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ORIGINAL RESEARCH

Medication Adherence and Perceived Family Support Among Elderly Patients with Hypertension Attending a Specialty Clinic in Lagos, Nigeria

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Abstract

Background: Hypertension and medication adherence are global public health challenges, with elderly patients suffering the most because they frequently have multiple co-morbidities.
Objective: To evaluate the level of medication adherence and perceived family support among Nigerian elderly patients with hypertension.
Methods: A descriptive, cross-sectional study among 293 consecutively consenting elderly hypertensive patients using an interviewer-administered, semi-structured questionnaire. The Modified Morisky Adherence Scale (MMAS-8) and Perceived Social Support-Family Scale (PSS-Fa) tools were used to assess medication adherence and perceived family support, respectively.
Results: The mean age of respondents was 69.5±6.4 years. Medication adherence was good, moderate and poor among 14.3%, 68.6%, and 17.1% of the respondents respectively. Difficulty remembering to take medications was the primary reason for non-adherence in 73.7% of cases. Good adherence to medication was significantly associated with male gender ($p = 0.046$), living with grandchildren ($p<0.001$), having other sources of income ($p = 0.026$) and receiving treatment for comorbid illnesses ($p = 0.025$). A higher proportion of the respondents (94.9%) had strong perceived family support, which lacked statistical significance regarding good medication adherence. ($p = 0.739$).
Conclusion: This study found medication adherence low, despite most participants' strong family support. Forgetfulness and financial constraints were the primary reasons for poor medication adherence. Although family support is highly recommended and beneficial for medication adherence, other comorbid and social factors should be considered.

Keywords: Elderly, Family Support, Hypertension, Medication Adherence, Nigeria.

Introduction

Adherence to antihypertensive medication is critical to treatment success of hypertensive patients. Controlling blood pressure through

medication adherence remains the most effective way to reduce hypertension-related complications such as stroke, heart failure, and renal failure. [1,2] Several factors influence medication adherence, including demographic characteristics, medical history, clinical variables, healthcare provider relationships, health system influence, beliefs, knowledge of disease and health-seeking behaviours.[2] The level of information provided to the patient at each point of care may also affect medication adherence. [2] Poor adherence to antihypertensive treatment may impact the patient and the health system because of a worsening medical condition, over-prescription of drugs, increased avoidable hospital admissions and prolonged hospital stays. [2,3]

The prevalence of hypertension increases with age, and the impact is worse in the elderly, partly explained by vascular changes from ageing. [4,5] The age cut-off for the elderly varies globally. For this study, the authors situated globally adopted definitions of the elderly as individuals aged 60 years and above, as defined by the World Health Organization (WHO). However, the United Nations extended the definition to 65 years. [6,7] That implies the number of the elderly at risk of hypertension will likely increase. There is a need for concerted efforts to reduce morbidity and mortality from hypertensive disease and its consequence among the elderly population. [6,7]

Globally, the proportion of elderly people continues to increase; 12.3% of the total population comprises people aged 60 years and above, and this proportion will increase to about 22% by the year 2050. [8] For elderly people with or without hypertension, especially in low-middle-income countries, the family is the most significant single source of support. [9] Elderly people largely depend on others due to their reduced physical activity and multiple morbidities. [9] The family constitutes a very significant provider of health and social care services. Social and medical researchers have demonstrated the relevance of family support for health and well-being. Several studies have shown that high family support positively correlates with improved physical health. [10,11] Family members, friends, and other social ties can influence health by encouraging various health-enhancing behaviours, medication adherence, and healthcare utilisation through social control.[10] Various psychosocial interventions to optimise perceived family support in improving medication adherence among hypertensive patients are of utmost importance in health care management. There is a need for an expanded family support system to ensure the enhanced outcome consistently. [9,10]

In Nigeria, there is limited literature on hypertensive elderly patients. In addition, there is very little exploration of the family support system of the elderly, especially among patients attending secondary health facilities. This study seeks to fill the gap in assessing the relationship between good medication adherence and perceived family support, particularly among elderly hypertensive patients, to add to the knowledge in geriatric care. This study aims to assess the level of medication adherence and factors affecting it, assess the level of perceived family support and its relationship with good medication adherence among elderly hypertensive patients attending a secondary health facility in Nigeria. The findings will guide program planning and policy interventions for managing elderly hypertensive and ultimately improve their general well-being and health outcomes.

