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Research Article

Awareness Of Hypertension and Target Organ Damage Among Hypertensives Aged 30 Years and Above in A Nigerian Out-Patient Clinic

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ABSTRACT:

Background: There is a growing prevalence of systemic hypertension mediated organ damage. This study assessed the awareness of hypertension and target organ damage (TOD) among hypertensives aged 30 years and above attending the out-patient clinic of Dalhatu Araf Specialist Hospital, Lafia, Nigeria.

Methodology: This was a cross-sectional study. Systematic random sampling technique was used in selecting 261 respondents with systemic hypertension aged 30 years and above. Data was collected through interviewer administered questionnaire. They were screened for left ventricular hypertrophy, hypertensive retinopathy and kidney damage. Statistical package for Social Sciences version 23 was used to analyze the data. Statistical significance was set at $p< 0.05$

Results: The mean age of participants was 50.29 ± 12.73 years, with females making up 173 (66.3%) of the sample. Awareness of hypertension was 36.0% (94), while awareness of target organ damage was 42.1% (110). Hypertension had been diagnosed in 40.6% (106) of participants for less than five years. Additionally, 1.1% (3) smoked cigarettes, 2.3% (6) consumed significant amounts of alcohol, and 28.0% (73) were obese. The prevalence of microalbuminuria and target organ damage was 43.3% (113) and 77% (201), respectively. No significant association was found between awareness of hypertension and the presence of left ventricular hypertrophy, kidney damage, or retinopathy, indicating that awareness alone does not effectively reduce the occurrence of these complications.

Conclusion: Awareness of systemic hypertension and target organ damage is still low. There is urgent need for primary care physicians to raise awareness by increasing effort at giving proper education and counselling on the complications of systemic hypertension, importance of blood pressure control and adherence to treatment plan. This study can also serve as a basis for longitudinal studies on the relationship between awareness of systemic hypertension and development of target organ damage in patients with systemic hypertension.

Keywords: *Awareness, hypertension, target organ damage, left ventricular hypertrophy, microalbuminuria, retinopathy*

INTRODUCTION

Hypertension is a significant public health issue and a leading modifiable risk factor for cardiovascular diseases. Affecting an estimated 1.28 billion adults globally, nearly half remain undiagnosed or inadequately treated (WHO, 2021). Uncontrolled hypertension contributes to target organ damage (TOD), including cerebrovascular, cardiac, renal, and retinal complications, thereby exacerbating disease burden and healthcare costs.

Globally, the prevalence of hypertension continues to rise, with urbanization, sedentary lifestyles, and dietary shifts toward processed foods rich in sodium and saturated fats being notable contributors. Despite the availability of effective antihypertensive medications and management guidelines, many Nigerians remain unaware of their hypertensive status, and many who are aware fail to adhere to prescribed treatments, exacerbating the burden of TOD. In West Africa, Nigeria stands out with a prevalence rate ranging from 20% to 30%,

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depending on geographic location and socioeconomic factors (Oguanuo et al., 2020). For instance, a recent nationwide study reported a prevalence of 38.1% of hypertension in Nigeria, with marked variations across different geopolitical zones. The prevalence was highest in the South-East region (52.8%) and lowest in the North-Central region (20.9%) (Odili et al., 2020). Notably, the prevalence of hypertension increased from 6.8% among individuals under 30 years to 63.0% among those aged 70 years and above (Odili et al., 2020), highlighting the growing burden of this condition.

Hypertension, or high blood pressure (BP), is defined as a consistent elevation of systolic blood pressure (SBP) above 140 mmHg or diastolic blood pressure (DBP) above 90 mmHg, measured on at least two separate occasions. Target organ damage refers to structural and functional changes in vital organs, such as the heart, kidneys, eyes, and brain, due to prolonged exposure to high blood pressure (Williams et al., 2018). These alterations can significantly impair quality of life and increase the risk of premature death if left unchecked (Mancia et al., 2020).

To define TOD, the European Society of Cardiology/European Society of Hypertension (ESH-ESC) criteria use pulse pressure in the aged more than 60 mmHg, ankle-brachial index ratio less than 0.9, microalbuminuria using urine albumin-creatinine ratio (between 30 - 300 mg/g), glomerular filtration rate less than 60ml/min/1.73m2 and left ventricular hypertrophy by electrocardiogram or echocardiography (William et al., 2019). In addition, the 2020 International Society of Hypertension GLOBAL-Hypertension-practice guidelines defines hypertensive mediated organ damage (HMOD) as the structural or functional alteration of the arterial vasculature and/or the organs it supplies, that is caused by elevated blood pressure (Unger et al., 2020).

