Compliance To and Knowledge of Anti-Hypertensive Therapy amongst Hypertensive Patients Attending Lagos University Teaching Hospital (Luth), Idi-Araba, Lagos, Nigeria.

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Abstarct: *Good knowledge and compliant to antihypertensive therapy can have a positive effect on high blood pressure control. The objective of this study is to assess compliance to and knowledge of antihypertensive therapy amongst outpatient's attending the hypertensive clinic of the Lagos University Teaching Hospital, Idi-Araba, Lagos.*
This descriptive cross-sectional study on out-patients attending the hypertension clinic of LUTH, was conducted from the16th June to 20th July, 2012. Multistage sampling technique was utilized to select the calculated minimum sample size of 282 (133 males and 149 females). A validated questionnaire by Morisky Green was modified to suite the study, pretested and self administered by two (2) trained medical personnel (nurses). Collected data was entered, cleaned and analyzed using Epi-Info version 2007 statistical software.
Up to 252(96.18%) of the hypertensive patients showed good knowledge of anti-hypertensive therapy while only 10(3.82%) had poor knowledge. Majority 196 (74.81%) of the respondents were not compliant to antihypertensive treatment while only 66(25.19%) complied. Poor compliance was found to be mainly due to forgetfulness 188(71.76%) and non-availability of drugs in respondent's place of domicile 136(51.91%). There was relationship between sex, religion, education and knowledge of respondents to hypertensive therapy. Significant association was found between knowledge of hypertensive therapy and forgetfulness. There was a significant association between forgetfulness and poor compliance 14.8(3.9-54.8).
Good knowledge of antihypertensive therapy has not significantly improved compliance to antihypertensive therapy thereby leading to low healthcare outcome.
Keyword: *Antihypertensive therapy, Compliant, Hypertension, Knowledge.*

I. Introduction

Hypertension is the single most common and most important risk factor for cardiovascular disease in the world [1]. The prevalence of hypertension varies around the world with the lowest prevalence in rural India (3.4% in men and 6.8% in women) and the highest prevalence in Poland (68.9% in men and 72.5% in women) [2]. Global prevalence of hypertension is increasing. About 54% of stroke and 47% of ischemic heart disease worldwide were attributable to high blood pressure [3]. The analysis of world wide data gives a projection of 1.54 billion affected individual and a prevalence rate of 29.2% by year 2025[2]. At present, the prevalence of hypertension (blood pressure > 160/95mmHg) among adults > 25 years of age in West Africa is estimated to be around 8% in the rural areas and between 15-20% in the urban areas [4]. A community based study on rural and semi-urban population in Enugu, Nigeria put a prevalence of hypertension in Nigeria at 32.8% [5], and this was later estimated in a hospital setting to be 17-20% [6]. Hypertension is an important public health problem that is difficult to control for several reasons, among them is non-compliant to treatment [7].

Compliance is defined as the degree to which the patient conforms to medical advice about lifestyle and dietary changes as well to keep appointments for follow-up and taking treatment as prescribed [8]. WHO report 2003, defines compliance to medication as the extent to which patients take medications as prescribed by their health care providers [9]. Understanding the reasons for patient's non-compliance with antihypertensive medication is essential if blood pressure is to be more effectively managed [10]. Non-compliance to antihypertensive medication has been associated with misunderstanding of the condition, perceived improvement in health, worsening in health, general disapproval of medications and concern over side effects. This is one possible reason why success in clinical trials has not been translated into everyday practice [7].

The aim of this study therefore is to assess the knowledge of and compliance to antihypertensive therapy amongst hypertensive patients attending the outpatient hypertensive clinic of the Lagos University Teaching Hospital, Idi-Araba, Lagos, Nigeria.

II. Methodology.

1.1 Study Setting

Lagos University Teaching Hospital, (LUTH) Idi-Araba, is Federal Government owned tertiary hospital in Nigeria. LUTH is located in Mushin Local Government with a population size of 1,321,517 [11]. LUTH has high patients' attendance among the south-western tertiary hospitals in Nigeria, comprising of over forty departments that provides tertiary health services and with staff strength of 1,715. Medical, surgical, obstetric, laboratory, radiology and physiotherapy services are offered in the different departments of the hospital [12]. In the Faculty of Clinical Sciences, the Department of Medicine runs an out-patient hypertension clinic by the Cardiology Unit twice weekly. As at March 2012 there were 762 (359 males and 403 females) registered hypertensive patients with the Medical Records Department, and an average of 100 patients seen per clinic day.

