Journal of Family Medicine and Health Care
2026, Vol. 12, No. 3, pp. 67–77
https://doi.org/10.11648/j.jfmhc.20261203.14

Research Article

Socio-demographic Profiles, Clinical Determinants, and Medication Adherence Patterns Among Hypertensive Adults at a Nigerian Teaching Hospital: A Cross-sectional Study

Abdul Rauf Segun Ibraheem[1, *], Lateef Shola Mustapha[1], Abitare Hope[1], Chinyere Beatrice Nwosu[1], Lawal Badru[1], Zuliat Nihinlola Sanni[2], Nusirat Tinuke Abdullateef[3]

[1]Department of Family Medicine, Federal Teaching Hospital, Birnin Kebbi, Nigeria

[2]Department of Family Medicine, Federal Medical Centre, Abuja, Nigeria

[3]Department of Family Medicine, University of Ilorin Teaching Hospital, Ilorin, Nigeria

Abstract

Background: Hypertension is a leading cause of cardiovascular disease globally, but its management is frequently hindered by suboptimal medication adherence, which leads to poorly controlled blood pressure. While poor adherence is a well-documented challenge, a critical research gap exists in North-Western Nigeria regarding how the region's unique socio-cultural factors, such as high levels of informal education and polygamous family structures, influence patients' medication adherence in general outpatient settings. *Objective:* This study aimed to evaluate the socio-demographic profiles, clinical determinants, and medication adherence patterns among adult hypertensive patients attending a general outpatient clinic in a teaching hospital in North-Western Nigeria to provide context-specific epidemiological data for localized healthcare policies. *Method:* A hospital-based descriptive cross-sectional study was conducted among 130 adult hypertensive patients at the General Outpatient Clinic of the Federal Teaching Hospital Birnin Kebbi. Participants on antihypertensive medications for at least six months were selected using a systematic random sampling technique. Data were collected using a semi-structured questionnaire for socio-demographics, and the validated 8-item Morisky Medication Adherence Scale was utilized to evaluate adherence patterns. Additionally, blood pressure and Body Mass Index were measured and categorized. Data were analyzed using SPSS version 23, with chi-square tests used to determine statistical associations ($p \leq 0.05$). *Results:* The participants had a mean age of 50.16 ± 11.09 years, and the majority (62.3%) were female. Medication adherence was exceptionally poor; according to the MMAS-8 scale, 74% of participants had low adherence, 23% had medium adherence, and only 3% had high adherence. There were no statistically significant associations between medication adherence patterns and socio-demographic variables. However, there was a statistically significant inverse relationship between the duration of hypertension treatment and medication adherence ($p = 0.012$). Participants treated for less than one year showed better adherence, while low adherence was exceedingly high among those treated for 1-5 years or longer. Furthermore, a significant majority (67.8%) of participants had uncontrolled blood pressure, and nearly half (43.1%) were obese. *Conclusion:* Medication adherence among adult hypertensive patients in North-Western Nigeria is alarmingly low, which severely undermines treatment efficacy and cardiovascular outcomes. The significant decline in adherence observed with longer treatment durations suggests pervasive treatment fatigue. To mitigate this, healthcare providers must implement continuous, patient-centered educational interventions and holistic lifestyle management strategies tailored to patients undergoing long-term therapy.

*Correspondence: Abdul Rauf Segun Ibraheem (ibraheemabdulrauf@ymail.com)

Received: 18 July 2026; **Accepted:** 28 July 2026; **Published:** 22 August 2026

Keywords

Adult, Hypertension, Medication Adherence, Socio-demographic Profiles, Treatment Duration

1. Introduction

In most of the world's nations, including Nigeria, the Omran hypothesis that non-communicable diseases like hypertension would replace infectious diseases as the main causes of morbidity and mortality as a community or nation develops has been proven true [1]. Hypertension, an important public health issue with high levels of morbidity and death worldwide, is defined as a sustained systolic blood pressure (SBP) of 140 mmHg or higher and/or a diastolic blood pressure (DBP) greater than or equal to 90 mmHg [2]. Research reports on hypertension have shown a high prevalence and complications in Africa, as it has killed more people than malaria [3]. It is the leading cause of cardiovascular disease, and its complications account for more than 25% of medical admissions in low- and middle-income hospitals [3]. Studies have also reported that adequate blood pressure (BP) control is poor globally; only about one-third of patients with systemic hypertension have their BP controlled despite drug treatment, while some are even on three antihypertensives without achieving optimal control [4, 5].

Evidence has shown that adherence to anti- hypertensive medication is a challenge to most patients, and this is affected by socio-economic circumstances, pill burden from other co-morbidities and disease duration [6]. In Nigeria and other parts of sub-Saharan Africa, studies have found that the level of medication adherence among hypertensive patients is still quite low [7]. Adisa et al. conducted their survey in two tertiary hospitals in Sokoto State, Nigeria and reported a low prevalence of medication adherence of 8.9% among the participants [7].

