Evaluation of Clinical Outcomes of Patients with Hypertension at the Out-Patients Clinic, Federal Medical Centre, Owo, Ondo State, Nigeria

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ABSTRACT

Background: Effective blood pressure control prevents most complications associated with hypertension. Despite the benefits of effective blood pressure control, most known hypertensive patients are not on medications, and only few of those on medications have their blood pressure adequately controlled.

Aim: This study aimed at evaluating the clinical outcomes of various antihypertensive drugs taken by patients attending the out-patient clinic at the Federal Medical Centre, Owo, Ondo State Nigeria.

Method: The research was a cross-sectional, descriptive study of patients with hypertension attending clinic at the Medical Outpatient Department of the facility. Subjective and objective information were obtained from patients using a structured questionnaire and case files respectively. One hundred and thirty-seven patients were sampled and data collected using questionnaire and structured interview.

Ethical clearance was obtained from the institution's Ethical Review Board of FMC Owo. The data collected was analyzed using Microsoft excel and Statistical Package for Social Sciences (SPSS version 16.0).

Results: Most (69.3%) of the respondents were female and majority of them were above 50 years of age (79.6%). More than half (52.5%) of the patients were taking combinations of two medications. ACEI/ARB and calcium channel blockers were the most common combination prescribed. About a third (33.6%, n=46) of the patients were not compliant with their medications. Overall, only a little above half (51.1%) of the respondents had reached target blood pressure goal. Only those with dysrhythmias and chronic cardiac failure as co-morbidity had achieved the blood pressure goal.

Conclusion: Majority of the participants used more than one medication in the management of hypertension. Diuretics were the most widely used. Even though Angiotensin Converting Enzymes inhibitors (ACEIs)/Angiotensin Receptor Antagonists (ARBs) with Diuretics are frequently prescribed and used by patients. Some of the patients were not compliant with their medications and almost half of the patients are not at blood pressure goal.

INTRODUCTION

Hypertension is the leading cause of cardiovascular related morbidity and mortality.[1] It is a global problem that affects all races across the globe. In 2010, the global prevalence of hypertension was estimated to be 31.1%,

meaning that about 1.39 billion adults are hypertensive worldwide.[1] The prevalence of hypertension among adult Chinese aged 18 years and above was 27.5%, with male having higher prevalence than female.[2] About a third (33%) of the American adult population was hypertensive.[3] A survey involving six European countries, Canada and the United States of America found a higher prevalence among the Europeans than the Americans and Canadians.[4] Prevalence rates are higher among Black Americans when compared to other races.[3] There is increase in the prevalence of hypertension especially in low- and middle income countries.[5] As the population ages, the prevalence of hypertension will increase even further, unless broad and effective preventive measures are implemented.[6] It was projected that up to three quarters of the world's hypertensive population will be in economically developing countries by the year 2025.[7]

Effective blood pressure control is key to the prevention of cardiovascular and renal complications associated with hypertension.[5] The incidence of cardiovascular morbidities such as cerebrovascular accidents, myocardial infarctions and heart failure has been found to decrease with adequate of blood pressure control.[8] Despite the clear benefits of effective blood pressure control, most known hypertensive patients are not on medications, and only few of those on medications have their blood pressure adequately controlled.[9,10,11]

Attainment of therapeutic goal in the management of hypertension necessitates compliance with life style modifications, rational use of drugs and recognition and management of co-morbid disease. However, there is paucity of information on clinical usage and treatment outcomes among hypertensive patients in Ondo State, South-west, Nigeria. The aim of this study was to evaluate clinical outcomes of various antihypertensive drugs of patients attending the out-patient clinic at the Federal Medical Centre Owo, a referral Federal Hospital in Ondo State Nigeria.