Various studies have highlighted the prevalence of target organ damage (TOD) in hypertensive patients across different regions. In Finland, a study observed a 22% prevalence of TOD among individuals with undiagnosed hypertension, though this was likely influenced by selection bias, as patients with risk factors were excluded (Korhonen et al., 2020). In Greece, a higher prevalence of 72.7% was reported among newly diagnosed hypertensive patients, with the specialized care provided at a tertiary center likely contributing to the high rate (Triantafyllou et al., 2020). Similarly, in Ethiopia, a study found a 40.3% prevalence of TOD, with non-adherence to clinical guidelines and the presence of co-morbidities being significant predictors (Abegaz et al., 2021). In Togo, the subclinical and clinical prevalence of TOD was 48.4% and 27.7% respectively and was attributed to socio-economic challenges such as limited access to healthcare and financial difficulties (Tcherou et al., 2020). A rural study in Nigeria revealed a 43.1% prevalence of TOD, emphasizing the critical need for aggressive management of hypertension, particularly for patients with high blood pressure (Oladapo et al., 2012). These studies collectively underline the varying prevalence of TOD in different settings, stressing the importance of early detection and timely intervention to mitigate complications from hypertension. Studies have shown that up to 60% of hypertensive patients exhibit signs of left ventricular hypertrophy (LVH), while renal impairment and retinal damage are also prevalent (Akinlua et al., 2016).

A growing concern is the increasing prevalence of early-onset hypertension, especially in low- and middle-income countries like Nigeria, where hypertension is being diagnosed in individuals under the age of 40 (Adeloye et al., 2015). Early detection and management of hypertension are crucial, as prolonged exposure to elevated blood pressure can lead to irreversible TOD, even in relatively young individuals. Furthermore, a significant knowledge gap exists in understanding how well patients comprehend the connection between their blood pressure readings and the long-term risks posed to their vital organs. Addressing this gap is essential for promoting timely interventions and reducing the incidence of preventable complications.

Despite the rising prevalence of hypertension in Nigeria, there remains a significant gap in awareness, treatment, and control. The awareness of hypertension approaches 73% in the United States while in Nigeria only 30% are aware at the time of diagnosis (Adeloye et al., 2015). Odili et al reports that only about 60% of hypertensive individuals in Nigeria are aware of their condition, and even fewer

are treated and controlled (Odili et al., 2020). Other studies in Nigeria reported low awareness ranging from 14.2% to 30% (Oga et al., 2012). Due to low awareness of hypertension in Nigeria, hypertensive TOD is often what brings patients to healthcare facilities (Oga et al., 2012). This gap in awareness and management is particularly concerning given the strong association between uncontrolled hypertension and TOD. As such, it is imperative to design public health strategies to enhance awareness of hypertension and its long-term effects.

This study has the potential to contribute valuable insights into hypertension awareness among young adults in Nigeria. While much existing research focuses on older populations, younger cohorts remain equally vulnerable and are often overlooked. This research aligns with the global health goal outlined in the Sustainable Development Goal (SDG) 3.4, which seeks to reduce premature mortality from NCDs by one-third by 2030 (United Nations, 2015).

The current study aimed to bridge this gap by assessing the awareness of hypertension and its associated TOD among hypertensive individuals aged 30 years and above. By understanding the relationship between hypertension awareness and TOD, we can identify key areas for intervention and develop strategies to improve hypertension management and reduce the incidence of severe complications. This study is particularly relevant in the context of Nigeria, where the burden of hypertension is high, and public health resources are limited

MATERIALS AND METHODS

Study area

This research was conducted in the general outpatient clinic of Dalhatu Araf Specialist Hospital (DASH) Lafia, Nasarawa State. Nasarawa is a state in North central Nigeria. Dalhatu Araf Specialist Hospital Lafia is a state-owned hospital which provides three levels of health care services.

Study population

The study population was made up of hypertensive patients aged 30 years and above who had been on treatment for at least three months.

Inclusion criteria

Newly diagnosed with primary hypertension (≥30 years) using JNC VII who had been on treatment for at least three months.

Exclusion criteria

1.Patients with hypertension who have co-morbidities such as diabetes mellitus.

2. Pregnant women.

3.Patients with secondary hypertension.

4.Those who are too ill to take part in the study.

5.Patients who engage in strenuous exercise which is known to cause exercise-induced albuminuria.