Poor medication adherence is a harbinger for the increasing incidence and prevalence of poorly controlled blood pressure [8]. Other reasons proffered include forgetfulness, a feeling of well-being, lack of funds, advice from spiritual leaders, and use of herbal remedies [7, 8]. Some of these factors are found to be related to patients; among the patient-related barriers is low or poor adherence to antihypertensive treatment [8, 9]. Suboptimal adherence, which results from failing to commence treatment therapy, take medications as prescribed, and maintain long-term therapy, is a well-recognized factor contributing to poor BP control [10]. Patients with chronic diseases like hypertension often find it challenging to stick to complex treatment plans, including changing medication schedules, self-monitoring, dietary restrictions, and exercise [11, 12]. Medication adherence is a crucial part of patient care and indispensable to reaching clinical goals; by contrast, non-adherence leads to poor clinical outcomes, increased morbidity and mortality rates, and unnecessary healthcare expenditure [13, 14]. Forgetfulness and lack of effective social support networks are important factors that have been suggested to contribute to poor adherence [15-17]. Hence, it is logical to reduce the levels of forgetfulness by strengthening the patient's economic and social support network, which would go a long way toward improving medication adherence and, ultimately, BP control [17].

Latest guidelines in the management of hypertension emphasized the need to address medication adherence during routine clinical visits to achieve optimal BP control and prevent irreversible complications [18]. Quite disheartening that this practice is deficient in our routine clinical practices, partly due to busy clinics and clinicians' limited time [19]. Despite the well-documented global concern of poor medication adherence among patients with hypertension, an important research gap remains in North-Western Nigeria. Most existing studies in Nigeria have focused on the Southern and Eastern regions, leaving limited local evidence on how the North-West's distinct socio-cultural factors, such as high levels of informal or Quranic education and polygamous family structures, may influence medication adherence. In addition, much of the current literature centres on specialized cardiology clinics, with little attention paid to general outpatient settings, where most routine long-term care is delivered. Therefore, this study was conducted to bridge this critical gap by providing essential, context-specific epidemiological data to guide localized healthcare policies, while examining how regional socio-demographic factors interact with participants' clinical variables (Body Mass Index [BMI], treatment duration and BP status) and medication adherence. The study outcome will provide healthcare providers with insights to develop culturally tailored health literacy programs, which would entail identifying specific high-risk patient profiles and addressing vulnerabilities through targeted interventions that would ameliorate cardiovascular complications resulting from poorly controlled BP.

2. Materials and Methods

2.1. Study Area

This study was conducted at the General Outpatient Clinic (GOPC) of Federal Teaching Hospital (FTH) Birnin Kebbi, Kebbi State, Nigeria.

2.2. Study Population

The participants were adults (18 years and above) patients diagnosed with hypertension, on antihypertensives for six months or more, and attending GOPC of FTH Birnin Kebbi, and also satisfied the inclusion criteria.

2.3. Study Design

This was a hospital-based descriptive cross-sectional study.

2.4. Sample Size Estimation

The required sample size was determined using the statistical formula for estimating minimum sample size in health studies, Leslie Kish's formula: $n = Z^2pq/d^2$, was used to obtain the required sample size of 130 participants [20].

2.5. Selection Criteria

All consented adult hypertensive patients who were on medications for more than six months attending the GOPC of FTH Birnin Kebbi. Participants excluded from the study were those who were critically ill, those with co-morbidities (diabetes mellitus, cardiovascular events such as myocardial infarction, heart failure, stroke patients with complications such as memory loss), and patients with major psychiatric illness.

2.6. Method of Data Collection

The participants were recruited using a systematic random sampling technique; informed consent was obtained, and their confidentiality was maintained. A pretested interviewer-administered semi-structured questionnaire was used to collect information on participants' socio-demographic characteristics, medical history and family history, while the structured questionnaire Morisky Medication Adherence Scale-8 (MMAS-8) was used to assess medication adherence. MMAS-8 is a validated tool that can be used to assess medication adherence in patients with chronic conditions like hypertension, focusing on both intentional and unintentional non-adherence. It has been used to measure non-adherence in a variety of patient populations and has been substantiated by numerous studies on a global scale. It helps clinicians identify barriers to adherence and supports researchers in studying the effectiveness of treatments. Additionally, its concise design makes it well-suited for busy clinical environments and large-scale studies. It is a highly reliable and valid tool for assessing medication adherence. Its psychometric strength is evidenced by a Cronbach's alpha of 0.83, which indicates good internal consistency. Furthermore, it demonstrates strong test-retest reliability, ensuring stability over time [21, 22]. The tool employs behavioural questions designed to minimize "yes-saying" bias common in chronic care patients. The question wording helps patients disclose non-adherence issues candidly. The MMAS-8 has been effective in addressing adherence concerns, such as forgetting to take medications or stopping them without guidance. It is scored on a scale from 0 to 8 points; a score of 8 indicates high adherence, 6 to < 8 represents medium adherence, and < 6 indicates low adherence [22, 23].

