Original Article

Factors associated with noncompliance to hypertension treatment in adults in a district health facility in north Dayi in the Volta Region of Ghana

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ABSTRACT

Context: Hypertension is known to affect more than one billion of the world's population with complications such as stroke and myocardial infarction. Compliance with hypertension therapy is the extent to which one's behavior in following a diet plan, taking medications, or making lifestyle changes corresponds to the agreed recommendations from a health-care provider. This research explores factors influencing noncompliance to hypertension treatment in the North Dayi District of the Volta Region, Ghana.

Aims: To determine the prevalence of noncompliance to hypertension therapy in patients diagnosed with hypertension in the study population. 1. To evaluate the knowledge of patients on hypertension. 2. To ascertain contributing factors influencing noncompliance to the treatment of hypertension.

Settings and Design: A cross-sectional study.

Methodology: A cross-sectional study was conducted from January 2021 to February 2021 in the North Dayi District. A sample of 191 respondents diagnosed with hypertension for at least 1 month with or without comorbidities and on treatment were selected using the systematic sampling method. An Adherence Barrier Questionnaire was adopted to assess reliability in the responses. Bivariate and multivariate analyses were done using noncompliance to hypertension therapy as the outcome of interest.

Statistical Analysis Used: Fisher's Exact, logistic regression, Cronbach's alpha analysis.

Results: Data were collected from 191 study participants between the ages of 25 and 101 years with an average age estimated at (62.2 ± 13.5) years. The prevalence of nonadherence to hypertension treatment in this study was 31.4% in the North Dayi District Hospital. The reported Marital status and Default review were statistically significant predictors of adherence to hypertension treatment at a chosen 95% Confidence Level.

Conclusion: The degree of non-compliance to hypertension treatment was less than fifty per cent among respondents. The data suggests that strategies should be developed to help reduce waiting times for consultation at the Hypertension Clinic by the District Hospital in collaboration with other stakeholders.

Keywords: Ghana, hypertension, noncompliance, North Dayi District

Introduction

Hypertension occurs when increased force is exerted by circulating blood on the walls of the body's arteries. In Ghana, it is reported as the leading cause of cerebrovascular and cardiovascular deaths.[1] A significant portion of the

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population are unaware of their hypertension status. 60% of those with hypertension are on treatment, however only half have adequately controlled blood pressures.[2] Hypertension is known as the "Silent Killer" meaning it can cause death without symptoms or with symptoms so vague that they are ignored. Among the sixteen regions in Ghana, hypertension (HTN) is listed as the fifth cause of outpatient morbidity. Both HTN and stroke are the leading cause of admission and death in health facilities in the country.[3] A systematic review and meta-analysis of population-based studies on hypertension among Ghanaians revealed that the prevalence of hypertension was 30.1% (95% confidence interval [CI] 25.6%–36.0%) among females and 34.0% (95% CI 28.5%–40.0%) among males.[4] The rate of noncompliance to antihypertensive therapy was 58.6% in Ghana.[3] Poor medication adherence has led to a significant increase in the incidences of cerebrovascular accidents (stroke), cardiovascular diseases and chronic kidney disease, sometimes causing sudden death irrespective of age, gender, and settlement area.

Methodology

Profile of study area
It was a facility-based cross-sectional study conducted in the Anfoega Catholic Hospital in the North Dayi District in the Volta Region of Ghana. The North Dayi District is one of the seventeen administrative districts in the Volta Region as well as one of the seven newly created districts in the then Volta Region by the late president, His Excellency J. E. Atta Mills in 2012. It was carved off the old Kpando Municipality with its capital being Anfoega. The district is about 41 km away from Ho, the regional capital. The 2010 Population and Housing Census reported a total population of 93, 649 and it is predominantly female, 52.43%.[5] The district has five sub-districts to enhance focused healthcare delivery and planning activities.

Study method and design
A cross-sectional study was employed to collect data from the selected facility in the North Dayi District. A structured questionnaire was issued as the primary data collection instrument with information on the respondents regarding their sociodemographic characteristics, knowledge on hypertension, their compliance level to hypertension treatment, and the reliability of their responses using an Adherence Barrier Questionnaire (ABQ).