Methods

A descriptive, cross-sectional study was conducted over six weeks (between 14 June and 23 July 2021) among elderly hypertensive patients aged 60 years and above at the Medical Outpatient Clinic of General Hospital, Orile-Agege, a public secondary health care facility in Lagos, Nigeria. Elderly hypertensive patients

who have been on medical treatment for at least six months as of the day of the survey were included in the study. The study excluded people aged less than 60 years or with impaired cognition that may significantly affect recall.

The minimum sample size was statistically computed using a good medication adherence prevalence rate of 30.3% [12] and adjusted for a 10% non-response rate. The calculated sample size was 293 subjects, as shown below:
The minimum sample size was estimated using the formula:
$n=Z^2pq/d^2$
Where: n is the minimum sample size for a target population > 10,000
Z = standard normal deviate corresponding to a 5% level of significance =1.96
p = prevalence of good medication adherence from previous study = 30.3%
q = 1-p = 1-0.303 = 0.697,
d = degree of accuracy desired = 0.05
$n = 1.96^2 \times 0.303 \times 0.697/0.05^2 = 0.811/0.0025 = 342$
For a population less than 10,000 (actual population of elderly hypertensives N was 1200), sample size correction was achieved using the formula: $n_f = n/ (1+n/N)$
$N_f = 342(1+342/1200) = 266$. This came to 293 with the addition of a 10% non-response rate.
Consecutively consenting subjects were enrolled until the calculated sample size was attained. A pretested, semi-structured questionnaire was used to obtain relevant information for the study.

Medication adherence was determined using the Modified Morisky Medication Adherence Scale (MMMAS-8) questionnaire. MMMAS-8 is a validated, eight-item self-report scale developed by Morisky *et al*. [13, 14] with high reliability, and it is used in various medication adherence studies. [15 - 17] This tool measures intentional and unintentional adherence based on forgetfulness, carelessness, stopping the medication when feeling better, and discontinuing medication when feeling worse. MMAS-8 has seven 'yes/no' questions. The questions are phrased to avoid the ''yes saying'' bias by reversing the wording of the questions because there is a tendency for patients to give their healthcare providers positive answers. The eighth item in the tool has a five-point Likert scale. Items 1 through 7 were scored as either '0' or '1' for 'yes' or 'no' responses, respectively, except for item 5, which has reversed scoring, while item 8 has, the first question on the scale scored one and the remaining questions scored zero. Scores obtained were summed up to give a total score ranging from 0 to 8, with a score of 8 reflecting good adherence, 6 -7 as moderate adherence, and ≤ 5 reflecting poor adherence.

Perceived family support was assessed using the Perceived Social Support-Family Scale (PSS-Fa), developed by Procidano and Heller. [18] PSS-Fa is a 20-item, validated self-report scale that examines how individuals perceive support, information, and response from their family. The respondents answered 'yes', 'no', or 'I don't know' to each item. Each 'yes' answer to the questions in the perceived family support scale was scored one, while other responses were scored zero. Items 3, 4, 16, 19, and 20 had reversed scoring (a 'no' response was scored +1). Summated scores were used to arrive at a family support score between zero and twenty. The scores were categorised as strong family support (≥11), weak family support (7-10), and no family support (≤6).