The BP of each patient was measured by the auscultatory method using a standard mercury sphygmomanometer with an appropriately sized cuff and a stethoscope, in accordance with recommended guidelines for BP measurement. The mean BP of each patient was taken and categorized into two groups: controlled hypertension (SBP < 140 and DBP < 90mmHg) and uncontrolled hypertension (SBP ≥ 140 and DBP ≥ 90mmHg) [4]. The weight in kilograms was measured to the nearest 0.5kg using a standard weighing scale, and the height in meters (m) to the nearest 0.01m using a stadiometer. The BMI of each participant was calculated as weight (kg) divided by height (m^2) squared.

2.7. Data Analysis

The collected data were coded and analysed using the Statistical Package for Social Sciences version 23 (SPSS IBM 23). The socio-demographic characteristics were analysed and described using frequency tables and proportions. The patterns of medication adherence among the participants were also determined. The chi-square test was used to assess the level of significance of the association between socio-demographic variables and patterns of medication adherence, as well as between patterns of medication adherence and clinical determinants (Duration of treatment, BP and BMI). A *p*-value of less than or equal to 0.05 was considered statistically significant.

2.8. Ethical Consideration

Ethical permission was sought from the Ethical Review Committee of FTH, Birnin Kebbi (dated 17th October 2019 and number FMC/BK/HP/045/P/157/VOL III). The research process was clearly explained to the participants, written informed consent was obtained, and all collected data were kept confidential, with no financial incentives or coercion throughout the study. They agreed to participate in the study, and the consent forms were properly signed.

3. Results

Socio-demographic characteristics of participants

The ages of the participants ranged from 30 to 75 years (mean = 50.16 ±11.09 years). A larger proportion 39 (30.0%) of the 130 participants, were in the 50-59 years age group, and the majority of them 81 (62.3%) were females, with male to female ratio (M:F) of 1:1.7. Most of the participants 120 (92.3%) practised Islam, while the majority 104 (80.0%) of the participants were married. A higher proportion, 75 (57.7%), of the respondents were in monogamous marriage. Almost half of the participants 47 (36.2%) attended Quranic school only, and half of the 64 (49.3%) were self-employed. Almost three-quarter 75 (57.7%) of them earn more than thirty thousand naira monthly (National minimum wage).

Table 1. Socio-demographic characteristics of the participants. N = 130.

Socio-demographic variables	Frequency (n = 130)	Percentage (%)
Age group (years)		
30-39	23	17.7
40-49	35	26.9
50-59	39	30.0
≥ 60	33	25.4
Sex		
Male	49	37.7
Female	81	62.3
Religion		
Islam	120	92.3
Christianity	10	7.7
Marital status		
Married	104	80.0
Separated	3	2.3
Widowed	23	17.7
Type of marriage		
Monogamous	75	57.7
Polygamous	55	42.3
Family type		
Extended	55	42.3
Nuclear	75	57.7
Educational level		
No formal education	16	12.3
Quranic school only	47	36.2
Vocational	2	1.5
Primary	10	7.7
Secondary	18	13.8
Tertiary	37	28.5
Occupation		
Housewife	29	22.3
Self-employed	64	49.2
Civil servant	36	27.7
Retired Civil servant	1	0.8
Average monthly income		
≤ 30,000	55	42.3
>30,000	75	57.7

Figure 1 below shows the patterns of medication adherence among the study participant's and according to MMAS-8, a larger proportion 96 (74%) had low medication adherence, while only 4 (3%) participants had high medication adherence.

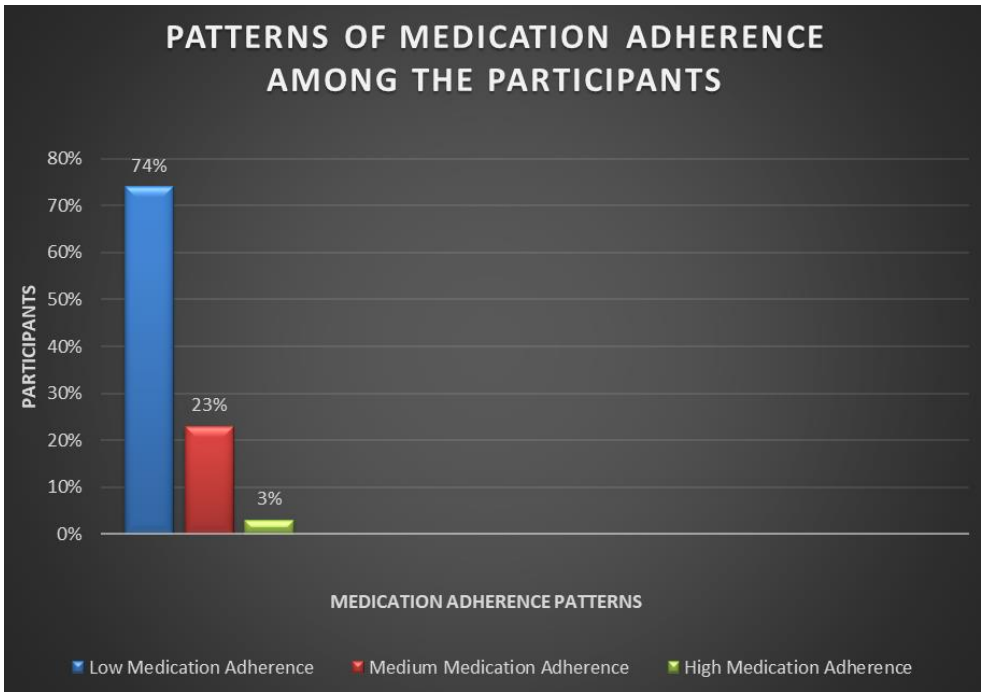

Figure 1. *Bar chart showing the level of medication adherence among participants.*