METHOD

Ethical Consideration

Ethical clearance was obtained from the institution's Ethical Research Review Committee (FMC/OW/380/VOL.XXII/136). Informed consent of the subjects was obtained with the informed consent form after the subjects have been duly educated about the research work. Only patients who granted their consent voluntarily participated in the study

Research Design

The research was a cross-sectional, descriptive study. This involved the collection of subjective and objective information from patients through questionnaires and case files respectively

Research Setting

This study was conducted at the medical out-patients clinic of the Federal Medical Centre, Owo. The institution being a tertiary healthcare facility is involved in healthcare services, training of specialized manpower and researchers. By virtue of its location and lack of well-developed healthcare facilities in the neighborhood, the catchment area of the hospital is extremely large including the whole of Ondo State, part of Ekiti, Kogi, Edo, and Osun states. The large catchment area avail the researchers the opportunity to see patients with diverse backgrounds.

Study Population

The participants were hypertensive patients who attend the pharmacies attached to the Internal Medicine, Family Medicine and staff Clinics.

Inclusion Criteria: Adult, ambulatory hypertensive patients who have attended at least three clinics or three months management duration.

Exclusion criteria: New patients for less than three months, pregnant & breast feeding patients and patients that were on admission.

Sample Size:

The sample size will be estimated using the Leslie & Kish (1965) formula for the sample size calculation for descriptive studies[12]:

$$n = \frac{Z^2 pq}{d^2}$$

Where z=standard unit deviation at 5% level of significance = 1.96

p = proportion of hypertensive patients that received comprehensive care = 10%

q = 1-p i.e. proportion of hypertensive patients that did not receive comprehensive care = 90%

d = level of precision = 5%

n = sample size

$$n = \frac{Z^2 pq}{d^2}$$

$$= \frac{1.96^2 \times 0.1 \times 0.9}{0.05^2}$$

$$= \frac{3.8416 \times 0.09}{0.0025}$$

$$= \frac{0.345744}{0.0025}$$

138.2976

138 participants is the required sample size

Allowing for 10% attrition,

138 x 1.1 = 151.8

Thus 152 questionnaires were administered.

Sampling Method: The sampling of the hypertensive patients had no bias for sex, occupation, and educational level. The hypertensive patients were selected through random sampling to give each patient equal chance of being selected.

Data Collection Procedure

Three trained research assistants collected the data. Interviewer-administered method was used to administer questionnaire to a sample of randomly selected hypertensive patients who attend the medical clinics. No form of intervention was rendered.

Research Instrument

A structured questionnaire was used to gather information from the subjects. The patients were directly questioned on information on socio-demographic characteristics of respondents which include age class, sex, level of education, occupation. Others include questions to assess their knowledge of hypertension, duration of hypertensive condition, level and factors affecting adherence to medication and lifestyles modifications and satisfaction with services being enjoyed were documented.

Validity of Instrument

The questionnaire used was critically evaluated by an expert in pharmacy, public health, statistics and research methodology.

Reliability of Instruments

This was determined by a test-retest method. Ten patients were randomly selected at the outpatient outlets and given the questionnaire to complete. These questionnaires were administered to same patients again after two weeks interval. The data was then subjected to Pearson's Product-Moment Correlation Test. The Pearson's Product-Moment Correlation reliability co-efficient of the instrument was found to be less than 1.

Blood Pressure Measurement

The documented blood pressure in the patients' case notes were used in the assessment of treatment goal. Systolic pressures ≤140 mmHg or diastolic pressure of ≤90 mmHg was categorized as controlled or achieved goal of therapy.

Data Analysis

The data collected from the administered questionnaire was analyzed using Microsoft excel and Statistical Package for Social Sciences (SPSS version 16.0). Descriptive statistics were computed such as frequencies, percentage, and measure of central tendency with emphasis on the mode.

RESULTS

The Socio-Demographic Characteristics

The socio-demographic characteristics showed the sex distribution, age distribution, educational background, and the marital status of the population (Table 1). Also, the distribution of the antihypertensive medication taken by the patients is presented in Table 2.