1.2 Methods

A descriptive cross-sectional study design was conducted on out-patients attending the hypertension clinic in LUTH. Participants eligible for the study were between the ages 18 and 80 years, who had been diagnosed as stage 1 and 2 hypertension. Also included in the study were follow up patients who had been attending the clinic for at least six months and had been placed on anti hypertensive therapy by a physician. All pregnant women and individuals who had psychiatric, renal, physical, or sensory alterations were excluded. All ethical protocols were strictly adhered to and ethical clearance obtained from the LUTH Research and Ethics Committee. The minimum sample size of 282 patients was calculated using the Cochrane formular [13].

Using a multistage sampling technique, a proportionate sample size of 133 males and 149 females were calculated for stratification; a sample frame was attained from the list of patients on each clinic day; a total number of 50 patients were selected using systematic random sampling technique for a period of five weeks until the desired sample sizes were attained.

A validated questionnaire by Morisky Green [14] was modified to suite the study, pretested and self administered by two (2) trained medical personnel (nurses) over a period of three days, for an hour per day. The 51 items instrument consisted of four sections: A, B, C and D; which sought to answer questions on socio-demographic characteristics and personal data (13); knowledge on antihypertensive therapy (10); compliance to antihypertensive therapy (9); and reasons for non-compliance to anti hypertensive therapy (19) respectively. Concerning knowledge of hypertensive therapy, a score of 1 was allotted to each correctly answered question and 0 for wrong answers. Scores were then converted to percentage and scores below 50% were considered poor and ≥ 50 as good. The protocol for **Morisky-Green** test on compliance to hypertension therapy was used to ascertain respondents' compliance to hypertension therapy [13], with the answering options of **"Yes"** and **"No".** Respondents were considered compliant to the treatment when they obtained the maximum score of 4 points, and patients were considered non-compliant when they obtained 3 points or less [15,16].

Collected data was entered, cleaned and analyzed using Epi-Info version 2007 statistical software. Categorical variables were presented in tables and charts, associations were made using chi square test and test of significance was set at $p \leq 0.05$ while T-test was used to analyzed continuous variables. Similarly, quantitative variables was described using measures of central tendency (mean, median) and measures of dispersion (range, standard deviation) as appropriate.

1.3 Limitation

This study was limited by being a purely hospital based study on a population of referred hypertensive cases only.

III. Results

Table 1: Demographic Characteristics of Respondents.

Variable	Frequency N (%) N=262
Socio-demographic Variables:	
Age Group (Years)	
20 - 29	10(3.81)
30 - 39	28(10.68)
40 - 49	58(22.13)
50 - 59	82(31.29)
60 - 69	62(23.66)
70 - 79	22(8.39)
Age (Means ± SD) Year	54.5± 11.6
Level of Education	
Primary	23(8.77)

Secondary	83 (31.67)
Tertiary	152 (58.01)
None	2(1.53)
Others	2(1.53)
Marital Status	
Divorced	14(5.34)
Married	221(84.35)
Single	15(5.72)
Widowed	12(4.58)
Ethnicity	
Hausa	6(2.29)
Igbo	74(28.24)
Yoruba	176(67.18)
Others	6(2.29)
Religion	
Christian	188(71.56)
Islam	74(28.24)
Employed	
Yes	201(76.71)
No	61(23.28)
Occupation (n=201)	
Skilled	64(31.84)
Semi Skilled	124(61.69)
Unskilled	13(6.46)
BMI (Means ± SD) Kg/m^2	27.96± 3.94
BMI Range	
Below Normal (16 – 18.5)	5(1.92)
Normal (18.5- 25)	55(20.99)
> Normal (25 – 30)	105(40.07)
Obese (> 30)	97(37.02)
Blood Pressure	
Normal	70(26.72)
Abnormal	192(73.28)

Table 2: Knowledge of the Respondents

Preventive Measures	Yes N (%)	No N (%) N=260
Weight loss	239(91.92)	21(8.08)
Reduce salt intake	239(91.92)	21(8.08)
Low fat diet	222(84.73)	40(15.27)
Reduce calcium and potassium Intake	122(47.66)	134(52.34)
Lifestyle Changes		
Stop tobacco use	241(92.69)	19(7.31)
Reduce alcohol Intake	253(97.31)	7(2.69)
Reduce sleeping hours	240(92.31)	20(7.69)
Regular exercise	235(90.38)	25(9.62)
Diet modification		
Adequate fruit and vegetable	252(96.92)	8(3.08)
Remove skin of chicken	240(92.31)	20(7.69)
Eat Fast food	216(83.40)	43(16.60)
Reduce fat intake	240(92.31)	20(7.69)

Table 3: Rating of Respondents Knowledge.