The study participants' income was grouped into two based on Nigeria's poverty line cut-off value of ₦11 453 (US$31.7) per month as of 2019. This may be computed as ₦137 430 (US$381.75) per year using the foreign exchange conversion rate of $1= ₦360 at the time of the study (June 2021). [19]

Data analysis
The data were recorded and analysed using IBM Statistical Package for the Social Sciences (SPSS) version 26 (IBM Corp., Armonk, NY, USA). Descriptive and inferential statistics of the demographic factors, medication adherence

and family support were conducted using appropriate frequencies, percentages, mean and standard deviation. Associations between categorical variables were tested using Chi-Squared test. Fisher's Exact test was also used for bivariate analyses with variable cell counts of less than five. Logistic regression analysis was used to explore the predictable significant factors of medication adherence, and the level of significance was set at $p<0.05$.

Ethical considerations

Ethical approval was obtained from the Health Research Ethics Committee of Lagos University Teaching Hospital (ADM/DCST/HREC/APP/4175). A letter of approval was also obtained from the Lagos State Health Service Commission. All study procedures adhered to the tenets of the Helsinki declaration. Written informed consent was obtained from each participant after a detailed explanation of the study and its procedure.

Result

The age of the study participants ranged from 60 to 93 years with a mean of 69.5±6.4 years. The male-to-female ratio was 1:3. Most respondents (81.6%) lived with at least one family member, while 15.0% stayed alone (Table I). Most of the respondents (65.5%) received monthly monetary support from children or family members that was above the poverty line in Nigeria (₦11 453), and 4.4% did not receive any form of financial support from family (Table I). Slightly more than half of the participants (54.9%) had other sources of regular income, including pensions and rent returns (Tables I and II).

More than one-third of the respondents (39.2%) have been hypertensive for more than ten years, 38.2% spent less than ₦5000 (US$13.8) to procure medications in a month, and about half of them (49.8%) took three or more pills for the treatment of hypertension. Diabetes mellitus ranked highest as the comorbid illness among the participants receiving treatment for any other condition (Table II). Medication adherence was good in 14.3%, moderate in 68.6%, and poor in 17.1% of the participants.

Most respondents (73.7%) had difficulty remembering to take all their medications, and only 26.3% never or rarely had issues remembering to take all their medications. Of the studied population, 15.4% missed their pills for some days in the two weeks preceding the interview, while 11.3% expressed tiredness about sticking to their medication plan (Table III).

About 36.2% of the respondents admitted missing their antihypertensive medications for various reasons. Over 50% of those that missed their medications for the listed reasons did so for lack of funds, while other reasons were due to the non-availability of medications in pharmacy stores (28.3%), experimenting with other forms of treatment such as herbs (16%), not understanding how to take the medications (16%) or due to the side effects of the medications (10.4%) among other reasons (Figure 1).

After adjusting for possible confounders in the multivariate logistic regression model, male gender ($p = 0.046$), living with grandchildren ($p = <0.001$), having other sources of income ($p = 0.026$) and receiving treatment for other illnesses ($p = 0.025$) were found to be significantly associated with good medication adherence (Table IV).

The level of perceived family support was 94.9%, 1.4%, and 3.8% for strong, weak and no family support, respectively. However, there was no statistically significant association between the level of strong perceived family support with good medication adherence in this study (Tables Ib and IIb).

Table Ia: Sociodemographic and socioeconomic characteristics of the study participants

Variable	*Frequency (n =293)*	*Percentage*
Age (years)		
60-69	163	55.6
70-79	109	37.2
80+	21	7.2
Sex		
Male	79	27.0
Female	214	73.0
Marital status		
Married	162	55.3
Widowed	119	40.6
Divorced/Separated	12	4.1
Family type		
Monogamous	195	66.6
Polygamous	98	33.4
Living arrangement		
Alone	44	15.0
With spouse	105	35.8
With children	71	24.2
With spouse and children	52	17.7
With grandchildren	11	3.8
Help/others	10	3.4

Table Ib: Sociodemographic and socioeconomic characteristics of the study participants