Sample size determination

The minimum sample size required was calculated using the Kish Leslie formula

$N = [Z2pq]/d2$

Where

N = Minimum sample size

Z = The standard normal deviate, taken to be 1.96 for this study which corresponds to 95% confidence level.

P = The Proportion in the target population estimated to have microalbuminuria among hypertensive patients in another study in Nsukka by Ogbu et al, Nigeria, (22%) (Ogbu et al., 2013) = 0.22

q = I – p (proportion in the target population not having microalbuminuria) (that is 1 – 0.22) = 0.78

d = desired precision (degree of accuracy) of 5% set for this study = 0.05

$$N = \frac{1.962 \times 0.78 \times 0.22}{0.052} = 263.687424 \approx\approx 264$$

Since the total number of patients is < 10000, the sample size was adjusted using the formulae

nf = n/1+(n)/N; (Singh et al., 2013).

where

nf = is the final sample size when study population (or sample frame) is < 10000

n = is the sample size when the population is > 10000 (i.e., 264)

N = the estimate of the study population for the period of study (2160 hypertensives aged 30 years and above were expected to visit within a period of three months).

Therefore nf = 264/1 + 264/2160 ≈ 235 which is the final sample size for population < 10000 for this study.

However, to compensate for anticipated attrition, non-response and missing questionnaires, adjustment was made for the sample size which was calculated from the formula, (Singh et al, 2013).

Ns = N/r; where

N = calculated sample size

r = anticipated response rate (90% (0.9) anticipated).

Therefore,

Ns = 235/0.9 = 261.1 ≈ 261. Therefore, a total of 261 participants were recruited.

Sampling technique, study instruments and protocol

A systematic random sampling method was employed. An interviewer-administered questionnaire adapted from the World Health Organization questionnaire for hypertensive patients was used (WHO). The questionnaire covered socio-demographic attributes, duration of diagnosis of hypertension, duration of taking medication, type of medications taken, alcohol intake and tobacco smoking. Anthropometric indices, blood pressure measurements and other appropriate investigations (as outlined below) were conducted and recorded. Responses to questions on the knowledge and awareness of hypertension and target organ damage were recorded.

Weight and height measurement: - The Stadiometer incorporated with a weighing scale (ZT-120 Dial Body Scale) was used. The calibration was adjusted to the zero-mark and the scale placed on a horizontal surface. Subjects were requested to stand with both feet on the centre of the scales platform without shoes, headgear and with empty pockets to ensure they did not carry any additional weights. The weight was taken three times and the average recorded to the nearest 0.1 kilogram (kg) (NHNES, 2017).

Measurement of the height and weight were done simultaneously. The occiput, shoulders, gluteus, calves and heels were against the vertical surface of the Stadiometer. Subjects were requested to look straight ahead with the chin not tucked or stretched too far. The head piece of the Stadiometer was then brought down to touch the crown of the head so that the hair (if present) was compressed. The height was measured three times and the average recorded to the nearest 0.1cm (NHNES, 2017). The body mass index (BMI) was calculated using the formula: BMI = weight (Kg)/height2 (m2). Participants were classified using the World Health Organization classification for obesity into underweight (BMI< 18.5kg/m2), normal (BMI of 18.5 to 24.9kg/m2), overweight (BMI of 25 to 29.9kg/m2) and Obese (BMI ≥ 30kg/m2) (Abdelaal, 2017).

Blood pressure measurement: The Accoson® mercury sphygmomanometer and a 3M Littman® stethoscope were employed. The subjects were requested to sit down and relax for approximately five minutes. Excess or tight-fitting clothing was removed to avoid interference with the cuff or restriction of blood flow. The subjects sat upright with their upper arm placed so that it was levelled with the heart, and feet flat on the floor. The cuff covered two third of the upper arm and was inflated to about 30mmHg above the palpated systolic pressure. The brachial artery was identified and the stethoscope placed gently over it at the point of highest pulsation and the cuff deflated at a rate of 2 - 3mmHg per second. The first and fifth korotkoff sounds was used to note the systolic and diastolic blood pressures respectively. Two readings taken two minutes apart were obtained and the mean value recorded. The subjects were classified using the JNC VII criteria.

Random blood glucose: This was measured in the side laboratory using the Accu-Chek glucometer.

Electrocardiogram: The electrocardiogram (ECG) machine (3-RAY ECG machine) was used and the

Araoye ECG-based criteria was employed to determine LVH. The Araoye Criteria: R-wave in lead-1 >12 mm, or S-wave in V2 + R-wave in V6 ≥ 35 mm in females (40 mm in males) with or without T-wave inversion or flattening in V5 and/ or V6 (Ale et al., 2014).