Table 2 shows the measured clinical variables (determinant factors) among the participants; the majority of them, 59 (45.4%), were on treatment for 1 to 5 years, and almost three-quarters of the participants, 88 (67.8%), had uncontrolled BP, while almost half, 56 (43.1%), were obese.

Table 2. *Clinical Variables (Determinants) of the Participants.*

Determinant variables	Frequency (n=130)	Percentage (%)
Hypertension treatment duration (years)		
<1	29	22.3
1-5	59	45.4
>5	42	32.3
BP Status		
Controlled BP	42	32.3
Uncontrolled BP	88	67.8
BMI Status		
Underweight	3	2.3
Healthy weight	38	29.2
Overweight	33	25.4
Obese	56	43.1

Table 3 below illustrates the relationship between socio-demographic characteristics and medication adherence patterns among

the participants. There were no significant statistical associations between patterns of medication adherence and socio-demographic variables.

Table 3. *Association between Socio-demographic Factors and Medication Adherence Patterns among the Participants.*

Variables	Pattern of Medication Adherence			χ^2	*P*-value
	Low adherence N_1 (%)	Medium adherence N_2 (%)	High adherence N_3 (%)		
Age					
30-39	18 (78.3)	5 (21.7)	0 (0.0)	2.094	0.911
40-49	24 (68.6)	4 (23.6)	1 (2.9)		
50-59	29 (74.4)	8 (20.5)	2 (5.1)		
≥ 60	25 (75.8)	7 (21.2)	1 (3.0)		
Gender					
Female	64 (79.0)	14 (17.3)	3 (3.7)	4.176	0.124
Male	32 (65.3)	16 (32.7)	1 (2.0)		
Religion					
Christianity	8 (80.0)	2 (20.0)	0 (0.0)	0.433	0.805
Islam	88 (73.3)	28 (23.3)	4 (3.3)		
Marital status					
Married	74 (71.2)	26 (25.0)	4 (3.8)	2.800	0.592
Separated	3 (100.0)	0 (0.0)	0 (0.0)		
Widowed	19 (82.6)	4 (17.4)	0 (0.0)		
Type of marriage					
Monogamous	56 (74.7)	16 (21.3)	3 (4.0)	0.741	0.691
Polygamous	40 (72.7)	14 (25.5)	1 (1.8)		
Family type					
Extended	40 (72.7)	14 (25.5)	1 (1.8)	0.741	0.691
Nuclear	56 (74.7)	16 (21.3)	3 (4.0)		
Educational Level					
NFE	13 (81.3)	3 (18.8)	0 (0.0)	6.942	0.731
Vocational	1 (50.0)	1 (50.0)	0 (0.0)		
Quranic	32 (68.1)	14 (29.8)	1 (2.1)		
Primary	8 (80.0)	1 (10.0)	1 (10.0)		
Secondary	15 (83.3)	2 (11.1)	1 (5.6)		
Tertiary	27 (73.0)	9 (24.3)	1 (2.7)		
Occupation					
RCS	1 (100.0)	0 (0.0)	0 (0.0)	2.418	0.877
Civil servant	27 (75.0)	8 (22.2)	1 (2.8)		
Housewife	27 (72.4)	6 (20.7)	2 (6.9)		
SE	47 (73.4)	16 (25.0)	1 (1.6)		

Variables	Pattern of Medication Adherence			χ^2	*P*-value
	Low adherence N_1 (%)	Medium adherence N_2 (%)	High adherence N_3 (%)		
Monthly income					
≤ 30,000	57 (76.0)	17 (22.7)	1 (1.3)	4.662	0.793
> 30,000	39 (70.9)	13 (23.6)	3 (5.5)		

N= Total number of respondents affected by the variables, N1= number of respondents with low medication adherence affected by the variable, N2= number of respondents with medium medication adherence affected by the variable, N3= number of respondents with high medication adherence affected by the variable, χ2 = Chi-square value, NFE= no formal education, RCS= retired civil servant, SE- self-employed.

Table 4 shows the associations between participants' clinical variables (determinant factors) and medication adherence patterns. There was a statistically significant association (p = 0.012) between the duration of hypertension treatment and medication adherence patterns, with most participants on treatment for less than one year showing high medication adherence. No significant associations were found between medication adherence patterns and participants' BP status and BMI (p-values 0.158 and 0.097, respectively).