Variable	*Frequency (n =293)*	*Percentage*
Present Working status		
Working	126	43.0
Not working	167	57.0
Financial support received monthly (₦) ($31.8 equivalent) based on the country's poverty line		
Nil	13	4.4
<11,453	88	30.0
≥11,453	192	65.5
Other sources of regular income are available		
Yes	161	54.9
No	132	45.1
Average monthly income (₦)		
<25,000	89	30.4
25,000-49,999	91	31.1
50,000-74,999	67	22.9
≥75,000	46	15.7
Medication Adherence		
Good	42	14.3
Moderate	201	68.6
Poor	50	17.1
Perceived Family Support		
Strong family support	278	94.9
Weak family support	4	1.4
No family support	11	3.8

Table IIa: Analysis of the association of perceived family support and other factors with medication adherence

Variable	*Good*	*Moderate*	*Poor*	χ^2	*p-value*
Sex					
Male (n = 79)	17 (21.5)	52 (65.8)	10 (12.7)	5.247	0.073
Female (n = 214)	25 (11.7)	149 (69.6)	40 (18.7)		
Living arrangement					
Alone (n = 41)	6 (13.6)	35 (79.5	3 (6.8)	39.789	<0.001
With spouse (n = 105)	12 (11.4)	76 (72.4)	17 (16.2)		†<0.001
With children (n = 71)	6 (8.5)	56 (78.9)	9 (12.7)		
With spouse and children (n = 55)	12 (23.1)	26 (50.0)	14 (26.9)		
With grandchildren (n = 11)	6 (54.5)	3 (27.3)	2 (18.2)		
Help/others (n = 10)	0 (0)	5 (50.0)	5 (50.0)		
Present working status					
Yes (n = 126)	13 (10.3)	83 (65.9)	30 (23.8)	8.621	0.013
No (n = 167)	29 (17.4)	118 (70.7)	20 (12.0)		
Other sources of regular income					
Yes (n = 161)	31 (19.3)	109 (67.7)	21 (13.0)	9.464	0.009
No (n = 132)	11 (8.3)	92 (69.7)	29 (22.0)		
Other sources of income n=161					
Pension/Retirement benefits (n = 91)	20 (22.0)	62 (68.1)	9 (9.9)	7.055	0.133
Rent (n = 61)	10 (14.5)	47 (68.1)	12 (17.4)		†0.145
Others (n = 1)	1 (100)	0 (0)	0 (0)		

† Fisher Exact Test

Discussion

In this study, the age distribution and mean age of the participants in the present study are similar to the observations made in other Nigerian studies where mean ages of 68.6±6.7 years, 70.5±6.8 years and 70.8±8.1 years were reported. [20 - 22] In contrast, Uchmanowicz *et al.* and Kenneth *et al.* reported slightly higher mean ages of 72.1 and 79.6±8.9 years among elderly hypertensives in the United States. [5, 23] This may be explained by higher life expectancy in the United States population, where access to healthcare and medication prescription are better through health insurance coverage which ensured optimised care, compared to Nigeria, where healthcare financing is mainly based on an out-of-pocket payment system. Most of the respondents in the present study (81.5%) lived with at least one family member, those living with their spouses constituting the greatest proportion (35.8%), and only 15% lived alone. This mirrors observations from other studies among the elderly in Nigeria and the United States. [5, 21] While there is provision for older persons to live in an organised institution in the United States when there is limited or no family support, elderly homes rarely exist in Nigeria; hence, most elderly individuals live with their children or receive support from extended family members who stay with them or visit occasionally. [5]

Only 30% of the respondents in the present study had an average monthly income below the poverty line. This finding is lower than in Ibadan, another Nigerian city, where 52.4% of their respondents earned below the poverty line. [21]

Table IIb: Analysis of Perceived Family Support and other factors associated with medication adherence

