

# ASSESSMENT OF HYPERTENSION TREATMENT ADHERENCE AND ITS DETERMINANTS AMONG THE PEOPLE RESIDING IN RURAL AREA OF DISTRICT GAUTAM BUDDHA NAGAR, UTTAR PRADESH- A CROSS-SECTIONAL STUDY

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## Abstract

**Objectives:** To study the prevalence of treatment adherence among the known hypertensive individuals in rural community and to identify the determinants for non-adherence to treatment among the study populations. **Methods:** A community-based cross-sectional study was conducted in the rural field catchment area (Panchayat) of the Community Medicine Department, School of Medical Sciences & Research, Sharda University, Greater Noida. Adults above 18 years of age residing in rural areas (for more than 6 months) of Greater Noida were considered eligible as the study population. A total of 166 adults who fulfilled the inclusion criteria and had given informed consent were interviewed using a pre-designed pre-validated and reliable/ standardized tool (MMAS) and an 8-item self-response questionnaire to determine the level of medication/treatment adherence. The data were entered and coded in SPSS version 16.0 and analyzed using both inferential and descriptive statistics. **Results:** In this study, it was observed that out of 166 participants with HTN, 90(54.46%), both male and female, have poor adherence to their medications. It was observed that in participants with the age group of  $\geq 60$  years, 49(56.9%) have poor adherence to their medication. There is a significant association between the level of education and treatment adherence, where 59(55.1%) out of 107 literate participants and 42(71.2%) out of 59 illiterate participants, have poor treatment/medication adherence. There is a significant association between education and study participants' medication adherence, with Chi-Square= 10.618,  $p=0.001119$ .

**Keywords:** Adults, Hypertension, Treatment Adherence, Rural.

## INTRODUCTION

Hypertension is one of the most important global public health concerns, as it often appears at a late stage in the healthcare system with complications because of its symptomless nature, even though it can be easily detected and treated.<sup>[1]</sup> Nearly 40% of people worldwide  $\geq 25$  of age have hypertension, which is a major risk factor for mortality and disability associated primarily with cardiovascular, cerebrovascular, and kidney disorders and complications.<sup>[2]</sup> Globally, an estimated 1.13 billion people, are diagnosed with hypertension, and two-thirds live in low-income and middle-income nations.<sup>[2]</sup> Medication non-adherence or sub-optimal medication adherence is a well-known issue related to poor blood pressure management.

Medication adherence is critical in the treatment of many chronic conditions to make sure that patients receive essential therapeutic benefits. Nonetheless, it has always been an issue for persons suffering from medical conditions, particularly the elderly.<sup>[3]</sup> Suboptimal medication adherence may add to the emergence of newer health concerns or diseases, functional impairments, deprived quality of life, recurrent visits to the hospital and pharmacy, meagre outcomes, and an increased usual length of hospital stay, thus leading to an increase in overall healthcare, expenditure/cost, and utilization of services.<sup>[4]</sup> Medication adherence is complicated, and people's behavior toward sustaining optimal adherence to the treatment regimen has been heavily impacted by elements such as healthcare professionals, patients, the current healthcare system, medicine, and socio-economic situations. Person-related variables might be either deliberate or inadvertent. Intentional behaviors are influenced by the individual's level of beliefs, satisfaction, and attitude toward the disease condition, side effects of medication, and expectations of improved health, which results in an agile decision to stop taking treatment or modify the treatment regimen without the treating physician's knowledge.<sup>[4][5]</sup> Unintentional variables impact patients' medication-taking behavior because of their level of knowledge and education, declining rational capacity, impairments in vision and hearing, and other physical infirmities. The complexity of treatment regimens, healthcare team members' lack of coordinated care, and healthcare providers' failure to establish good communication and a trusting relationship with individuals with hypertension can all lead to confusion in treatment regimens and poor treatment adherence. Inequity in the distribution of healthcare resources in specific demographic areas can lead to inadequate access to healthcare services, which may lead to patients' unsatisfactory treatment adherence. The utmost important medication-related considerations are medicine cost, flavour, size, and adverse effects. Diminished social and familial support, financial and economic restraints, and a lack of public transportation are all socioeconomic factors that influence a person's medication adherence behavior.<sup>[6]</sup> Treatment adherence is a vital component of care for any group of individuals, particularly the elderly, who are more susceptible to suboptimal adherence to prescribed treatment due to multimorbidity, polypharmacy, and poor perception caused by physiological changes in their bodies.<sup>[6][7]</sup> According to the research, treatment non-adherence is more common in elder patients, and the medication expenses, economic and financial restrictions, and beliefs in substitute therapies are essential elements to consider when tackling these phenomena.<sup>[7]</sup> So, the role of primary care physicians becomes crucial, and they need to ensure their patients are adhering to their antihypertensive medication regimens as it directly affects their health outcomes, and quality of life and helps prevent severe cardiovascular and renal complications. Primary care physicians can assist in