The Araoye criteria has been shown to correlate better with echocardiographic-based LVH in Nigerians (Akinwusi et al., 2017). A standard resting 12 lead ECG was conducted by the Cardiologist for all subjects. The safety of the procedure was explained to them to allay anxiety. The upper clothing was removed to expose the chest. Lead placement was according to the recommendation by the American Heart Association. The paper speed was set at 25mm/second with a calibration of 10 millivolts/mm.

Assessment of renal damage: (Formula-based Estimated GFR): Kidney damage was assessed using serum creatinine and was calculated using the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI). Kidney damage was defined as eGFR less than 60ml/min/1.73m2 (Wyss et al., 2020).

Ophthalmoscopy: The Gowllands ophthalmoscope was used to perform direct fundoscopy. The findings were documented using the Wagener-Keith grading.

Urinalysis: A mid-stream spot urine, collected in a universal bottle was used. A dipstick was done with Combi 9 urinalysis strip for the presence of protein, glucose, blood and nitrite to screen the participants. If all were absent, microalbuminuria quantification was done by determining the urine albumin creatinine ratio (uACR). Urine specimen was sent to the laboratory within an hour of collection.

Urine Albumin Creatinine Ratio: This was done using semi-automated immunofluorescent assay machine, i-chroma II reader. The ratio was calculated manually.

Statistical analysis

Data was entered into the Statistical Package for Social Science (SPSS Version 23). Descriptive statistics such as frequencies, percentages, mean and standard deviation were used to present continuous variables. Chi Square test was used to analyze association between two categorical variables. Logistic regression analysis was used to measure and predict associations between variables. All statistical values were set at 5% level of significance ($P < 0.05$).

Ethical clearance and approval

Ethical clearance was sought and obtained from Dalhatu Araf Specialist Hospital Research ethics committee (DASH/L/ADM/0340). Informed written consent was obtained from the participants. Research respondents participated voluntarily and without coercion. Patients who did not give consent were also given adequate care, treatment and follow-up appointments.

Funding

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RESULTS:

1. Sociodemographic characteristics of the respondents

Table 1: Sociodemographic characteristics of the respondents

Socio-demographic characteristics	Frequency(n=)	Percent
Age category (in years)		
30-39	50	19.2
40-49	67	25.7
50-59	77	29.5
60-69	48	18.4

70-79	12	4.5
80-89	6	2.3
90-99	1	0.4
Mean ±(SD)= 50.29 ±12.73		
Gender		
Male	88	33.7
Female	173	66.3
Marital status		
Single	5	1.9
Married	238	91.2
Divorced	2	0.8
Widowed	16	6.1
Level of education		
None	124	47.5
Primary	46	17.6
Secondary	28	10.7
Tertiary	46	17.6
Informal	17	6.6
Employment status		
Employed	92	35.2
Unemployed	169	64.8
Ethnicity		
Hausa	36	13.8
Eggon	70	26.8
Koro	19	7.5
Kanuri/Beri Beri	23	8.8
Alago	34	13.0
Mada	3	1.1
Agatu	9	3.4
Kambari	6	2.3
Fulani	9	3.4
Others*	42	16.1
Migili	4	1.5
Gwandara	6	2.3
Religion		
Christianity	78	29.9
Islam	182	69.7
Traditional	1	0.4

Average monthly income in Naira		
Less than 18,000	9	3.4
18,000-58,999	27	10.3
59,000-99,999	36	13.8
100,000 and above	20	7.7
Unemployed	169	64.8

Others- Tiv, Idoma, Igbo, Yoruba etc.

The average age of participants in the study was 50.29 years with a standard deviation of 12.73 years. Majority of the respondents were aged 50-59years (29.5%, n=77) and the least were aged, 90-99years (0.4%, n=1). Majority, 173(66.3%), were females and more than half, 238(91.2%), were married while close to half, 124(47.5%) had no education. Majority of the study participants, 169(64.8%), were unemployed.