Variable	*Good*	*Moderate*	*Poor*	χ^2	*p-value*
Monthly drug expenses (₦)					
≤5000 (n = 112)	19 (17.0)	74 (66.1)	19 (17.0)	1.045	0.593
>5000 (n = 181)	23 (12.7)	127 (70.2)	31 (17.1)		
Duration of hypertension (Year)					
≤5 (n = 93)	15 (16.1)	58 (62.4)	20 (21.5)	6.560	0.161
6-10 (n = 85)	8 (9.4)	60 (70.6)	17 (20.0)		
>10 (n = 115)	19 (16.5)	83 (72.2)	13 (11.3)		
Number of drugs for BP control					
1 – 2 (n = 147)	17 (11.6)	106 (72.1)	24 (16.3)	2.202	0.332
≥3 (n = 146)	25 (17.1)	95 (35.1)	26 (17.8)		
Receiving treatment for other illnesses					
Yes (n = 129)	24 (18.6)	89 (69.0)	16 (12.4)	5.872	0.053
No (n = 164)	18 (11.0)	112 (68.3)	34 (20.7)		
Comorbid illness (n=129)					
Diabetes mellitus (n = 83)	16 (19.3)	58 (69.9)	9 (10.8)	4.109	0.847
Dyslipidaemia (n = 18)	3 (16.7)	12 (66.7)	3 (16.7)		
Arthritis (n = 14)	2 (14.3)	11 (78.6)	1 (7.1)		
Chronic eye problem (n = 10)	3 (30.0)	5 (50.0)	2 (20.0)		
Others (n = 4)	0 (0)	3 (75.0)	1 (25.0)		
Perceived Family Support					
Strong (n = 278)	39(14.0)	192(69.1)	47(16.9)	0.604	0.739
Weak/No Support (n = 15)	3(20.0)	9(60.0)	3(20.0)		†0.605

BP – Blood pressure; † Fisher Exact

Table III: Medication Adherence Assessment using MMAS-8

Medication Adherence	*Frequency (n =293)*	*Percentage*
Sometimes forget to take your blood pressure medication	38	13.0
Didn't take medications some days in last two weeks	45	15.4
Ever stopped taking your medicines without telling your doctor	25	8.5
Sometimes forget to bring medications along when travelling	11	3.8
I took all my medications yesterday	260	88.7
Sometimes stop taking medication when they feel their BP is controlled	62	21.2
Ever feel tired of sticking to your treatment plan	33	11.3
Rate of difficulty remembering to take all medicines*		
Never/Rarely	77	26.3
Once in a while	131	44.7
Sometimes	71	24.2
Usually	14	4.8

*** Multiple responses; BP – Blood pressure**

Table IV: Multiple logistic regression of good medication adherence on associated factors

Predictor variable	*SE*	*p-value*	*Adj. OR*	*95% CI*	
				Lower	*Upper*
Constant	0.47	<0.001			
Male sex	0.38	0.046	2.12	1.01	4.43
Living with grandchildren	0.67	<0.001	11.94	3.23	44.20
Not presently working	0.38	0.505	1.29	0.61	2.74
Has other sources of income	0.40	0.026	2.43	1.11	5.32
Receives treatment for other illnesses	0.37	0.025	2.26	1.11	4.63

SE - Standard error; Adj OR – Adjusted Odds ratio.