Table 1: Socio-demographic characteristics

Variables		Frequency (n)	Percentage (%)
Gender	Male	42	30.7
	Female	95	69.3
Age	<30	2	1.5
	30-40	9	6.6
	41-50	17	12.4
	51-64	42	30.7
	65 and above	67	48.9
Marital status	Single	0	0.0
	Separated	11	8.0
	Widowed	45	32.9
	Married	81	59.1
Educational Qualification	None	32	23.4

	Primary	46	33.6
	Secondary	29	21.2
	Tertiary	30	21.9
Occupation	Not working	19	13.9
	Working	118	86.1

Table 2: Distribution of anti-hypertensive medications used

Characteristics		Frequency (n)	Percentage (%)
Medication Combination	Single	13	9.5
	Double	72	52.5
	Triple	45	32.8
	Quadruple	6	4.4
	Quintuple	1	0.7
	Total	137	100
Distribution of antihypertensive usage by class	Calcium channel blockers (CCB)	94	28.9
	ACEIs	79	24.3
	Amiloride/HCT	77	23.7
	Other diuretics	28	8.6
	Central acting	20	6.2
	ARB	15	4.6
	Beta blockers	4	1.2
	Others	8	2.5
	Total	325	100
Types of double combinations of medication	ACEI/ARB & CCBs	60	32.6
	CCBs & Amiloride +HCT	59	32.1
	ACEI/ARB & Amiloride+HCT	44	23.9
	ACEI/ARB & other diuretics	20	10.9
	ACEI/ARB & B. Blockers	1	0.5
	Total	184	100.0

The different medication combinations for various comorbid conditions with hypertension are presented in Figure 1.
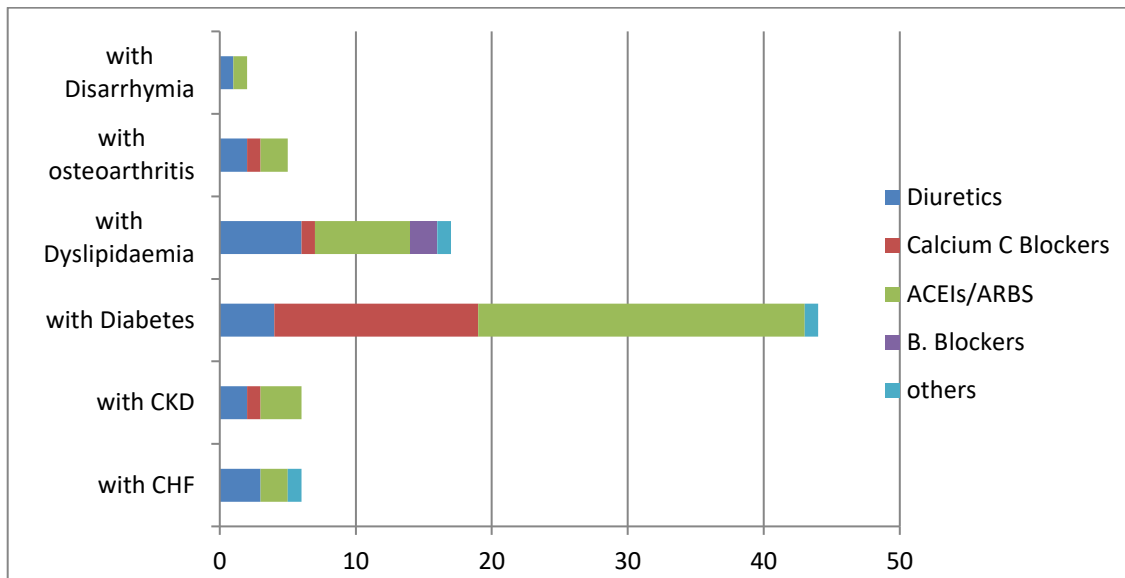

Fig 1: Usage of Medication combinations in co-morbid conditions

Note: CKD: Chronic Kidney Disease, CHF: Chronic Heart Failure

Patients' compliance to lifestyle modifications are presented in Table 3. One hundred and fifteen (83.9%) of the respondents eat fruits, vegetable and diet low in fat, while 111 (81.0%) have reduced their salt intake. Majority of the respondents obtained their medications from the hospital's pharmacy (81.6%). Their other practices as regard filling of prescription are depicted in Figure 2.