Sample size and sampling technique
A total of 191 respondents above 18 years who had been diagnosed with hypertension and undergoing treatment for at least 1 month, with or without comorbidities were admitted into the study. The target sample size was estimated based on the total prevalence of hypertension of about 13.0% from an earlier study conducted in Ghana.[1] Cochran's formula was used to obtain the sample size.[6]

$$n = \frac{(Z)^2 p(1-p)}{e^2}$$

where:

n = desired sample size.

Z = Reliability coefficient for 95% CI translated to z-score of 1.96.

p = prevalence of hypertension in Ghana (13%)

e = margin of error set at 0.05

Therefore:

$$n = \frac{(1.96)^2 \times 0.13(1-0.13)}{(0.05)^2} = 173.79 \approx 174$$

Adding a 10% nonresponse rate to the generated sample size, the operational size was brought to about 191 respondents. A systematic sampling method with a skip pattern was employed to select the respondents for enrolment after consenting to the study.

Data analysis
Frequencies and percentages were used to assess study participants' characteristics. Fisher's Exact and Pearson's Chi-square tests were used to determine the association between demographic, socioeconomic, and clinical factors with treatment compliance. Bivariate and multivariate analyses were performed to evaluate factors associated with poor treatment adherence and predict factors that statistically affect the prevalence of noncompliance to hypertension treatment at a predetermined $P < 0.05$. Statistical data analysis was conducted using the STATA statistical software package (StataCorp. 2007. Stata Statistical Software. Release 14. StataCorp LP, College Station, TX, USA).

Ethical consideration
Ethical and administrative approvals were sought from the Institutive Review Board of Ensign College of Public Health. Permission was also obtained from the North Dayi District Health Directorate of the Ghana Health Service (GHS). Respondents were selected based on

their willingness to participate in the study and were assured of confidentiality and privacy of the information provided.

Results

Characteristics of the study participants

A total of 191 respondents participated in this study. Females made the majority (71.7%) of respondents. Most of the study participants were married (46.1%). Majority of the respondents had some level of education (82.7%), where 26.7% had basic/primary level education with only 15.7% schooling to the tertiary level. About 36.7% of the study participants were farmers with 25.1% either retired or unemployed. About 74.9% of respondents earned between GH₵ 100 to GH₵ 500 per month. The majority of respondents (91.1%) had valid health insurance with the National Health Insurance Scheme (NHIS).

The study further revealed that the majority of the respondents would first prefer to seek healthcare at the Health Center (46.6%) when they are unwell while an insignificant proportion would first seek divine intervention or resort to treatment from a herbalist. Study participants attributed this to the proximity (39.8%) of the health facilities, affordability of medical therapy (24.1%); however, 1.1% stated continuity of care as their reason. About 63.9% of respondents stated that medications prescribed were not always available, but 72.8% of the study participants were able to purchase their medications from drug stores or pharmacies outside the health facility Table 1.

Respondents' knowledge on hypertension

Out of the total respondents, 43.5% pointed out that stress is the cause of hypertension while 30.4% reported that the cause of hypertension is unknown. Increasing age was cited by 13.6% of the respondents as the cause of hypertension. About half of the study participants knew of their hypertension status for 1–5 years however, 20.4% have lived with the condition for more than 10 years. 77.5% of respondents reported stroke as a complication of high blood pressure, 16.2% stated heart failure as a sequela of hypertension. However, 4.7% had no idea what hypertension complications are.