2. Relevant hypertension history of the respondents

Table 2: Relevant hypertension history of the respondents

Variable	Frequency(n=261)	Percent
Taking medication for hypertension		
Yes	256	98.1
No	5	1.9
Duration of taking medication		
3months-11months	44	16.9
1year-10years	160	61.3
11years-20years	42	16.1
21years-30years	15	5.7
Types of antihypertensives		
No medication	11	4.2
Lifestyle modification alone	1	0.4
Calcium channel blocker alone (CCB)	34	13.0
ACEI alone	15	5.7
Centrally Acting alone	5	1.9
Loop diuretic alone	1	0.4
ACEI + CCB	67	25.7
ACEI + Centrally acting	5	1.9
ACEI + beta-blocker	2	0.8
Loop diuretic + Potassium sparing	12	4.6
CCB + Centrally Acting	14	5.4
CCB + Loop diuretic	9	3.4
Centrally Acting + Loop diuretic	1	0.4

CCB + Loop diuretic + Potassium sparing	49	18.8
ACEI + loop diuretic + Potassium sparing	31	11.8
ACEI + CCB + beta-blocker	1	0.4
ACEI + CCB + Centrally acting	2	0.8
Loop diuretic + Potassium sparing + beta-blocker	1	0.4
Current smoking status		
Yes	3	1.1
No	258	98.9
Current alcohol status		
Yes	6	2.3
No	255	97.7
Category of alcohol intake		
Significant	4	1.5
Not significant	257	98.5
Duration of diagnosis		
Less than 5 years	106	40.6
More than 5 years	155	59.4
Family history of hypertension		
Yes	109	41.8
No	38	14.6
I do not know	114	43.6

Majority, 256(98.1%), were on medication for hypertension while 160(61.3%) had been on medication between 1 and 10 years. Few of the participants, 3(1.1%), smoked cigarette, 6(2.3%) ingested alcohol out of which 4(1.5%) ingested a significant volume of alcohol. One hundred and six, (n=106; 40.6%), respondents had hypertension for less than five years. Sixty-seven participants used a combination of CCB and ACEI (n=67, 25.7%) and 114 (43.6%), did not know whether they had a family history of hypertension

3. Bio-physical examination and assessment of target organ damage.

Table 3: Bio-physical examination and assessment of target organ damage.

Variable	Frequency	Percent
Weight: Mean ± SD		
71.0 ±15.2		
Height: Mean ± SD		
1.61 ± 0.08		
Body Mass Index: Mean ± SD		
27.6 ± 6.1		
Underweight	5	1.9

Normal	101	38.7
Overweight	82	31.4
Obesity	73	28.0
Systolic BP: Mean ± SD		
155.95 ± 17.7		
Controlled systolic hypertension	22	8.4
Stage 1	121	46.4
Stage 2	118	45.2
Diastolic BP: Mean ± SD		
95.48 ± 12.49		
Controlled diastolic hypertension	56	21.5
Stage 1	76	29.1
Stage 2	129	49.4
Category of hypertension/JNC 7 classification		
Controlled hypertension	15	5.7
Stage I	83	31.8
Stage II	163	62.5
Target organ damage		
Present	201	77
Not present	60	23
Left ventricular hypertrophy		
Not present	193	73.9
Present	68	26.1
Albuminuria		
None	148	56.7
Microalbuminuria	113	43.3
Kidney damage		
Present	58	22.2
Absent	203	77.8
Retinopathy		
Absent	77	29.5
Present	184	70.5
Grades of retinopathy		
Normal	77	29.5
Grade 1	45	17.2
Grade 2	83	31.8
Grade 3	45	17.2
Grade 4	11	4.3

A breakdown down of BMI revealed; underweight 5(1.9%), normal weight 101(38.7%), overweight 82(31.4%) and obesity 73(28.0%). Target organ damage was found in 201(77%) of respondents while 60(23%) had no target organ damage. Concerning retinopathy, 45(17.2%) had Grade 1 retinopathy, 83(31.8%) had grade 2 retinopathy, 45(17.2%) had Grade 3 retinopathy and 11(4.3%) had Grade 4 retinopathy. Microalbuminuria was assessed with 52.5% (n=148) of the respondents having normal uACR measurements (<30mg/g) while microalbuminuria (30-300mg/g) was found in 113(43.3%) of the participants. Kidney damage defined as eGFR less than 60ml/min/1.73m^2 was assessed; 58(22.2%) respondents had kidney damage. One-hundred and ninety-three (73.9%) participants had LVH.

4. Knowledge and awareness of hypertension and target organ damage.

Table 4: Knowledge and awareness of hypertension and target organ damage.