Table 3: Compliance to lifestyle modification

| Lifestyle Modification	Compliant n (%)	Non-compliant n (%)	Total
Eating diets rich in fruits, vegetables and low fat	115 (83.9)	22 (16.1)	137
Reducing salt intake	111 (81.0)	26 (29.0)	137
Engaging in regular physical activities	64 (46.7)	73 (54.4)	137
Alcohol consumption	57 (41.6)	80 (58.4)	137
Reduction in alcohol intake	47 (82.5)	10 (17.5)	57
Seen a dietician?	40 (29.2)	97 (70.8)	137
Following dietician instructions?	38 (27.3)	99 (72.3)	137
Missing of clinic appointment in the last 6 months	33 (24.1)	104 (75.1)	137
Working on weight reduction	29 (21.2)	108 (78.3)	137
Smoking	17 (12.4)	120 (87.6)	137
Stopped or making effort to quit smoking	16 (94.1)	1 (5.9)	17
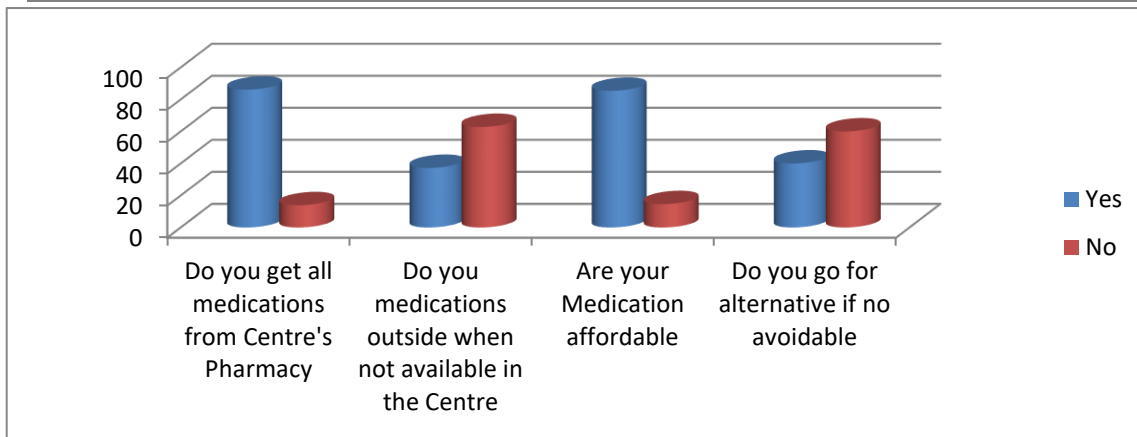
Fig 2: depicting response to source of patients' medications

The responses of patients to medication compliance showed that about a third (n=46; 33.6%) had stopped taking their medications. Majority (99.3%) of the patients knew how and when to take their medications and they (88.3%) also felt their medications were affordable. The responses of the patients to their level of compliance to medications are presented in Table 4. Reasons given by respondents for stopping medications are shown in Figure 3.