Compliance status of study participants

The prevalence of noncompliance to hypertension treatment (i.e., the nonuse or discontinuity of the treatment process and inattention or failure to follow the prescribed hypertension therapy by the patient) in

Table 1 Socio-demographic Characteristics of Study Participants

Variables	Frequency	Percentage
Age Groups		
Youth	24	12.6
Middle-age	84	43.9
Elderly	83	43.5
Gender		
Female	137	71.7
Male	54	28.3
Marital Status		
Single	17	8.9
Married	88	46.1
Divorced/separated	27	14.1
Widow/widower	59	30.9
Educational Level		
No Formal Edu.	33	17.3
Primary	51	26.7
JHS	48	25.1
SHS/TECH/VOC	29	15.2
Tertiary	30	15.7
Occupation		
Farmer	70	36.7
Trader	49	25.7
Retired/Unemployed	48	25.2
Other	24	12.6
Valid Health Insurance		
No	17	8.9
Yes	174	91.1
First health facility attended when ill		
Health Center	89	46.6
Herbalist	1	0.5
Hospital	84	44.0
Pharmacy	16	8.4
Prayer Camp	1	0.5
Availability of all prescribed drugs at the facility		
No	122	63.9
Yes	69	36.1
Ability to buy drugs when given a prescription		
No	52	27.2
Yes	139	72.8

Source: Field data, 2021

this study was reported to be 31.4% as shown in Figure 1. In this study, several factors including housing, presence of comorbidities, and medication side effects influenced adherence to hypertension therapy.

Factors associated with noncompliance

Of all the participants, 47.5% attributed their nonadherence to hypertension treatment to forgetfulness, 23.8% cited financial constraint as the reason for not complying with treatment and 21.8% reported feeling better as the reason. However, 6.93% stated experiencing medication side effects and pill burden as their reason for nonadherence to hypertension treatment. About 5% of the respondents reported having experienced side effects from

anti-hypertensive therapy which also contributed to their noncompliance status as illustrated in Figure 2.

Table 2 displays the distribution characteristics of the participants' responses to the 12 ABQ items. Most of the items showed a negatively skewed distribution of the scores indicating a strong agreement to the item being a barrier. Exceptions like items 1, 3, and 4 with relatively strong positive skewness indicate that the respondents do understand the instructions provided them, agreed to the treatment plan with the provider and do know the benefits of taking the prescriptions as offered. A Cronbach's alpha (α) scale reliability coefficient on the 12-ABQ items was 0.7003, which demonstrates an acceptable reliability in the responses provided. The Item-Total correlation ranged from 0.0826 to 0.6884 where Item 12 *"the fear of side effects of medication"* had the highest correlation.

Association between compliance and selected socio-demographic characteristics

Table 3 explores the test of association between the selected socio-demographic characteristics of the respondents and their level of compliance to hypertension treatment. This study highlighted females (73.3%) to be more compliant to hypertension therapy compared to their male counterparts (26.7%) which could be a result of the increased awareness and management of high blood pressure among females than males though there was no observed statistical significance ($P = 0.493$). Respondents who lived in their personal property had increased treatment compliance (51.9%) than their counterparts who lived in family houses or were renting with ($P = 0.015$). The study further revealed that the majority of the participants (93.9%) who had enrolled on the NHIS were more adherent to treatment than those who had invalid health insurance however there was no observed statistically significant association ($P = 0.057$).

Multivariate analysis assessing the factors contributing to noncompliance to treatment

As demonstrated in Table 4, married, divorced and widowed participants were more adherent to therapy (odds ratio [OR] = 0.08; 95% CI = 0.01–0.88; $P = 0.038$), (OR = 0.05;
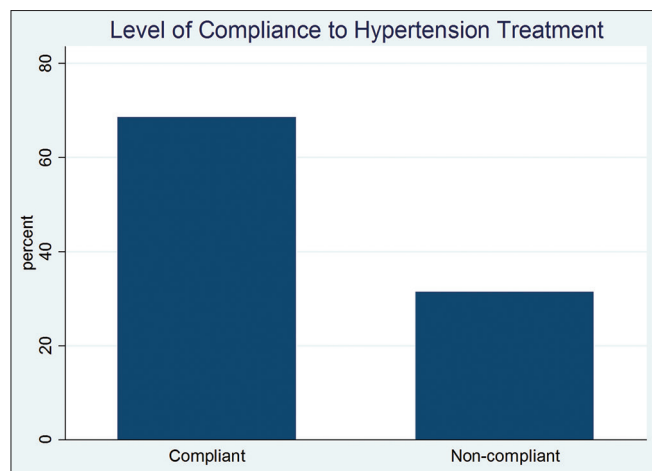