Variable	Frequency	Percent
Knowledge of hypertension		
Screening	51	19.5
Emergency services	42	16.1
Private	1	0.4
Had no idea	167	64
Awareness of hypertension		
Aware	94	36.0
Not aware	167	64.0
Duration of diagnosis		
Less than 5 years	106	40.6
More than 5 years	155	59.4
Place of first diagnosis		
Secondary care facility	196	75.1
Primary care facility	25	9.6
Tertiary care facility	27	10.3
Others/Private	13	5.0
Status of facility		
Public	222	85.1
Private	27	10.3
Non-governmental	12	4.6
Place of regular routine follow up		
Tertiary	185	70.9
Nearby hospital	55	21.1
Secondary hospital	11	4.2
Primary health center	6	2.3
No routine visits	4	1.5
Fees for consultation/medications		
Paid nothing	10	3.8
Paid part	82	31.4
Paid fully	157	60.2
Don't know whether part or full	9	3.4
Don't know whether fees were paid	3	1.2
Education on blood pressure control		
Yes	261	100
No	0	0
Frequency of routine blood Pressure check		

As advised by doctor	128	49.0
When I don't feel well	46	17.6
Both above	85	32.6
No routine checks	2	0.8
Besides PHC, how else do you check BP		
Tertiary care	201	77.0
Secondary care	21	8.0
Self	1	0.4
Family member/neighbor	3	1.1
Nearby Pharmacy	31	11.9
Only PHC	2	0.8
Private facility	1	0.4
Don't check	1	0.4
Status of Blood Pressure in the past 12 months		
Better	48	18.4
Same	5	1.9
Worse	18	6.9
I don't know	185	70.9
Not checked	5	1.9
Hospital admission over the past 12 months		
No	234	89.7
Yes	27	10.3
Knowledge of reason for admission		
Yes	27	10.3
No	234	89.7
Was admission related to hypertension?		
Yes	16	6.1
No	8	3.1
I don't know	3	1.1
No response	234	89.7
Status of BP control while on admission		
Controlled	16	6.1
Don't know	11	4.2
No response	234	89.7
Self-reported complications of hypertension?		
No	7	2.7
Stroke	7	2.7
Cardiovascular	2	0.8
I don't know	245	93.8
Have you been prescribed medication?		
Yes	259	99.2
No	2	0.8
Medication adherence		
Yes	95	36.4
No	166	63.6
Number of medications per day		
None	12	4.6
One	53	20.3
Two	120	45.0
Three	76	29.1
Reasons for non-adherence		
Cost of medication	28	10.7
Aversion to medications	4	1.5
Takes medication when needed	37	14.2
Side effects	26	10.0
Prefer alternative medicine	11	4.2
Forgetfulness	45	17.2

Do not know	7	2.7
High pill burden	6	2.3
Others*	2	0.8
Adhered to medications	95	36.4
Awareness of TOD		
Aware	110	42.1
Not aware	151	57.9
Was source of awareness from a health personnel		
Yes		
No	90	34.5
Not aware	20	7.6
Have you been told stroke is related to hypertension?	151	57.9
Yes		
No	112	42.9
	149	57.1

**Thought they no longer had hypertension*

Assessment of knowledge of hypertension among the participants revealed that 51(19.5%) came to know their hypertension status during screening programs, 42(16.1%) during emergency service, 1(0.4%) private consultation while majority, 167(64.0%) had no idea. Majority, 155(59.4%), had been diagnosed for more than 5 years while 106(40.6%) had been diagnosed for less than 5 years. All were told to control their blood pressure, with majority, 128(49.0%), being told during a routine follow up with a doctor.

On awareness of TOD, 110 (42.1%) were aware of complications of hypertension and 90(34.5%) reported being informed by a health personnel.

5. Relationship between knowledge of hypertension and Target Organ Damage among the respondents

Table 5: Relationship between knowledge of hypertension and TOD in the respondents.

Variables	Knowledge of hypertension		Statistical values		
	Aware	Not aware	Chi square	Df	p-value
LVH			1.551	1	0.213
Absent	66(34.2%)	127(65.8%)			
Present	29(42.6%)	39(57.4%)			
Kidney damage			0.76	1	0.783
Absent	73(36.0%)	130(64.0%)			
Present	22(37.9%)	36(62.1%)			
Retinopathy			1.256	1	0.262
Absent	32(41.6%)	45(58.4%)			
Present	63(34.2%)	121(65.8%)			

Table 5 shows bivariate analysis between awareness of hypertension and development of target organ damage among the participants. There was no significant relationship between knowledge of hypertension and LVH ($P = 0.213$), kidney damage

(P = 0.783) and retinopathy (P =0.262) among the participants.

DISCUSSION

The present study provides an evaluation of the awareness of hypertension and target organ damage (TOD) in patients aged 30 years and above with systemic hypertension.