achieving this by educating their patients, involving them in decision-making, creating personalized care plans, and monitoring their progress.

## RATIONALE OF STUDY

Gautam Buddha Nagar, a district in the Indian state of Uttar Pradesh, is a rapidly developing rural region with a diverse population. As development progresses, the prevalence of non-communicable diseases, including hypertension, rises. This makes it imperative to study and understand the factors influencing hypertension treatment adherence in this region. Hypertension is a silent killer, often asymptomatic, and a leading cause of morbidity and mortality. In Gautam Buddha Nagar, as in many other rural areas, the burden of hypertension is likely to be significant. An in-depth study on treatment adherence is crucial to address this public health concern effectively. The efficacy of hypertension treatment depends on consistent adherence to prescribed medications and lifestyle modifications. Understanding the adherence patterns in Gautam Buddha Nagar can help healthcare providers and policymakers tailor interventions to improve treatment outcomes. Gautam Buddha Nagar is characterized by a diverse population, with variations in socioeconomic status, cultural beliefs, and healthcare access. These factors can impact hypertension treatment adherence. Exploring these variations will help design targeted interventions for specific subpopulations. Limited healthcare resources are often allocated to regions with the highest disease burden. A study on hypertension treatment adherence can guide resource allocation and distribution of services to ensure effective management and control of hypertension. Understanding the barriers to treatment adherence can shed light on disparities in healthcare outcomes. Identifying and addressing these disparities can promote health equity and reduce the burden of hypertension-related complications. Hypertension-related complications and hospitalizations impose a substantial economic burden on both individuals and healthcare systems. Improved adherence can lead to significant cost savings for both patients and the healthcare system, thereby promoting economic stability. The study on hypertension treatment adherence in Gautam Buddha Nagar is essential to address the growing burden of hypertension and its associated health and economic consequences. By identifying the factors influencing adherence and tailoring interventions to the specific needs of the population, this research can contribute to better health outcomes, reduced healthcare costs, and an overall improvement in the quality of life for individuals living with hypertension in the region.

**Objectives:** To study the prevalence of treatment adherence among the known hypertensive individuals in rural community and to identify the determinants for non-adherence to treatment among the study populations.

## METHODOLOGY

The present study was conducted after approval from the Institutional Ethics Committee. The sample size included males as well as females aged 18 years and above in the study area. After obtaining the informed consent face-to-face interviews of the study participants were conducted. Hypertension treatment adherence assessment was done by using the Morisky Medication Adherence Scale (MMAS), an 8-item questionnaire. MMAS, an 8-item self-response questionnaire was used to determine the level of treatment adherence. The degree of adherence was determined according to the score resulting from the sum of all the correct answers:

High adherence (eight points), Average adherence (6 to < 8 points), and Poor adherence (< 6 points). The blood pressure was measured with a mercury sphygmomanometer in a sitting position, three readings were taken and the lowest one was recorded to determine the blood pressure. Height and Weight were measured using standard methods. The modified B.G. Prasad classification (2022) determined the socioeconomic class.

