7.
8. Sundar JS, Vijayan S, Hema Priya AS, Valarmathi S, Kalpana S,

Srinivas G, Arul Paul A, Rajkumar D. Prevalence of hypertension among fisherman community in Chennai, Tamil Nadu, South India: a descriptive cross-sectional study. International Journal of Research in Medical Sciences. 2024 Aug;12(8):2949.

9. Pal B, Dutta A, Chaudhary V, Kumari S, Meenakshi S, Murti K. Prevalence of antihypertensive medication adherence and associated factors in India: A systematic review and meta-analysis. Hipertensión y Riesgo Vascular. 2024 Dec 21.
10. Santra G. Assessment of adherence to cardiovascular medicines in rural population: An observational study in patients attending a tertiary care hospital. Indian journal of pharmacology. 2015 Nov 1;47(6):600-4.
11. Mishra S. Assessment of treatment adherence among hypertensive patients in a coastal area of Karnataka, India. International Journal of Community Medicine and Public Health. 2016 Aug;3(8):1998.
12. MV K, BG N. Self-reported medication adherence pattern of rural Indian patients with hypertension. Asian Journal of Pharmaceutical and Clinical Research. 2013;6(1):49-52.
13. Balasubramanian A, Nair SS, Rakesh PS, Leelamoni K. Adherence to treatment among hypertensives of rural Kerala, India. Journal of family medicine and primary care. 2018 Jan 1;7(1):64-9.
14. Gupta S, Dhamija JP, Mohan I, Gupta R. Qualitative study of barriers to adherence to antihypertensive medication among rural women in India. International journal of hypertension. 2019;2019(1):5749648.