Table 4: Patients' response to adherence to medications

Questions	Yes n (%)	No n (%)	Total
Do you understand how and when to take your medication?	136 (99.3)	1 (0.7)	137
Are your Medications affordable?	121 (88.3)	16 (11.6)	137
Medications are taken as advised?	129 (94.2)	8 (5.8)	137
Any problem in taking medication?	40 (29.2)	93 (70.8)	137
Does your spouse or relative encourage with use of medication?	93 (67.9)	44 (32.1)	137
Do religious activities affect the use of medication?	15 (9.5)	122 (90.5)	137
Does your work affect use of medication?	6 (4.4)	131 (95.6)	137
Does your eating pattern affect use of medication?	15 (10.9)	122 (89.1)	137
Did you report problem encountered to Pharmacist or Doctor?	27 (19.7)	110 (80.3)	137

The responses of patients to medication compliance showed that about a third (33.6%, n=46) had stopped taking their medications.
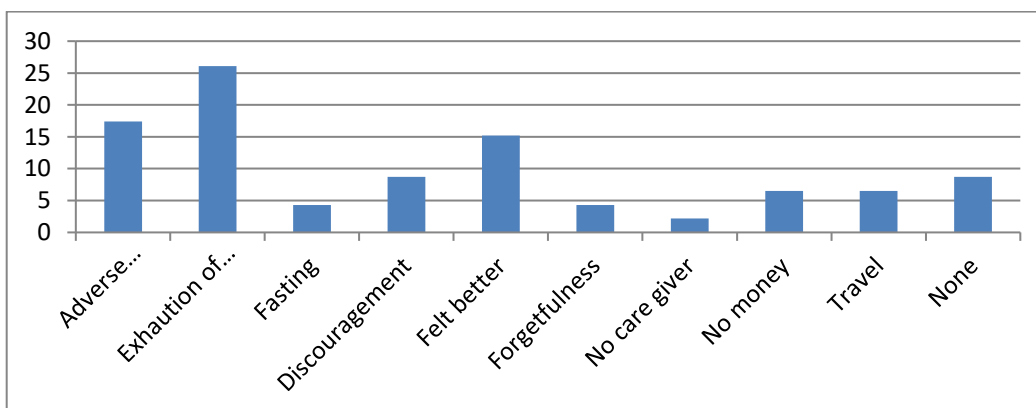

Fig 3: Reasons given by patients for stopping medications

Overall, only a little above half (51.1%) of the respondents had reached target blood pressure goal while the remaining were not at goal as at the time of the study. Figure 4 depicts the clinical outcome of blood pressure management according to co-morbid conditions the patients had with hypertension. Only those with dysrhythmias and chronic cardiac failure as co-morbidity had achieved the blood pressure goal.
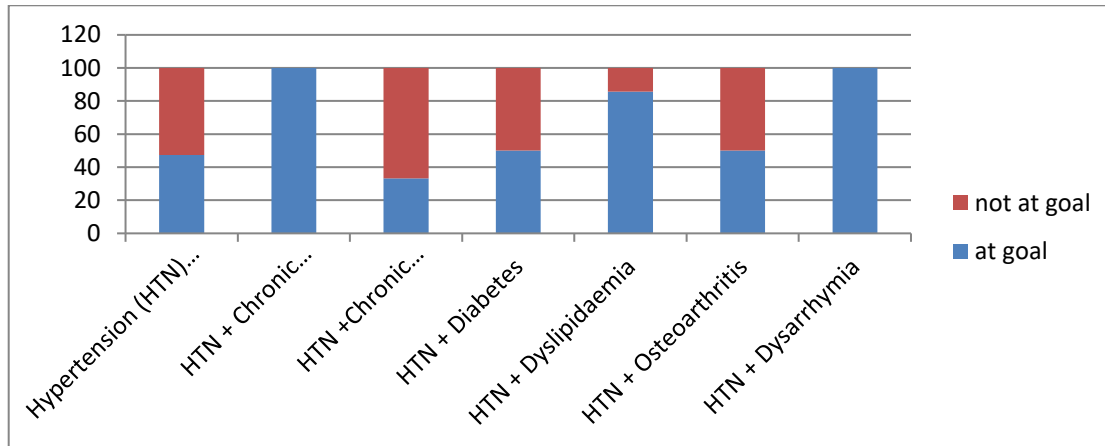