Table 4. *Association between Participants' Clinical Variables (Determinant Factors) and Medication Adherence Patterns. N = 130.*

Clinical Variables	Medication Adherence Patterns			χ^2	*P*-value
	Low Adherence N_1 (%)	Medium Adherence N_2 (%)	High Adherence N_3 (%)		
Hypertension treatment duration					
< 1year	14 (48.3)	13 (44.8)	2 (6.9)	12.760	0.012
1-5 years	48 (81.4)	10 (16.9)	1 (1.7)		
>5years	34 (80.0)	7 (16.7)	1 (2.4)		
BP status					
Controlled	27 (64.3)	14 (33.3)	1 (2.4)	3.694	0.158
Uncontrolled	69 (78.4)	16 (18.2)	3 (3.4)		
BMI status					
Underweight	2 (66.7)	0 (0.0)	1 (33.3)	10.734	0.097
Normal weight	27 (73.0)	9 (24.3)	1 (2.7)		
Overweight	26 (78.8)	6 (18.2)	1 (3.0)		
Obese	40 (71.4)	15 (26.8)	1 (1.8)		

N = total number of respondents affected by the variables, N_1= number of respondents with low medication adherence, N_2= number of respondents with medium medication adherence, N_3= number of respondents with high medication adherence, χ^2= Chi-square value.

4. Discussion

This cross-sectional survey aimed to evaluate the socio-demographic profiles, clinical variables (determinants), and patterns of medication adherence among adult hypertensive patients attending a general outpatient clinic in North-Western Nigeria. A total of 130 adult hypertensive patients participated in this study. The participants' ages ranged from 30 to 75 years, with a mean age of 50.16 ± 11.09 years, contrasting with the 67 years reported by

Leiva et al in Spain and 60 years by Osamor in South-West Nigeria [24, 25]. This younger mean age may result from rural-urban migration of younger individuals seeking better opportunities, as well as Nigeria's lower life expectancy compared to developed countries. Participants of the middle age group (40-60 years) had the highest representation (56.9%) in the study, as compared to 61.1% reported by Ojo et al in a study in South Western Nigeria [26].

This study had more female participants (62.3%) than male (37.7%), consistent with findings from Osamor (65% women) and Adisa et al. (59% women) [7, 25]. In contrast, Leiva reported 56% of male participants [24]. The higher female representation may be due to women's more proactive health-seeking behaviour. This study found that 92.3% of participants were of the Islamic faith, aligning with a 64.1% rate reported by Osamor et al. in Iwo, South-West Nigeria [25]. The majority of participants (80.0%) were married, similar to the 70% reported by Osamor et al., reflecting cultural marriage norms in both Islam and Christianity. Most marriages were monogamous (57.7%), consistent with Ekundayo et al.'s finding of 71.5% in South-Western Nigeria, but differing from Adisa et al.'s study in Kwara, where 71% practiced polygamy [25, 27, 28]. The study's findings may be influenced by its urban setting, where participants likely live in nuclear families, unlike in rural areas with extended family households. Forty-two per cent of participants attained secondary school education or higher, similar to 34.3% in Adisa's study in Sokoto, while Ojo et al found 63% in Western Nigeria, indicating relatively lower educational levels in the north [7, 26]. Nearly half (49.2%) were self-employed, with 57.7% earning above the national minimum wage of thirty thousand naira monthly, similar to Ekanem et al's findings in Uyo, suggesting a connection to the higher living standards in the affluent city where the study was conducted [3].

In assessing the socio-demographic determinants of adherence, the index study found no statistically significant associations between adherence patterns and variables such as age, sex, religion, marital status, educational level, occupation, or average monthly income. However, it is notable that despite the lack of statistical significance, vulnerable groups such as older participants (≥ 60 years) and those with no formal education exhibited substantial proportions of low adherence, at 75.8% and 81.3%, respectively. The uniform lack of significant socio-demographic associations suggests that non-adherence in the study setting is a systemic issue that cuts across all patient backgrounds and socioeconomic strata, rather than being isolated to specific socioeconomic subsets. This pervasive low adherence across all socio-demographic variables suggests that non-adherence in this region is likely driven by systemic healthcare barriers such as healthcare provider-patient communication gaps, cultural beliefs about chronic disease (incurability), or medication availability, rather than individual socioeconomic deficits [29].

The management of hypertension relies heavily on sustained medication adherence to prevent severe cardiovascular complications [30]. The results revealed a remarkably high prevalence of poor medication adherence; using the MMAS-8 scale, nearly three-quarters (74%) of the participants demonstrated low adherence, 23% had medium adherence, and only 3% achieved high adherence. These findings indicate a critical healthcare challenge that is consistent with observations from other studies within the region. For instance, Adisa et al in 2018 observed comparably dismal adherence levels, finding that only 8.9% of ambulatory hypertensive patients in tertiary hospitals in North-Western Nigeria were fully adherent to their medications [7]. Conversely, studies from other regions in Nigeria have reported slightly better, albeit still suboptimal, adherence outcomes. In Lagos, good adherence was observed in 14.3% of elderly patients, while a study in Eastern Nigeria reported an adherence rate of 42.9% [8, 16]. The differences in medication adherence outcomes among various study participants may be attributed to several factors. These include variations in the measurement methods used to assess adherence, differences in the study populations, improved access to healthcare in certain areas, and disparities in health education levels among participants from different regions. This disparity underscores a potential regional crisis in North-Western Nigeria that requires urgent, targeted interventions.