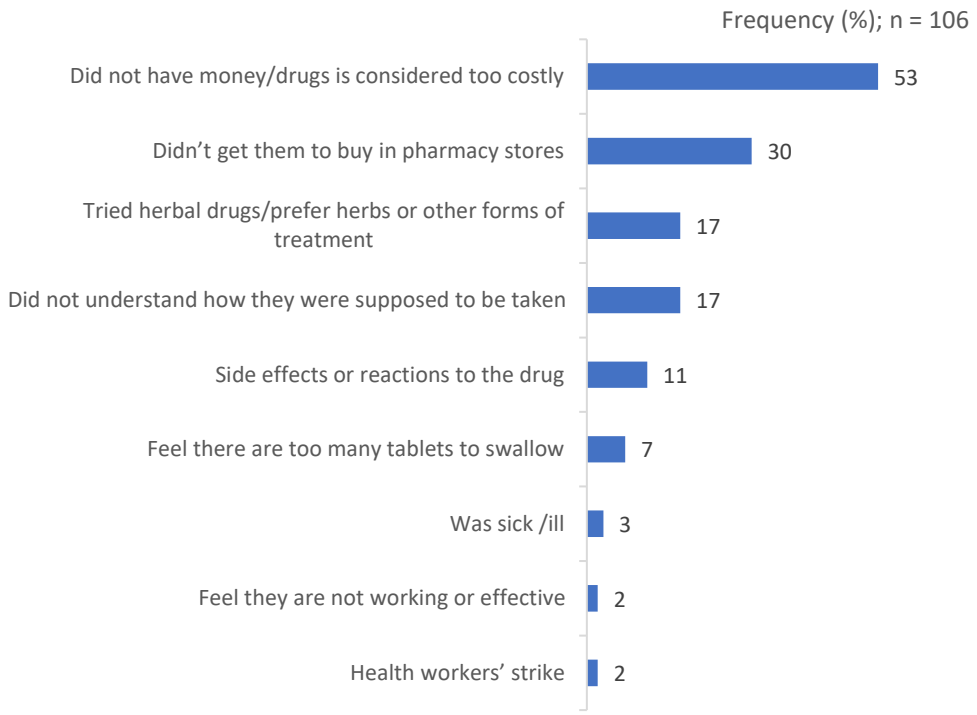

Figure 1: Reasons for missing doses of antihypertensive medications

The reason for this disparity cannot be fully explained though better opportunities for higher earning power in Lagos might have contributed to this observation. Using the eight-item Modified Morisky Medication Adherence Scale, 14.3%, 68.6%, and 17.1% of the respondents had good, moderate and poor antihypertensive medication adherence, respectively. There have been highly varied findings on medication adherence levels of patients both within and outside Nigeria arising from the use of different tools, sampling methods and sizes in conducting the studies. In Nigeria, there is minimal data on medication adherence among elderly patients for enough comparison with this study, as most studies were carried out among the general population of varied age groups. However, a study in Ibadan found 84.0% of 400 elderly hypertensive patients to have good medication adherence. [22] This may also be explained by the use of different medication adherence assessment tools. However, the level of good medication adherence found in the present study was higher than findings in some other studies in Lagos (1%), Ibadan (4.1%) and Sokoto (8.9%)

among various age groups. [24 - 26], all in Nigeria. The present study has the potential to contribute to the body of literature by identifying and documenting why those tools give widely varying results in Nigeria and subsequently guide how these tools can be adapted to the Nigerian context.

Forgetfulness and financial constraints were the major reasons for missing medications. Other reasons include the non-availability of medications in pharmacy stores, preference for other forms of treatment such as herbs, poor understanding of how to use the medication and side effects. These findings corroborate what was found by other researchers in Nigeria. [15,26]

Most respondents (94.9%) had strong perceived family support. This finding is very similar to the reports by Akinola in the study done among elderly hypertensive patients and by Ayonote *et al*. among elderly diabetics, both in tertiary health facilities in Ibadan and Lagos, respectively. Both studies used the same family support assessment scale (PSS-Fa). [20,22] This trend is similar to findings among varied age groups of hypertensive patients in western Nigeria. [27 - 29] The scores obtained with the perceived family support scale (PSS-Fa) are prone to inflation because the respondents may provide socially desirable responses. The kinship and extended family system widely practised in Africa, including Nigeria, is an essential contributor to family support and may reflect the observation in the present study.

Study participants living with grandchildren were 12 times more likely to have good medication adherence than those living with other family members or alone. In a study in Ibadan, Nigeria, 69.6% of the studied elderly people also had their grandchildren as their major support system. [21] The relationship between the living arrangement of the elderly and, most especially, with their grandchildren and medication adherence has not been well explored in previous studies, leaving a research gap. However, this could be partly explained by the fact that children cannot afford to live with their parents; rather, they leave their parents to go and work, make ends meet and raise resources to care for their elderly parents. Therefore, they leave grandchildren with their own old parents to keep their grandparents' company and to help as a reminder for medication use.