The sociodemographic characteristics outlined in Table 1 gives insights into the composition of the study population. The predominance of middle-aged respondents (mean age: 50.29 ±12.73years) is particularly relevant to hypertension studies, as hypertension is more prevalent in middle-aged and older populations (Jiang et al., 2019). This trend is further supported by studies conducted in Nigeria and other African countries, where systemic hypertension is notably more prevalent among individuals aged 40 and above (Alhassan et al., 2020; Nganou et al., 2020).

A significant gender disparity was observed, with females representing 66.3% of the respondents. This higher female representation aligns with findings from similar studies conducted in Nigeria and India, where women tend to exhibit better health-seeking behaviour and are more likely to engage in preventive healthcare (Oladapo et al., 2010; Rukmini et al., 2018). The high unemployment rate (64.8%) within this cohort raises concerns, particularly since economic instability has been shown to exacerbate health outcomes, including hypertension (Akinmoladun et al., 2020). Furthermore, the educational profile, with a substantial portion of respondents having limited formal education, underscores the challenges related to health literacy. This is crucial, as low health literacy can impede effective management of chronic conditions like hypertension (Bamidele et al., 2019). These findings align with broader literature, which stresses that inadequate education exacerbates the burden of hypertension in low- and middle-income countries (LMICs), where access to health information is limited (WHO, 2018). The income distribution, with a substantial proportion of respondents earning below 58,999 Naira per month or being unemployed, highlights significant socio-economic disparities. These disparities are well-documented risk factors for hypertension, as lower socio-economic status is linked to limited access to healthcare, poor nutrition, and chronic stress, all of which exacerbate the risk of hypertension and related complications (Jiang et al., 2019).

In this study, 98.1% of respondents were on medication for hypertension. This finding is consistent with the experiences of hypertensive populations in other African countries (Mills et al., 2020). The use of long-term medication usually leads to adherence challenge (Mills et al., 2020). The medication regimens reported, including ACE inhibitors and calcium channel blockers, align with global best practices for hypertension management. The use of combination therapy, especially in cases where monotherapy fails to adequately control blood pressure, is in line with recommendations from the American College of Cardiology (Sharma et al., 2021). The prevalence of polypharmacy reflects the severity of hypertension in this population and the complexity of its management.

The lifestyle factors of smoking and alcohol consumption merit attention. Although smoking was less prevalent, with 1.9% of respondents identified as smokers, the recorded 40.6% alcohol consumption rate is concerning. Excessive alcohol intake is a well-established risk factor for hypertension and its complications, including organ damage (Olaide & Ezeoke, 2020). This highlights

the need for targeted public health interventions focused on reducing alcohol consumption in populations with hypertension.

A family history of hypertension was reported by 41.8% of the respondents. Studies have consistently demonstrated that family history is a significant predictor of hypertension and its associated complications (Oluwole et al., 2019). This finding supports the need for early screening and preventive measures, particularly in individuals with a familial predisposition to the condition.

The chronicity of hypertension in this study (with 59.4% of respondents diagnosed for more than five years) reinforces the importance of ongoing monitoring and effective treatment strategies to prevent target organ damage. The long-term nature of hypertension, when poorly controlled, often leads to irreversible damage to vital organs, including the heart, kidneys, and brain (Akinmoladun et al., 2020). This shows the urgent need for comprehensive management strategies that include both pharmacological treatment and lifestyle modifications.

The prevalence of target organ damage (TOD) in this study was alarmingly high, with 77% of respondents reporting some form of TOD. This high prevalence is indicative of the inadequate control of hypertension in the population, where untreated or poorly managed hypertension often leads to complications such as left ventricular hypertrophy, kidney damage, and retinopathy. These findings are consistent with global studies, which have demonstrated that untreated hypertension is a leading cause of organ damage, especially in LMICs where access to healthcare and adherence to treatment is often suboptimal (Mills et al., 2020). In a cross-sectional study done across four reference tertiary care centres among 338 participants in Yaoundé by Nganou-Gnindjio et al, the authors assessed target organ damage in newly diagnosed hypertensives and reported a prevalence of TOD to be 84.6% (Nganou-Gnindjio et al., 2018) which is higher than that obtained in this study (77%). The reason for this difference may be linked to recruitment of hypertensive participants who presented in the emergency department, cardiology emergency and neurology emergency and were being managed for complications compared to this study that recruited stable patients. A low prevalence of 22.4% was reported among 3073 subjects in a cross-sectional study by Balla et al, who assessed systemic hypertension among rural population in sixteen rural communities in Sudan (Balla et al., 2014). The slow and insidious nature of hypertension-related organ damage underscores the need for early screening, proactive management, and regular monitoring to prevent the onset of irreversible complications.