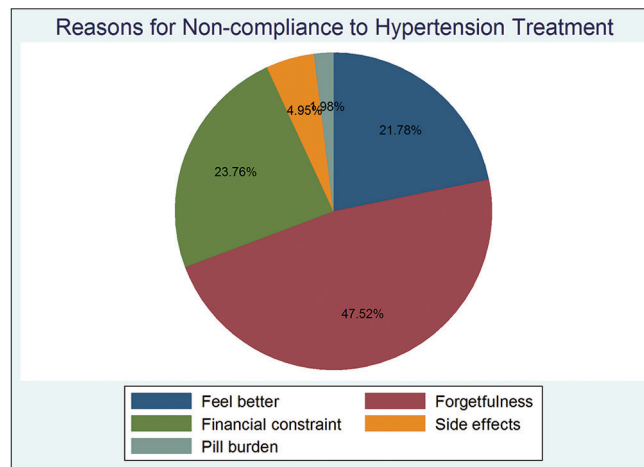Figure 1: Compliance level of the study participants

Figure 2: Reasons for nonadherence to hypertension treatment in noncompliant participants

Table 2 Findings from the ABQ Analysis

Item	Adherence Barrier Questionnaire	Mean	Median	SD	Skewness
1	I fully understand what my doctor, nurse or pharmacy attendants have explained to me so far.	1.042	1.00	0.287	6.691
2	I can mention the names of my medications and scope without hesitation	2.330	3.00	1.249	0.041
3	I trust my doctor and agree to my therapy plan together with him	1.052	1.00	0.320	5.935
4	My medications help me only if I take regularly as prescribed	1.058	1.00	0.400	6.914
5	Medicines are all poisonous. You should avoid taking them if possible	3.215	3.00	0.963	-1.290
6	I feel healthy so I'm sometimes unsure if I really need to take my medications daily	2.508	3.00	1.252	-0.187
7	I take my medications automatically every day at a fixed time	1.770	1.00	1.147	0.941
8	I frequently forget things on an everyday basis	2.471	3.00	1.128	-0.315
9	Generally, I often feel bad and sometimes I feel depressed or discouraged to take my medications	2.796	3.00	1.140	-0.641
10	I frequently have problems taking my medications	2.990	3.00	1.000	-0.992
11	I really will need help every day with my medications but I don't get any help	2.586	3.00	1.1972	-0.343
12	I am really frightened of the side effects of my medications	2.581	3.00	1.29471	-0.234

Source: Field data, 2021

Table 3: Association between Compliance Status and Selected Socio-demographic Characteristics, Clinical and Caregiving Practices

Characteristics	Treatment Compliance		P
	Compliance (n=131)	Non-Compliance (n=60)	
Age groups			
Youth	17 (13.0%)	7 (11.7%)	0.884
Middle-age	56 (42.8%)	28 (46.7%)	
Elderly	58 (44.3%)	25 (41.7%)	
Gender			
Females	96 (73.3%)	41 (68.3%)	0.493
Males	35 (26.7%)	19 (31.7%)	
Housing			
Family house	50 (38.2%)	28 (46.7%)	0.015*
Personal property	68 (51.9%)	19 (31.7%)	
Renting	13 (9.9%)	13 (21.7%)	
Valid Health Insurance			
No	8 (6.1%)	9 (15.0%)	0.057
Yes	123 (93.9%)	51 (85.0%)	
Waiting time for consultation			
30 mins - 1h	59 (45.0%)	13 (21.7%)	<0.001*
1 h - 2 h	55 (42.0%)	20 (33.3%)	
>2 h	17 (13.0%)	27 (45.0%)	
Explanation of Lab Results			
No	36 (27.5%)	35 (58.3%)	<0.001*
Yes	95 (72.5%)	25 (41.7%)	