## MATERIALS AND METHODS

**Study Area:** A Community-based cross-sectional study was conducted in the rural area(Panchayatan) of Gautam Buddha Nagar, Greater Noida, Uttar Pradesh which is the field practice area of the Department of Community Medicine of a medical college in western Uttar Pradesh.

**Study Population:** The adult population above 18 years of age residing in the study area for more than 6 months and meeting the inclusion criteria were considered for the study.

**Study Design:** It was a community-based cross-sectional study to assess hypertension treatment adherence in the adult population in the study area.

**Study Period:** The study was conducted from April to June 2023.

### Sample Size and Analysis

Calculation of Sample size(N) was performed using the formula:

$$N= Z^2PQ/ L^2$$

Where P (Prevalence of medication non-adherence) was taken as 49.67% based on results of a study done in India which showed non-adherence to antihypertensive medication among adults.<sup>[8]</sup> Thus, the sample size was calculated as: Where, P: 49.67; Q = (100-P), L: Level of allowable error: 8%.

$$N= (1.96)^2*49.67*(100-49.67)/ (8)^2= 151.$$

Additionally, with a 10% non-response rate, the final sample size was approximated to 166.

The data were entered, coded, and analyzed by Statistical Package for the Social Sciences (SPSS) version 16. The statistical test used for analysis was the Chi-Square test.

### Inclusion Criteria

1. Those giving valid informed consent.
2. Those who are known cases of hypertension.
3. Permanent resident in the area.(staying for >6 months).

### Exclusion Criteria

1. Those who were severely ill and mentally unsound and/or suffering from other co-morbid conditions.

**Sampling Technique:** The rural health Training centre of the Department of Community Medicine caters to eight villages; out of 8 villages we selected three villages for this study by simple random sampling using a lottery method. In these 3 villages participants were selected by simple random sampling method and those who fulfilled the inclusion criteria were interviewed face to face.

## RESULTS

**Table 1: Distribution of Socio-Demographic Characteristics of Study Participants (N=166)**

Sociodemographic characteristics	Frequency (%)
<b>Age</b>	
18-38	13(7.84)
39-59	67(40.36)
≥60	86(51.80)
<b>Gender</b>	
Male	79(47.3)
Female	87(52.7)
<b>Education</b>	
Literate	107(64.45)
Illiterate	59(35.55)
<b>Occupation</b>	
Unemployed	105(63.25)
Employed	61(36.75)
<b>Socio-economic status</b>	
Upper Class	5(3)
Upper Middle Class	24(14.45)
Lower Middle Class	78(47)
Upper Lower Class	53(31.93)
Lower Class	6(3.62)
<b>Family type</b>	
Nuclear Family	56(33.73)
Joint Family	110(66.27)

Table 1 revealed that the total number of participants in our study was 166, out of which the maximum number of the study participants 86(51.80%) belong to the age group ≥60 years, whereas female participants 87(52.7%) and male participants were 79(47.3%). The majority of participants were literate, 107(64.45%). Most of the participants 78(47%) belonged to the lower middle class and 105(63.25) were unemployed, 110(66.27%) participants belonged to joint families.

**Table 2: Distribution of Level of Hypertension Treatment Adherence among the Study Participants(N=166)**

Level of hypertension treatment adherence	Frequency(%)
High N(%)	20(12%)
Medium N(%)	56(34%)
Low N(%)	90(54%)

Table 2 shows that a poor level of treatment adherence was found among 54% of participants in the study as per the MMAS, whereas a medium and high level of treatment adherence was observed in 56(34%) and 20(12%) participants, respectively.

For the statistical analysis, the High and Medium level of treatment adherence was termed as good adherence, and the low level of treatment was termed as poor treatment adherence level. Thus, among the study participants, good adherence was found in 76(45.7%), and poor adherence was found in 90(54.2%).