The respondents' high average BMI (27.6 ± 6.1) is a significant factor in the prevalence of hypertension and its associated complications. Obesity is a well-known risk factor for the development of hypertension and target organ damage, particularly left ventricular hypertrophy and chronic kidney disease (Mills et al., 2020). These findings emphasize the importance of addressing modifiable risk factors, such as weight management, in the prevention and control of hypertension.

The blood pressure readings of the respondents revealed a high prevalence of stage 1 and stage 2 hypertension, with systolic and diastolic pressures exceeding the recommended thresholds. Uncontrolled hypertension is a primary risk factor for the development of target organ damage, including left ventricular hypertrophy, kidney

dysfunction, and retinopathy (Jiang et al., 2019). The high prevalence of left ventricular hypertrophy (77%) in this study is consistent with previous research, which has identified LVH as one of the earliest signs of hypertensive heart disease (Mills et al., 2020). Additionally, the presence of microalbuminuria in over 60% of respondents suggests that hypertension is causing early kidney damage, which could progress to chronic kidney disease if left untreated (Sharma et al., 2021).

Retinopathy, a well-established complication of chronic hypertension, was observed in a significant proportion of respondents, highlighting the importance of regular eye examinations for hypertensive patients. The early detection of retinopathy is crucial for preventing vision loss and other complications associated with poorly controlled hypertension (Akinmoladun et al., 2020). Despite the high awareness of hypertension (64%) and blood pressure control (89.7%) among the respondents, a significant proportion remained unaware of the connection between hypertension and its complications like TOD, including stroke and kidney damage as reported by another study (Omotoso et al., 2020). This lack of awareness shows the need for comprehensive public health campaigns aimed at educating individuals about the risks of untreated hypertension and the importance of early detection and regular monitoring. The high proportion of respondents who received education on blood pressure control (100%) is encouraging but 10.7% of respondents complained of high cost of medications. Addressing financial barriers is crucial for improving adherence to treatment and preventing the progression of target organ damage (Ogunbode & Akinmoladun, 2021).

The relationship between patients' awareness of hypertension and the prevalence of three key forms of target organ damage (TOD): Left Ventricular Hypertrophy (LVH), kidney damage, and retinopathy yielded no significant associations. However, some trends are worth noting and the need for further studies is seen. For LVH, 42.6% of those aware of hypertension had LVH compared to 34.2% without awareness, although this difference was not statistically significant. This suggests that even among those with awareness of hypertension, LVH may still develop, possibly due to poor adherence to treatment or late diagnosis, supporting findings by Tadic et al. (2021) that knowledge alone may not mitigate the structural cardiac impacts of prolonged hypertension if not matched by effective control (Tadic et al., 2021).

Concerning kidney damage, the pattern was nearly uniform across awareness levels: 37.9% of those aware of hypertension had kidney damage compared to 36% among the unaware. This finding aligns with Rodriguez et al. (2019), who reported that awareness without consistent monitoring and treatment does little to prevent progression to hypertensive nephropathy (Rodriguez et al., 2019).

For retinopathy, the distribution again showed no significant difference. Notably, a slightly higher proportion of aware individuals (41.6%) had no retinopathy compared to those not aware. However, this may not reflect a protective effect of awareness, as retinopathy development is often insidious and may be present even in asymptomatic stages, a concern reported in the findings of Wong & Mitchell (2018), who emphasized the importance of routine retinal screening in hypertensive individuals regardless of their perceived knowledge (Wong & Mitchell 2018). The absence of statistically significant associations in this study may suggest that mere awareness of hypertension does not necessarily translate into effective prevention of

TOD. This highlights the need for not just awareness campaigns, but sustained education, access to care, treatment adherence strategies and further studies.

CONCLUSION

This study conveys the critical need for improved awareness, early detection, and management of hypertension and its complications. The high prevalence of target organ damage in this population highlights the importance of timely intervention, regular monitoring, and adherence to treatment. Public health initiatives should focus on enhancing knowledge about the risks of untreated hypertension, promoting lifestyle modifications, and addressing financial barriers to healthcare. The findings also call for further research into the cost-effectiveness of microalbuminuria screening and its potential role in preventing the progression of target organ damage in hypertensive patients.

CONFLICT OF INTEREST: The authors declare that there is no conflict of interest in the research

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