Knowledge	Frequency	Percent (%)
Poor	10	(3.82)
Good	252	(96.18)
Total	262	(100)

Table 4: Compliance to Anti-hypertensive therapy and reasons for non compliance

Level of Compliant	Yes	No Frequency (%) (N =258)
Morisky-Green Test.		
Forgotten to take medication (N=258)	178(68.99)	80(31.01)
Neglectful to medication (N=258)	70(27.13)	188(72.87)
Skip medication when feeling good. (N=258)	104(40.47)	153(59.53)
Skip medication when feeling badly. (N=258)	57(22.09)	201(77.91)
Compliant (N =262)	66(25.19)	196(74.8)
Appointment days		
Keep appointment days (N=262)	245(93.51)	17(6.49)
Regularity for clinic days		
Regular	205(83.67)	40(16.32)
Prescribed dose.		
Failed to use	118(45.03)	144(54.96)
Days with no medication since last visit to clinic (N=244)		
0- 1 days	158(64.75)	
2 – 3 days	75(30.74)	
4 – 5 days	11(4.51)	
Reasons for Non Compliance.		
Insufficient funds to purchase drugs.	90(34.3)	
Absence of symptoms.	81(30.9)	
Avoiding side effects.	97(37.0)	
Ran out of prescribed drugs.	136(51.9)	
Forgetfulness.	188 (71.7)	
Busy schedule.	40(15.2)	
Drug change by another doctor.	57(21.7)	
Misunderstood instructions.	12(4.5)	
Frustrated of the illness.	8(3.05)	
Multiple Responses.		

Table 5: Odd Ratios (95% CI) for Logistic Regression of Effect of Some Reasons on Poor Compliance to Hypertension Therapy.

Reasons	OR(95%CI)	P-value
Insufficient funds to purchase drug	1.2(0.5-3.1)	0.649
Absence of symptoms	3.3(1.3-8.0)*	0.010
Avoid side effect	3.0(1.4-6.7)*	0.006
Non availability of drugs/drugs disappeared from the market	1.1(0.2-5.1)	0.948
Ran out of prescribed drugs	1.3(0.1-0.4)*	0.000
Too many drugs to swallow	0.2(0.0-1.3)	0.087
Have a normal blood pressure	3.6(0.9-14.7)	0.071
Forgetfulness	14.8(3.9-54.8)*	0.000
Busy schedule	1.2(0.5-3.0)	0.721
Misunderstood instructions	4.7(0.5-44.8)	0.177
Frustrated of the illness	0.7(0.2-3.2)	0.706
Preference for alternative medicine	2.0(0.2-18.5)	0.531
Irrational fears	0.4(0.0-4.1)	0.450
Inability to pay for transport on clinic days	0.6(0.1-2.9)	0.500
Inability to swallow drugs	1.0(0.2-6.7)	0.964
Drug change by another doctor	0.5(0.2-1.4)	0.166
Contrary advice by pharmacist	4.8(0.4-59.5)	0.220

*significant at 5%; OR=odd ratio and CI=confidence interval

Table 6: Relationship between Socio- Demograhic Variables, Knowledge and Compliance of the Respondents.

Socio-Demographic	Non - Compliant N (%)	Compliant N (%)	P-value	X^2
Sex				
Female	108(78.83)	29(21.17)		
Male	88(70.40)	37(29.60)		
TOTAL	196(74.81)	66(25.19)	0.116329	2.4661
Marital Status				
Divorced	13(92.86)	1(7.14)		
Married	160(72.40)	61(27.60)		
Single	11(73.33)	4(26.67)		
Widowed	12(100)	0(0.00)		
Total	196(74.81)	66(25.19)	0.8248	0.0490
Level of Education				
None	1(50.00)	1(50.00)		
Others	2(100.00)	0(0.00)		
Primary	15(65.22)	8(34.78)		
Secondary	60(71.43)	24(28.57)		
Tertiary	118(78.15)	33(21.85)		
Total	196(74.81)	66(25.19)	0.1296	2.2977