A major, statistically significant clinical finding of this study is the inverse relationship between the duration of hypertension treatment and medication adherence ($p = 0.012$). Participants who had been on antihypertensive therapy for less than one year showed better adherence profiles. In contrast, low adherence was exceedingly high among those treated for 1-5 years and for more than 5 years. This reflects the phenomenon of "treatment fatigue," which is particularly common in chronic asymptomatic conditions like primary hypertension, and patients often struggle to rationalize the lifelong daily consumption of medications when they feel physically well [31]. As the years progress, patients often become tired of daily pill-taking regimens, as initial fears regarding the diagnosis may wane, leading to complacency. Additionally, the cumulative financial burden of purchasing daily medications over several years can drive patients toward cheaper, unverified traditional remedies [32]. Qualitative research from neighbouring West African countries supports this timeline of non-adherence, highlighting that long-term treatment default often stems from a dwindling trust in medication efficacy, accumulated financial exhaustion, and a gradual pivot towards perceived cheaper alternative herbal therapies [33].

Findings from this study showed widespread non-adherence among the participants. The clinical consequences of this are evident in the participants' suboptimal cardiovascular outcomes and poor health metrics. A significant majority (67.8%) of the participants had uncontrolled blood pressure. Although the statistical association between blood pressure status and adherence pattern was not significant, the clinical reality remains that 78.4% of those with uncontrolled blood pressure had low medication adherence. Strict adherence is biologically required to maintain stable plasma drug concentrations;

without it, therapeutic targets cannot be met [8].

Compounding this cardiovascular risk is the high prevalence of obesity within the study group. Nearly half of the participants were obese, and another 25.4% were overweight. Adherence to medication across all BMI categories was uniformly low, showing no significant associations. This dual burden of poor pharmacological compliance and inadequate lifestyle management (evidenced by high BMI) places this patient population at an alarmingly high risk for target organ damage, including stroke, myocardial infarction, and chronic kidney disease. Weight management and medication compliance must be tackled simultaneously to improve therapeutic outcomes [7].

4.1. Limitations of the Study

This survey has notable limitations. Its cross-sectional design captures only associations at one time point, preventing confirmation of causal relationships, such as whether longer treatment duration improves medication adherence. With only 130 participants from a single outpatient clinic, the findings may not apply to the wider Nigerian population or different healthcare settings. Additionally, adherence was measured via the self-reported MMAS-8 questionnaire, which may suffer from recall and social desirability biases, potentially inflating adherence rates [34]. The study also did not account for various systemic and pharmacological factors affecting adherence, such as pill burden, adverse drug reactions, medication shortages, and the physician-patient relationship.

4.2. Implications for Clinical Practice

To improve clinical practice, physicians and pharmacists must recognize that patients on long-term medication for over a year are at a high risk of treatment discontinuation and should reinforce targeted counselling during follow-up visits. Furthermore, because medication alone is insufficient, as evidenced by the prevalence of obesity and uncontrolled blood pressure, clinics must adopt a holistic management approach that integrates lifestyle changes, dietary modifications, and weight-loss interventions with pharmacological treatments. Finally, since socio-demographic factors do not fully explain this poor adherence, further qualitative research is needed in this North-Western region to uncover systemic issues, including cultural, psychological, and health-system barriers like drug stock-outs or counterfeit medications.

5. Conclusion and Recommendations

In conclusion, medication adherence among adult hypertensive patients in North-Western Nigeria is alarmingly low, undermining treatment efficacy. The decline in adherence with longer treatment duration highlights treatment fatigue in chronic disease management. It is crucial to focus on patients undergoing long-term therapy to improve adherence and achieve target blood pressure goals. This study emphasises the need for healthcare providers to implement continuous, patient-centred educational interventions to manage hypertension effectively.

Abbreviations

BP	Blood Pressure
DBP	Diastolic Blood Pressure
FTH	Federal Teaching Hospital
GOPC	General Outpatients Clinic
MMAS-8	Morisky Medication Adherence Scale-8
SBD	Systolic Blood Pressure
SPSS IBM 23	Statistical Package for Social Sciences Version 23

Acknowledgments

The authors would like to express their gratitude to the entire staff of the Family Medicine Department, FTH Birnin Kebbi. We also appreciate Dr Ibraheem AbdulRauf Segun. for his efforts in reviewing the final version of this manuscript.