Source: Field data, 2021

95% CI = 0.00–0.66; P = 0.023) and (OR = 0.05; 95% CI = 0.00–0.70; P = 0.026) respectively compared to their counterparts who were single after adjusting for all other covariates. Study participants who had enrolled unto the NHIS were 2.71 times more likely to adhere to hypertension treatment than those who had not enrolled unto the scheme or had invalid health insurance (P = 0.052; 95% CI = 0.99–7.43) in a Crude Logistic Regression Model, however upon adjusting for all other variables, there was no statistical significance. It is imperative to continuously create awareness on the benefits of being enrolled in the NHIS to an individual and their communities to boost acceptance and utilization of the Health Insurance Scheme.

Defaulting review was significantly associated with noncompliance to hypertension therapy (OR = 0.02; P < 0.001; 95% CI = 0.01–0.07) with same reported (OR = 0.01; P ≤ 0.001; 95% CI = 0.00–0.05) after adjusting for all other covariates. Respondents who were always able to purchase their medications when given prescription were 1.95 times more likely to be adherent to treatment than those who were not (OR = 1.95; P = 0.049; 95% CI = 1.00–3.79) meanwhile upon adjusting for all other variables, there was no statistically significant association.

Facilities need to make available medications required to manage patients' conditions to enhance compliance and help bring to the barest minimum hypertension-related sequelae and disability hence improve on the economic gains of various households, communities, and the country as a whole.

Discussion

This study highlighted females (73.3%) to be more compliant to hypertension therapy compared to their male counterparts (26.7%) which could be a result of the increased awareness and management of high blood pressure among females than males though there was no observed statistical significance (P = 0.493). This observation is quite alarming considering the increased incidence of cerebrovascular accidents among men than women in Ghana.[7] It can also be said that women have better health-seeking behavior than their male peers similar to what was reported in Canada[8] hence their high level of treatment adherence.

In this study, 31.4% of respondents seeking treatment at the District Hospital in North Dayi were found to be noncompliant to hypertensive therapy and this was influenced by respondents' marital status, the validity of their health insurance, and longer waiting times at the hypertension Clinic compared to 30.9% as reported in Southern Zimbabwe.[9] However, this finding was lower than highlighted in[2,10,11] as 44.4%, 50%, and 58.6%, respectively. Poor compliance with hypertension therapy is a major challenge in achieving blood pressure control. This study demonstrated that marital status, occupation, health insurance validity, housing, frequency of follow-up, presence of comorbidities, waiting time at the hypertension Clinic and the ability to purchase medications when given prescription were significantly associated with noncompliance to hypertension treatment among respondents at the District Hospital in the North Dayi District. Study participants who were married, divorced/separated, or widowed were highly adherent to hypertensive treatment (P = 0.038, 0.023, and 0.026 respectively) similar to what was reported by Okai *et al.*, with married respondents being 0.02 times less likely to be nonadherent to hypertension treatment compared to study single participants.[7] This could be because married respondents get support from their spouses to help manage their condition (hypertension) by reminding them. Forgetting to take medications was a common reason for noncompliance; however, it accounts for only 30% of all nonadherence.[12] However, it was lower than