Knowledge

Knowledge	Compliant					
	No	Yes	P-value	Fisher Exact	df	X^2
Yes N (%)	4(40.0)	6(60.0)	0.00972	0.0184	1	6.6848
No N (%)	192(76.2)	60(23.8)				
TOTAL	196(74.18)	66(25.19)				

A total of 282 hypertensive patients attending the Lagos University Teaching Hospital, Idi-Araba, Lagos were surveyed with a response rate of 89% and 11% non-response. The study participants consisted of 124 (47.32%) males and 138 (52.67%) females. Their ages ranged from 24 -79 years with a mean age of 54.5 ± 11.6 years. Majority of the respondents (34.35%) were between 50-59 years of age. The Yoruba ethnic group constituted the majority (67.18%) of the respondents, followed by Igbo (27.86%), and Hausa (2.67%). The predominantly Christians 187 (71.37%) and Muslims 75(28.63%) respondents were made up of 221(84.35%) married men and women, 15(5.73%) single, while the rest were widowed, divorced or separated. A total of 151(57.63%) of study sample had university/ higher education and 23 (8.78%) primary education. Up to 64(31.84%) of the respondents were skilled, 126(61.69%) were semi skilled and 13(6.46%) were unskilled "Table1"

Most 239 (91.92%) knows that losing weight and reducing high salt intake reduces high blood pressure (HBP), 220 (84.73%) believed that reducing fat consumption reduces high blood pressure and 134 (52.34%) did not know that reducing the consumption of fat could reduce HBP "Table 2". The level of knowledge on antihypertensive therapy was good 252 (96.18%) and 10(3.82%) had poor knowledge "Table 3".

In rating compliance using the Morisky- Green test [14], 178(69.0%) of the respondents would forget to take their medication; 57(22.1%) would skip medication when they felt good. Compliance rate was low 25.19% (66). The main reason for non compliance was forgetfulness 188(71.76%); other prominent ones were ran out of prescribed drugs 136(51.9%) avoiding side effects 97(37.0%), insufficient funds 90(34.3%) amongst others "Table 4".

Forgetfulness was the most significant reason influencing poor compliance. The odd of a person having poor compliance was 14.8 times higher for someone who forgot to take drug than for person who did not forget. Also significant association was forgetfulness and poor compliance 14.8(3.9-54.8). Other reasons such as absence of symptoms 3.3(1.3-8.0), avoid side effect 3.0 (1.4-6.7) and ran out of prescribed drugs 1.3(0.1-0.4) significantly contributed to poor compliance to antihypertensive therapy. An individual who misunderstood instructions was 4.7 times more likely to have poor compliant however the association was not significant 4.7

(0.5-44.8). Frustration of the illness was protective. The more an individual got frustrated, the less likely he/she reported poor compliant to hypertensive drugs 0.7(0.2-3.2) "Table5".

There was a statistical significant association between religion (X^2=5.0068 , df=1, P-value=0.025), knowledge (X^2 =6.6848, df = 1, P-value= 0.00972, F-exact Test= 0.0184) and compliance to antihypertensive therapy. However, the association between sex (X^2=2.4661, df=1, P-value=0.116329.), marital status (X^2=0.0490 df=3, P-value=0.8248), level of education (X^2=2.2977 Df=4, P-value=0.1296), and respondents' compliance to anti-hypertensive therapy were not significant "Table 6".

IV.   Discussion

Hypertension is a serious public health problem due to its high prevalence and good control of the disease has always been considered to be essential for reducing its morbidity and mortality [15]. This study however, shows that nine out of ten respondents 252(96.18%) had good knowledge of anti-hypertensive therapy. This showed a significant association between good knowledge of hypertensive therapy and level of education (P<0.02). This finding on the other hand contrasts with very low knowledge rates from other parts of Nigeria and other countries [8, 17-19]. However, this finding is not unexpected as the patients' level of education is generally known to have positive influence on their understanding of specific health education programmes and relevant behavior change techniques [20, 21].

It is important to note that many patients' still have a lopsided understanding of their treatment. A qualitative contact time between patient and the physician to sort out these areas is encouraged so the patient can be involved in his/her own care. This obviously has ready consequences in poor compliance and poor control of high blood pressure especially among males with increased risk of morbidity and mortality [20, 21]. Previous studies that used Morisky-Green Test to measure compliance of anti-hypertensive therapy actually discovered a compliant rate of (54.2%) [17]. However, previous researches [18,22,23] conducted in some parts of the world and Nigeria on patient's compliance were classified by using the regular attendance of patients at follow-up clinics, obtaining and taking all drugs as prescribed. The method used in these studies were however subjective and had shown that more than half of patients that were regular for clinics days often forgot to follow their treatment pattern as prescribed by their physician. A similar study conducted in Nigeria discovered a compliant rate of (65.8%) and non- compliant rate of (34.2%) [24].