Fig 4: Clinical Outcome of Management of Hypertension and comorbidities

DISCUSSION

This study evaluated the outcome of drug therapy in hypertensive patients attending the outpatient clinics at the Federal Medical Center, Owo, Ondo State. In this study, it was observed that there were more females (69.3%) than males (30.7%). The proportion of gender observed in this study rather than being a chance, may be a reflection of the greater number of women coming to the hospital for treatment. Several studies in the literature reported a higher prevalence of hypertension among men than women.[13] However, more women are aware of their hypertensive state and more are on treatment than their men counterpart.[13,14] This study had a larger proportion of older adults, an age group where the incidence of hypertension is ordinarily expected; as sustained high blood pressure has age as a risk factor.[15] The majority of the hypertensive patients in this study are from 51 years and above. It has been established that advancing age is a risk for cardiovascular diseases.[15]

More than 90% of the patients were prescribed more than one medication during their last visit. Most patients went home with more than two medications; the high prescription rate of combination therapy may be due to baseline blood pressure before commencement of pharmacotherapy or the presence of co-morbid disease condition.[16,17] A study in Iran found that polypharmacy was common among patients with hypertension.[18] Another study in Europe also reported high prevalence of polypharmacy among hypertensive patients.[19]

More than three-quarters of the patients were prescribed diuretics, with Amiloride plus Hydrochlorothiazide (Moduretics®) alone taken by more than half of the patients. High use of diuretics has also been reported in the literature.[19,20] Diuretics are reported to be superior to alpha-blockers, calcium channel blockers and angiotensin converting enzymes inhibitors in preventing one or more form of cardiovascular diseases, including stroke and heart failure as reported in The ALLHAT 2002.[21] Also the cost of diuretics, their efficacy in blacks and synergistic effect with other medications give this class of drugs further advantage. On the contrary, CCBs were the most commonly prescribed monotherapy among hypertensive Indians.[22]

The use of calcium channel blockers and angiotensin converting enzymes inhibitors or Angiotensin 2 receptor blockers was also common. The use of calcium channel blockers, mainly amlodipine and nifedipine, was also common probably because of the reported effectiveness of calcium channel blockers among African – Americas and the elderly while that of ACEI and ARBs are likely due to their documented benefits in co-morbid conditions like diabetes, renal disease and their increased efficacy in blacks when used in combination with diuretics. [23,24,25]

Out of 90.5% patients that were on more than one medication, 43% of them are on diuretics and angiotensin converting enzymes inhibitors/angiotensin receptor 2 antagonists of whom 32% were on amiloride plus

hydrochlorothiazide and ACEIs/ARBs. And calcium channels blockers and ACEIs/ARBs is the second most used combinations having 33% of the patients place on them as fixed dose combinations or as individual medications. Several studies have documented the long-term benefit of the use of combination blood pressure lowering medications in high risk population such as blacks who are usually at increased risk of morbidity and mortality from cerebrovascular and cardiovascular events.[26] Furthermore, black hypertensives have higher incidence of concurrent diseases such as left ventricular hypertrophy, congestive cardiac failure, Diabetes mellitus and chronic renal failure and have been shown to benefit from the use of blood pressure lowering medications combinations.[27]

The most prescribed medication combination, that is ACEIs/ARBs plus Diuretics is very effective among blacks. Douglas and Agoda (2003) reported that the addition of low dose diuretics to Lisinopril, an ACEI, achieved blood pressure control in 80 to 90 percent of black patients.[24] Other commonly used combination is calcium channel blockers and ACEIs/ARBs, the efficacy of which has been demonstrated in individuals with glucose intolerance or metabolic syndrome.[28] CCB alone or in combination with ACEI/ARB have been shown to be effective in lowering blood pressure and achieving goal of therapy.[29] This and their safety profile have popularized their use in the last two decades.