Author Contributions

Abdul Rauf Segun Ibraheem: Conceptualization, Methodology, Validation, Writing – original draft, Writing – review & editing

Lateef Shola Mustapha: Conceptualization, Methodology

Abitare Hope: Validation, Supervision

Chinyere Beatrice Nwosu: Validation, Writing – review & editing

Lawal Badru: Data Curation, Writing – review & editing

Zuliat Nihinlola Sanni: Supervision, Writing – original draft, Writing – review & editing

Nusirat Tinuke Abdullateef: Visualization, Writing – review & editing

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Ordinioha B. The prevalence of hypertension and its modifiable risk factors among lecturers of a medical school in Port Harcourt, South-South Nigeria: implications for control efforts. Nigerian Journal of Clinical Practice. 2013; 16(1): 1-11. https://doi.org/10.4103/1119-3077.106704

[2] Chiazor IE, Oparah AC. Assessment of hypertension care in a Nigerian Hospital. Tropical Journal of Pharmaceutical Research. 2012; 11(1): 137-45. https://doi.org/10.4314/tjpr.v11i1.18

[3] Ugwuja E, Ezenkwa U, Nwibo A, Ogbanshi M, Idoko O, Nnabu R. Prevalence and determinants of hypertension in an agrarian rural community in southeast Nigeria. Annals of medical and health sciences research. 2015; 5(1): 45-9. https://doi.org/10.4103/2141-9248.149787

[4] Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo Jr JL, et al. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of high blood pressure: the JNC 7 report. Jama. 2003; 289(19): 2560-71. https://doi.org/10.1161/01.hyp.0000107251.49515.c2

[5] Zhou B, Carrillo-Larco RM, Danaei G, Riley LM, Paciorek CJ, Stevens GA, et al. Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants. The Lancet. 2021 Sep 11; 398(10304): 957-80. https://doi.org/10.1016/s0140-6736(21)01330-1

[6] Oliveros E, Patel H, Kyung S, Fugar S, Goldberg A, Madan N, et al. Hypertension in older adults: Assessment, management, and challenges. Clinical cardiology. 2020; 43(2): 99-107. https://doi.org/10.1002/clc.23303

[7] Adisa R, Ilesanmi OA, Fakeye TO. Treatment adherence and blood pressure outcome among hypertensive outpatients in two tertiary hospitals in Sokoto, Northwestern Nigeria. BMC Cardiovascular Disorders. 2018; 18(1): 1-10. https://doi.org/10.1186/s12872-018-0934-x

[8] Iloh GU, Ofoedu JN, Njoku PU, Godswill-Uko EU, Amadi AN. Medication adherence and blood pressure control amongst adults with primary hypertension attending a tertiary hospital primary care clinic in Eastern Nigeria. African Journal of Primary Health Care and Family Medicine. 2013; 5(1): 1- 6. https://doi.org/10.4102/phcfm.v5i1.446

[9] Al-Noumani H, Wu JR, Barksdale D, Sherwood G, Alkhasawneh E, Knafl G. Health beliefs and medication adherence in patients with hypertension: a systematic review of quantitative studies. Patient education and counseling. 2019 Jun 1; 102(6): 1045-56. https://doi.org/10.1016/j.pec.2019.02.022

[10] Burnier M, Egan BM. Adherence in hypertension: a review of prevalence, risk factors, impact, and management. Circulation research. 2019 Mar 29; 124(7): 1124-40. https://doi.org/10.1161/CIRCRESAHA.118.313220

[11] Charchar FJ, Prestes PR, Mills C, Ching SM, Neupane D, Marques FZ, et al. Lifestyle management of hypertension: International Society of Hypertension position paper endorsed by the World Hypertension League and European Society of Hypertension. J Hypertens. 2024 Jan 1; 42(1): 23-49. https://doi.org/10.1097/hjh.0000000000003563

[12] Abegaz TM, Shehab A, Gebreyohannes EA, Bhagavathula AS, Elnour AA. (2017). Nonadherence to antihypertensive drugs: A systematic review and meta-analysis. *Medicine*. 2017; 96(4): e5641. https://doi.org/10.1097/md.0000000000005641

[13] Religioni U, Barrios-Rodríguez R, Requena P, Borowska M, Ostrowski J. Enhancing therapy adherence: impact on clinical outcomes, healthcare costs, and patient quality of life. Medicina. 2025 Jan 17; 61(1): 153. https://doi.org/10.3390/medicina61010153

[14] Neiman AB. CDC grand rounds: improving medication adherence for chronic disease management—innovations and opportunities. MMWR. Morbidity and Mortality Weekly Report. 2017; 66. Available at: https://www.cdc.gov/mmwr/volumes/66/wr/mm6645a2.htm (Accessed May 8, 2025).

[15] Zhou X, Zhang X, Gu N, Cai W, Feng J. Barriers and facilitators of medication adherence in hypertension patients: a meta-integration of qualitative research. Journal of Patient Experience. 2024 Mar; 11: 23743735241241176. https://doi.org/10.1177/23743735241241176

[16] Olaniran GO, Akodu BA, Olaniran AA, Bamidele JO, Ogunyemi AO, Idowu OO. Medication adherence and perceived family support Among elderly patients with hypertension attending a specialty clinic in Lagos, Nigeria. Annals of Health Research 2023 Mar 26; 9(1): 30-42. https://doi.org/10.30442/ahr.0901-04-188

[17] Shahin W, Kennedy GA, Stupans I. The association between social support and medication adherence in patients with hypertension: A systematic review. Pharmacy Practice (Granada). 2021 Jun; 19(2). https://doi.org/10.18549/pharmpract.2021.2.2300

[18] McCarthy CP, Bruno RM, McEvoy JW, Touyz RM. 2024 ESC Guidelines for the management of elevated blood pressure and hypertension: what is new in pharmacotherapy? 2025: 7-9. https://doi.org/10.1093/eurheartj/ehae178

[19] Lam WY, Fresco P. Medication adherence measures: an overview. BioMed Research International. 2015; 2015(1): 217047. https://doi.org/10.1155/2015/217047

[20] Araoye MO. Research methodology with statistics for health and social sciences. Ilorin: Nathadex Publisher. 2003; 115(9): 25-120.