Table 4: Factors Associated with Non-compliance to Hypertension Treatment

Variables	Categories	Unadjusted (P)	Unadjusted OR (95% CI)	Adjusted (P)	Adjusted OR (95% CI)
Age groups	Youth		1.00 (Reference)		1.00 (Reference)
	Middle-age	0.701	0.82 (0.31-2.22)	0.616	1.49 (0.32-6.99)
	Elderly	0.928	0.96 (0.35-2.59)	0.674	1.45 (0.25-8.28)
Gender	Female		1.00 (Reference)		1.00 (Reference)
	Male	0.481	0.79 (0.40-1.53)	0.350	0.56 (0.16-1.89)
Educational Level	No Formal Education		1.00 (Reference)		1.00 (Reference)
	Primary	0.406	0.67 (0.27-1.71)	0.281	0.41 (0.08-2.05)
	JHS	0.928	0.96 (0.37-2.50)	0.645	1.45 (0.30-6.94)
	SHS/TECH/VOC	0.290	1.67 (0.52-5.35)	0.448	1.95 (0.35-10.96)
	Tertiary	0.979	1.01 (0.35-2.98)	0.741	1.46 (0.15-13.77)
Marital Status	Single		1.00 (Reference)		1.00 (Reference)
	Married	0.099	2.10 (0.87-5.06)	0.038*	0.08 (0.01-0.88)
	Divorced/Separated	0.022*	6.96 (1.32-36.53)	0.023*	0.05 (0.00-0.66)
	Widow/widower	0.117	2.11 (0.83-5.40)	0.026*	0.05 (0.00-0.70)
Occupation	Farmer		1.00 (Reference)		1.00 (Reference)
	Retired/Unemployed	0.259	0.63 (0.48-1.40)	0.083	0.30 (0.07-1.17)
	Trader	0.729	0.87 (0.38-1.96)	0.262	0.46 (0.12-1.79)
	Others	0.070	0.41 (0.16-0.07)	0.026*	0.11 (0.02-0.75)
Valid Health Insurance	No		1.00 (Reference)		1.00 (Reference)
	Yes	0.052	2.71 (0.99-7.43)	0.912	1.10 (0.21-5.72)
Housing	Family house		1.00 (Reference)		1.00 (Reference)
	Personal property	0.047*	2.00 (1.01-3.99)	0.093	2.75 (0.85-8.93)
	Renting	0.205	0.56 (0.23-1.37)	0.236	0.38 (0.76-1.89)
Follow up	Monthly		1.00 (Reference)		1.00 (Reference)
	Every 2 months	0.294	0.44 (0.09-2.05)	0.324	0.43 (0.08-2.32)
	Default review	< 0.001*	0.02 (0.01-0.07)	< 0.001*	0.01 (0.00-0.05)
Ability to buy drugs when given a prescription	No		1.00 (Reference)		1.00 (Reference)
	Yes	0.049*	1.95 (1.00-3.79)	0.658	1.27 (0.44-3.70)

Source: Field data, 2021

highlighted in this study at 47.5%. With the educational level of respondents, there was no distinct bearing however, those who had only attained primary level education (33.3%) were more nonadherent to therapy compared to their peers who had no formal education. This is in congruence with what was reported by Osamor and Owumi, (2011).[13] According to earlier reports on compliance, Algabbani and Algabbani, (2020) and Eley *et al.*, education, though important in the health-seeking behavior of patients, had no significant association with treatment adherence similar to what has been revealed in this study ($P = 0.568$).[14,15]

Conclusions

Non-compliance to hypertension treatment in the District Hospital in North Dayi is relatively low compared to that in other studies. Marital status, occupation, health insurance validity, housing, frequency of follow-up, comorbidities, the ability to purchase medications when given prescriptions and longer waiting times were statistically significant predictors of nonadherence to hypertension treatment at the District Hospital in the North Dayi District. The amount of information patients have about their conditions also affects their health-seeking behavior. Hypertension prevention, screening, and management programs are of key importance to help reduce the incidence of hypertension-related sequelae.

Recommendations

Health-care providers should involve hypertensive patients in the management of their condition to reduce the prevalence of nonadherence to hypertension treatment and eventually hypertension-related complications. The District Hospital should collaborate with the Christian Health Association of Ghana, GHS, and the Ministry of Health to employ more physicians to reduce the waiting times for consultation at the Hypertension Clinic.

Mobile community clinics should be established by the District Health Directorate of the GHS in collaboration with the various community leaders where screening for hypertension can be employed to ascertain the prevalence of hypertension and early detection of cases in the district.

Finally, health facilities must ensure that anti-hypertensive medications are always available to patients to enhance compliance and help bring to the barest minimum hypertension-related sequelae and disability hence improve on the economic gains of various households, communities, and the country as a whole.

Data availability
All relevant data are within the paper.

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Nil.

Conflicts of interest
There are no conflicts of interest.

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