Co-morbidity with various disease conditions also affects medications combinations. The use of ACEIs/ARBs and calcium channel channels blocker was prevalent among patients with diabetes. Similarly, ACEIs/ARBs and diuretics were commonly prescribed for co-morbidity with dyslipidemia while ACEIs/ARBs and diuretics were common for co-morbidity with chronic kidney disease. Diuretics and ACEIs/ARBs were also common among patients with congestive heart failure coupled with hypertension. Moreover, all medications used by patients in co-morbidities are all in compliance with The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure of 2003 and Canadian Hypertension Education Program 2007.[30]

The lifestyle modifications observed by some of the patients include reduction in salt intake, taking of fruits, vegetables and low fat dairy products. However, majority paid less attention to exercise and weight reduction activities. This implies that there is poor adherence to lifestyle modification like acceptable exercise, following DASH as specified by JNC 7, weight reduction, and access to other professionals for adequate health information, education and follow-up. Studies in Ethiopia and Jordan reported poor adherence to lifestyle modifications among patients with hypertension while a high adherence level was reported among Ghanaians.[31,32,33,34]

About a third of the patients stopped their medication without medical advice because of adverse medication reactions, exhaustion of medications, feeling better or symptoms relief and some for no reason at all. Patients stopping their medication administration cannot have good outcomes.

Medications sourcing also contribute to non-adherence to medications. Some patients choose not to get medication outside the Centre when such is not available. The non-adherent rate of 33.6%, found in this study is lower than the value (67.7%) reported in Cameroon[35]. It is also a little lower than 45.2% reported in a meta-analysis among general hypertensive patients, although it is closer to 31.2% reported among hypertensive patients with other co-morbid conditions.[36]

Generally, regardless of co-morbidities, slightly above half of the patients (51.1%) are at therapeutic goal. This is likely due to poor adherence to lifestyle modification; regular exercise, diet according to DASH, and non-adherence to routine medications. However, based on co-morbidity, only patients with congestive heart failure and dysrhythmia were at therapeutic goal in accordance with JNC 7. However, those with co-morbid conditions such as chronic kidney disease (66.7%), diabetes (50.0%), osteoarthritis (50.0%) and dyslipidemia (14.3%) were not at therapeutic goal. Similarly, majority (52.6%) of hypertensive-only patients were not at goal.

CONCLUSION

Management of hypertension is complex and cumbersome and such require multi-disciplinary approach.

Majority of the participants used more than one medication in the management of hypertension. Diuretics especially hydrochlorothiazide and amiloride (Normorectic®) are the most widely used. In double combination of medications, Angiotensin Converting Enzymes inhibitors (ACEIs)/Angiotensin Receptor Antagonists (ARBs) with diuretics are frequently prescribed and used by patients. However, co-morbidities encountered includes; diabetes, chronic heart failure, and chronic kidney disease, patients used at least three blood pressure lowering medications in managing their conditions, and these medications followed the stipulated international recommendation for various co-morbidities

Various factors affect patients' adherence to medications like level of their knowledge of the disease and its management which leads some to stop medications without medical advice, non-compliance to exercise, diet, also religious activity like fasting to an extent also contributes to failure of therapy. Communication between patients and health workers involved in the management of their condition is not effective as few patients report back in case of adverse medication reactions or non-affordability of medications

Furthermore, the subjective response of patients to the care they are receiving is good. Despite this response, and compliance of prescriptions with Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) stipulation slightly more than half of the patients (51.1%) are at blood pressure goal.

Study Limitations

This study was limited to a tertiary hospital in Nigeria. Therefore, the findings may not be generalizable. Similarly, being a cross-sectional study, it cannot be used to establish causality. Also, it cannot be used to assess disease progression and it is subject to selection bias. All of these make it difficult to establish incidence and the generalizability of its findings.

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