[21] ResRef. Morisky Medication Adherence Scale-8 (MMAS-8): A Full Guide for Researchers and Clinicians. 2025. Available at: https://resref.com/morisky-medication-adherence-scale-8-mmas-8-full-guide/ (Accessed on July 8, 2026).

[22] Martínez-Pérez P, Orozco-Beltrán D, Pomares-Gómez F, Hernández-Rizo JL, Borrás-Gallen A, Gil-Guillén VF, et al. Validation and psychometric properties of the 8-item Morisky Medication Adherence Scale (MMAS-8) in type 2 diabetes patients in Spain. *Atención Primaria*. 2021; 53(2): 101942. https://doi.org/10.1016/j.aprim.2020.09.007

[23] Morisky DE, DiMatteo MR. Improving the measurement of self-reported medication non-adherence: response to authors. Journal of Clinical Epidemiology. 2011; 64(3): 255-7. https://doi.org/10.1016/j.jclinepi.2010.09.002

[24] Leiva A, Aguillo A, Fajo-Pascaul A, Moreno L, Martín MC, García EM. Efficacy of a brief multifactorial Adherence-based intervention in reducing blood pressure: a randomised clinical trial. Patient preference and adherence. 2014; 8: 1683. https://doi.org/10.2147/ppa.s66927

[25] Osamor PE. Social support and management of hypertension in south-west Nigeria: cardiovascular topic. Cardiovascular Journal of Africa. 2015; 26(1): 29-33. https://doi.org/10.5830/cvja-2014-066

[26] Ojo OS, Malomo SO, Sogunle PT. Blood pressure (BP) control and perceived family support in patients with hypertension seen at a primary care clinic in Western Nigeria. Journal of Family Medicine and Primary Care. 2016; 5(3): 569. https://doi.org/10.4103/2249-4863.197284

[27] Ekundayo O, Elegbede O, Gabriel-Alayode O, Agboola S, Shabi O, Bello I, et al. Relationship between Perceived Spousal Social Support and Blood Pressure Control among Hypertensive Patients Attending General Outpatient Clinic in Federal Teaching Hospital, Ido-Ekiti, Nigeria. Archives of Clinical Hypertension. 2020; 6(1): 022-8. https://doi.org/10.17352/ach.000027

[28] Adisa R, Olajide OO, Fakeye TO. Social Support, Treatment Adherence and Outcome among Hypertensive and Type 2 Diabetes Patients in Ambulatory Care Settings in Southwestern Nigeria. Ghana Medical Journal. 2017; 51(2): 64-77.

[29] Ekwunife, OI, Udeogaranya, PO, Nwatu, IL. Prevalence, patterns, and predictors of complementary and alternative medicine use among hypertensive patients in South-Eastern Nigeria. *BMC Complementary Medicine and Therapies*. 2020; 20(1): 244. https://doi.org/10.1186/s12906-020-03043-4

[30] Kengne AP, Bri ère JB, Zhu L, Li J, Bhatia MK, Atanasov P, et. al. Impact of poor medication adherence on clinical outcomes and health resource utilization in patients with hypertension and/or dyslipidemia: systematic review. *Expert Review of Pharmacoeconomics & Outcomes Research*. 2023; 24: 143-154. https://doi.org/10.1080/14737167.2023.2266135

[31] Osamor, PE, Owumi, BE. Factors associated with treatment compliance in hypertension in southwest Nigeria. *Journal of Health, Population and Nutrition*. 2011; *29*(6): 619-628. https://doi.org/10.3329/jhpn.v29i6.9899

[32] Boima, V, Ademola, AD, Odusola, AO., Ajiroba, FI., Akinkuwe, TA, Salako, BL. Factors associated with medication nonadherence among hypertensives in Ghana and Nigeria. *International Journal of Hypertension*. 2015; 205716. https://doi.org/10.1155/2015/205716

[33] Atinga, RA, Yarney, L, Gavu, NM. Factors influencing long-term medication non-adherence among diabetic and hypertensive patients in Ghana: A qualitative investigation. *PLOS ONE*. 2018; *13*, e0193995. https://doi.org/10.1371/journal.pone.0193995

[34] Morisky, D. E., Ang, A., Krousel-Wood, M., & Ward, H. J. (2008). Predictive validity of a medication adherence measure in an outpatient setting. *The Journal of Clinical Hypertension*. 2008; *10*(5): 348-354. https://doi.org/10.1111/j.1751-7176.2008.07572.x