**Table 3: Association of Sociodemographic Characteristics with Treatment Adherence among Study Participants**

Sociodemographic characteristics	Treatment adherence		TOTAL N=166 (%)	p-value
	Good N=76(45.78%)	Poor N=90(54.22%)		
<b>Age</b>				
18-38	7(53.8)	6(46.2)	13	0.701
39-59	32(47.8)	35(52.2)	67	
>60	37(43.1)	49(56.9)	86	
<b>Education</b>				
Literate	59(55.1)	48(44.9)	107	<b>0.001119</b>
Illiterate	17(28.8)	42(71.2)	59	
<b>Gender</b>				
Male	38(48.1)	41(51.9)	79	0.567
Female	38(43.7)	49(56.3)	87	
<b>Occupation</b>				
Unemployed	48(45.7)	57(54.3)	105	0.981
Employed	28(45.9)	33(54.1)	61	
<b>Socio-economic status</b>				
Upper Class	3(60.0)	2(40)	5	0.884
Upper Middle Class	9(37.5)	15(62.5)	24	
Lower Middle Class	36(46.2)	42(53.8)	78	
Upper Lower Class	25(47.2)	28(52.8)	53	
Lower Class	3(50)	3(50)	6	
<b>Family type</b>				
Nuclear Family	24(42.8)	32(57.2)	56	0.589
Joint Family	52(47.3)	58(52.7)	110	

Table 3 shows that in our study treatment adherence was poor in the ≥60 age group as well as in the female study participants. There was a significant association between literacy and treatment adherence with a p-value(0.001119).

**Table 4: Association between Hypertension Treatment-Seeking Behavior and Level of Treatment Adherence among Participants in the Study**

Hypertension treatment-seeking behavior	Level of treatment adherence (%)		Total	P value
	Good N=76(%)	Poor N=90(%)		
<b>Duration of hypertension</b>				
<3 years	64 (56.6)	49 (43.4)	113	<b>0.000042</b>
>3 years	12 (22.6)	41 (77.4)	53	
<b>Family history of hypertension</b>				
Yes	45 (45.0)	55 (55.0)	100	0.803
No	31 (46.9)	35 (53.1)	66	
<b>Frequency of blood pressure checkups</b>				
Regular	44 (83.1)	9 (16.9)	53	<b>0.00001</b>
Irregular	32 (28.3)	81 (71.7)	113	
<b>Comorbidities</b>				

Yes	35 (41.2)	50 (58.8)	85	0.222
No	41 (50.6)	40 (49.4)	81	
<b>History of any complications</b>				
Yes	30 (45.4)	36 (54.6)	66	0.944
No	46 (46.0)	54 (54.0)	100	
<b>Number of antihypertensive medications</b>				
1/day	67 (69.8)	29 (30.2)	96	<b>0.00001</b>
2 or more/day	9 (12.8)	61 (87.2)	70	
<b>Frequency of taking treatment</b>				
Once per day	68 (52.7)	61 (47.3)	129	<b>0.008</b>
Twice or more per day	8 (21.6)	29 (78.4)	37	
<b>History of Side effects of medications</b>				
Yes	3 (30.0)	7 (70.0)	10	0.301
No	73 (46.8)	83 (53.2)	156	
<b>Health-care facility distance</b>				
<3 km	53 (51.9)	49 (48.1)	102	<b>0.043</b>
>3 km	23 (35.3)	41 (64.1)	64	
<b>Transport facility</b>				
Available	53 (50.9)	51 (49.1)	104	0.082
Not Available	23 (37.1)	39 (62.9)	62	

Table 4 shows the association between hypertension treatment adherence and treatment-seeking behavior among study participants.