The Morsiky-Green Test used in this study, a more objective instrument classifying compliance and the variation in instrument for data analysis gave a more objective and higher non-compliance rate of 74.8% expectedly. However, studies conducted in other parts of the world such as Saudi-Arabia had a non-compliant rate of (65.8%) [25], in Sudan (40.4%) [26] and (37%) [27] In Hongkong.

Non-compliance with anti-hypertensive therapy is an inherent problem in the treatment of chronic asymptomatic conditions and is one major reason why hypertension may not be treated effectively with drugs. In order to improve non-compliance, high attention needs to be given to reasons for poor compliance and appropriate measures to improve the compliant rate need to be taken.

This study also showed that commonest causes of poor compliance was forgetfulness in contrast to exhaustion of drugs, ignorance and lack of funds [19], too many drugs to swallow and low level of education status [28] in other Nigerian studies. It was noted that patients just often forget to use their medication even though they were on once daily regimen. Majority 84(68.9%) of the patients that forgets to use their medications were business professionals who will leave home very early hours of the morning and return late hours of the night due to their work schedule and long distance from home resulting in tiredness.

In developed countries, electronic monitoring devices have been developed to remind patient of their pills and treatment therapy [17]. Other reasons cited by respondents in this study were exhaustion of drugs, lack of finances for replacement resulting in skipping appointments/failure to get a refill of prescription. The survey from University of Ibadan Teaching Hospital also identified economic constraint, use of alternative treatment, frustrations with daily drug ingestion and feeling of well being as constraint to compliance [19].

The observed association between poor compliance and lack of funds for the purchase of drugs was also observed in other previous research [8] whereas; in Iran anti-hypertensive drugs are given free to hypertensive patients at no extra-cost [17]. This helps to curtail lack of finance being a reason for non compliance.

As high as twenty four patients (9.16%) stopped taking their drugs because they believed that their blood pressure was normal as a result of the short time treatment of initially prescribed drugs. This implies that either instructions were not properly grasped or the patients' knowledge base regarding the disease was weak. The need for healthcare physicians to continually educate the patient and re-enforce the importance of continuous surveillance by the doctor and that treatment is long term and for life.

The survey from University of Ibadan Teaching Hospital also identified economic constraint, use of alternative treatment, frustrations with daily drug ingestion and feeling of well being as constraint to compliance [24].

Identifying factors that determines non- compliance of hypertensive patients to treatment is, therefore, of vital importance in applying therapeutic strategy and in obtaining satisfactory results [28, 29].

V.   Conclusion

In this study, knowledge of antihypertensive therapy was good however, compliance is relatively poor and forgetfulness was the major reason for non-compliance. However, good knowledge did not translate to compliance.

The major reasons for non-compliance where forgetfulness, insufficient funds, absence of symptoms, avoiding side effects, have a normal blood pressure and busy schedule. However, forgetfulness 14.8(3.9-54.8) was the most significant reason influencing poor compliance. The odd of a person having poor compliance was 14.8 times higher for someone who forgot to take his or her drugs for person who did not forgets. Other reasons such as absence of symptoms 3.3(1.3-8.0), avoid side effect 3.0(1.4-6.7) and ran out of prescribed drugs 1.3(0.1-0.4) significantly contributed to the poor compliance to hypertensive therapy.

In conclusion, good knowledge of hypertension and its treatment regimen does not necessarily translate to better compliance to hypertension. Hypertension itself can be best controlled when patients comply with their treatment regimen, do some sort of physical activity regularly and in this way, prevent themselves from the hypertensive complications.

VI.   Recommendation

It is therefore recommended that:
1. Hypertensive patients in LUTH should be counseled every time whenever they visit physician in order to improve their compliance to anti hypertensive therapy, thereby having a better control of hypertension.
2. Health practitioners should be involved in developing models that will always remind patients to take their medications regularly without forgetting it.
3. Patient-Physician communication should be strengthened and appropriate educational and behavioural strategies should be implemented.
4. An electronic monitoring device should be provided for patients to reduce patient's forgetfulness and enhance compliant to hypertensive treatment.
5. Healthcare providers should educate their patients concerning long term treatment of the disease.

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