Male study participants were found to be twice more adherent than females, which could be as high as four times. Khayyat *et al.* in Saudi also found males more adherent to their medication. [30] This may be because females are more engrossed with issues that take their time and attention, such as chores and other home affairs. On the contrary, females were reportedly more adherent to their medications in another study. [5]

As observed in the present study, treating other illnesses besides hypertension could improve medication adherence. This could be explained by the fact that elderly patients may remember more to take their antihypertensive medications while trying to take medications for other illnesses (es). This was also reported in Southern India and Saudi, where medication adherence was better in hypertensive patients receiving treatment for cerebrovascular disease and dyslipidaemia. [30,31] In contrast, some studies reported the negative influence of comorbid illnesses on medication adherence. [15,32] Asgedom in Ethiopia noted that patients with co-morbidities were 12 times more likely to be non-adherent than those without co-morbidities. [3]

Study participants with other sources (s) of income, such as receiving pensions or house rent returns, were also observed to be at least twice more likely to have better medication adherence than those without another income source. This is because they would be able to afford the cost of treatment. The situation in Nigeria is such that healthcare financing is mainly via out-of-pocket payments. Often, the

burden is borne entirely by the individuals affected and worse among people with co-morbidities. [33] There is a strong need to strengthen the health insurance system in Nigeria to enable patients, especially the elderly ones, to get the appropriate treatment they need without being thrown into a financial crisis. [33] Other studies corroborate this finding. The highest rates of non-adherence were reported in patients who were dependent, unemployed, and had no source of personal income or in patients with financial constraints. [1,3,15] All these findings buttress the place of health insurance as a relief to the enormous cost of treatment that may impair adherence or clinical outcome.

The present study found no association between perceived family support and medication adherence. This result is similar to the finding by Xiong in Kenya and Sheilini in India, in similar studies among hypertensive patients. [16.34] Also, in Ibadan, Nigeria, it was found that though elderly patients had very strong family support, it did not have any significance on their blood pressure control. [22] However, some studies have shown that good medication adherence is better with family support. [20,27,35] This difference cannot be ascertained and may be explored in future research.

There are limitations to this study. Firstly, the study was conducted in a clinic setting which may be less representative of the general population and limits the application of its findings. Also, medication adherence was assessed through self-reporting, which may have introduced recall and social desirability response biases. The family support scale has minimal variable options for the elderly and may have over-estimated responses obtained as well. Lastly, selection bias was possible due to the use of a non-probability sampling (consecutive sampling) method, as not all the elderly hypertensive patients in the clinic had follow-ups during the study.

Conclusion

Good medication adherence among the studied elderly hypertensive patient was low despite a strong level of perceived family support. Forgetfulness and financial constraints were the primary reasons for not adhering to their medications. Male sex, living with grandchildren, having other income sources and co-morbidities were associated with better medication adherence. However, there was no association between medication adherence and the perceived family support of the respondents. Therefore, it is recommended that family members pay more attention to the medication adherence of their elderly ones. The National Health Insurance Scheme (NHIS) should also be expanded to include the elderly population, and pharmaceutical companies should subsidise the cost of antihypertensives for the elderly as a form of their corporate social responsibility, as this will go a long way in reducing the burden on the elderly's lean economic resources. Promoting medication reminder apps, calendars, and pill cards that specify when and how to take medications will help reduce forgetfulness. Healthcare providers should also give clear instructions to patients on how to use their medications as this could help with improving medication adherence.

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Authors' Contributions: OGO, ABA, and BJO conceived and designed the study protocol. OGO and ABA analysed and interpreted the data. OGO drafted the manuscript while ABA, OAA, BJO, OAO, and IOO revised the draft for sound intellectual content. All the authors read and approved the final manuscript.

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