In the present study most of the participants, 113 (68.2%), were identified and diagnosed with hypertension <3 years ago, and amongst them, most of the participants were found to have good compliance to antihypertensive treatment 64 (56.6%) as compared to those who were diagnosed with hypertension for >3 years, 12 (22.6%), and this is statistically significantly different with p-value (0.000042). In more than half of the study participants, 100 (60.24%), family history of hypertension was found positive. Additionally, among the 166 participants in the study, only 53 (31.92%) were going consistently for regular follow-up to healthcare facilities for regular blood pressure monitoring. It was also observed that 85 (51.20%) of the participants had comorbidities. Poor adherence to treatment was found more commonly among participants who have been prescribed two or more than two antihypertensive medications per day, 61(87.2%) as compared to those with only one medicine prescribed per day, 29 (30.2%), and the difference was statistically significant with p-value (0.00001). History of Side effects to medications was observed only among 10 (6.02%) study participants.

## DISCUSSION

In the present study, only 45.78% of participants with hypertension have good adherence to their medications. In a similar study by Paul A. et al.<sup>[3]</sup> in the rural areas of south India adherence was 34.7% (participants with uncontrolled blood pressure). The overall adherence level to antihypertensive medications was observed in an Indian study conducted by Venkatachalam et al. (24.1%).<sup>[9]</sup> A similar study by Yousuf FS et al.<sup>[10]</sup> found that 64% of treatment adherence. Similarly in a study by Dennis T et al.<sup>[11]</sup> poor medication adherence was found in 49.67% of participants. In our study, 44.9% of literate and 71.2% of illiterate participants had poor adherence to their medication. We found that there was a significant association between treatment adherence and education level, p(0.001119). This is observed in a similar study

conducted in western Rajasthan by Krishnan V et al.,  $p(0.001)$ <sup>[12]</sup> However, a study done in Ethiopia showed that level of education,  $p(0.233)$  does not affect medication adherence.<sup>[13]</sup> The study by Ubogun O et al.<sup>[14]</sup> found a statistically insignificant association between health literacy and treatment adherence,  $p(0.082)$ .

Based on the socio-economic status of the participants in the present study, 53.8% of participants belonging to the lower middle class showed the lowest adherence to anti-hypertensive medication. The study conducted by Ipingbemi AE et al. discusses that overall expenses for medication were borne out of pocket largely leading to treatment non-adherence among the studied participants.<sup>[15]</sup> In the present study, it was found that 56.6% of participants with hypertension for <3 years showed good adherence to antihypertensive medication, there is a substantial association between the duration of hypertension and treatment adherence,  $p(0.000042)$ . Similar results were found in a study by Dhar L et al. which discussed that the duration of hypertension showed a significant contributory effect to medication non-adherence ( $p = 0.031$ ).<sup>[16]</sup>

In the present study, 52.7% of participants who take one medication per day showed good adherence to treatment which was statistically significant  $p(0.00001)$ . The results were consistent with the study in India by Tandon VR et al.(60.6%)<sup>[17]</sup> and Bharatia R et al.(45.4%).<sup>[18]</sup> A study by Srivastava AK et al. in a rural area of district Dehradun discussed the average adherence for once-a-day dosing was significantly higher than for multiple doses daily,  $p(<0.001)$ .<sup>[19]</sup> In addition to this, the role of Primary care physicians becomes crucial in promoting adherence to antihypertensive drugs. This helps control blood pressure, improve patient health outcomes, prevent severe health conditions, and reduce healthcare costs. Effective communication, patient education, and monitoring, as well as promoting a strong patient-provider relationship, are all essential in achieving medication adherence. Primary care physicians are well-positioned to provide ongoing guidance and care for patients with hypertension, ensuring long-term health maintenance.

## CONCLUSION AND RECOMMENDATION

The current findings show that higher medication compliance leads to better blood pressure control. During routine patient interactions with healthcare professionals, counselling of patients should be provided, with a focus on the significance of drug adherence. The benefits of adherence must be made clear, and myths and fears about drug side effects must be dispelled because these are crucial barriers to adherence.

### Conflicts of Interest

There are no conflicts of interest

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