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Comparative assessment of prevalence and treatment modalities for dyslipidemia amongst hypertensive and diabetic patients in a referral hospital in Nnewi, South East Nigeria

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Abstract: **Introduction: Dyslipidemia, characterized by elevated serum lipids, poses significant risks for hypertensive and diabetic patients. This study assessed the prevalence and treatment modalities for dyslipidemia among these patients in a referral hospital in Nnewi, Southeast Nigeria.**

Methodology: A comparative cross-sectional study was carried out amongst 50 hypertensive and 50 diabetic patients, recruited consecutively from patients accessing care from a referral hospital in Nnewi, Southeast Nigeria. Data on demographics, prevalence, and treatment of dyslipidemia were collected and analyzed using SPSS version 22 software (2013)

Results: The mean ages were 57.32 years for hypertensives and 59.54 years for diabetics.The prevalence of Dyslipidemia was 53.5% among the hypertensives and 46.5% among the diabetics. The difference was not statistically significant (p = 0.545). Statins were the most commonly used treatment modality among both groups. Fruit and vegetable consumption was significantly associated with both the hypertensive and diabetic conditions (p = 0.003), while smoking or alcohol were not (p = 0.695; p = 0.123). Healthcare visits were more frequent among the hypertensives than the diabetics (68% vs. 32%, p = 0.05).

Conclusion: Statistically significant differences did not exist in the prevalence and treatment modalities for hypertension and diabetes in this study. There is therefore a need for improved lifestyle modifications and healthcare access among the respondents.

Keywords: **Dyslipidemia, Hypertension, Diabetes, care seeking, Lifestyle, Nnewi, Anambra, Nigeria.**

1. INTRODUCTION

Dyslipidemia is characterized by abnormal levels of lipids such as total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), triglycerides (TG), and high-density lipoprotein (HDL-C). It is a key risk factor for atherosclerotic cardiovascular disease (ASCVD), which includes coronary artery disease, cerebrovascular disease, and peripheral artery disease. Dyslipidemia can be primary (genetic) or secondary to lifestyle and other modifiable factors, such as diet, alcohol

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consumption, and certain diseases like diabetes. Medications such as statins are often prescribed to manage dyslipidemia, as they inhibit cholesterol production. Statins are divided into high- and moderate-intensity, depending on patient risk and lipid levels. For instance, high-intensity statins are recommended for patients with LDL-C ≥ 190 mg/dL or those with ASCVD, while moderate-intensity statins are used for lower-risk patients.

Dyslipidemia is a common co-morbidity among diabetics, contributing to increased cardiovascular risk even before hyperglycemia becomes evident. The prevalence of dyslipidemia in type 2 diabetes is as high as 63.1%, with higher rates observed in males (Mehta *et al.*, 2021). In Nigeria, findings from research indicates that dyslipidemia affects 60% to 89% of diabetics, with low HDL-C and high LDL-C being common (Oguejiofor, Onwukwe, and Odenigbo, 2012). Hypertension, which often coexists with dyslipidemia, is also a major public health concern in Nigeria, where it is highly prevalent with about 58.9% (Akintunde, Ayodele, Akinwusi, and Opadijo, 2010).

Dyslipidemia, common in hypertensive and diabetic patients, exacerbates cardiovascular risks. Globally, it affects up to 89% of diabetics and 58.9% of newly diagnosed hypertensives in Nigeria. Elevated LDL cholesterol, a major risk factor for cardiovascular diseases (CVD), has been linked to increased CVD mortality, with even modest reductions in LDL levels significantly lowering risks. Studies show that a 10% reduction in LDL cholesterol correlates with a 22% lower risk of heart attack and a 17% lower risk of stroke occurring more in Low - and Middle - income countries. Dyslipidemia has been established as one of the multifactorial risk factors for cardiovascular diseases and diabetes (Hedayatnia *et al.*, 2020; Chen and Tseng, 2013). Optimal LDL levels in diabetics also reduce CVD mortality risk by 50%, emphasizing the importance of lipid control.

Managing dyslipidemia is crucial for people with diabetes and hypertension. By controlling cholesterol levels, the risks of heart disease, strokes, and other complications can be greatly reduced. This highlights the need for effective treatments and lifestyle modifications to address these risks.

Lifestyle modifications, including dietary changes and regular physical activity, are recommended as initial interventions for both hypertension and dyslipidemia. The World Health Organization (WHO) emphasizes the importance of managing these conditions through early screening and interventions, particularly in low- and middle-income countries like Nigeria, where cardiovascular disease is on the increase. Addressing modifiable risk factors remains crucial for reducing the burden of these diseases.

By evaluating dyslipidemia prevalence and current treatment practices in hypertensive and diabetic patients, the research seeks to identify care gaps and improve management. It will also raise awareness about dyslipidemia's risks, emphasizing early detection and treatment as well as provide evidence-based recommendations to guide policy, improve healthcare outcomes, and serve as a model for similar regions facing related challenges.

This study assessed the prevalence and treatment of dyslipidemia amongst hypertensives and diabetics accessing care from a referral hospital in Nnewi, Southeast Nigeria.

2. METHODOLOGY

Study Area: This study was carried out Nnewi, a commercial and industrial city in Anambra state, southeastern Nigeria. Nnewi is the second largest city in the state, comprising one local government area, Nnewi North, which includes the quarters of Otolo, Uruagu, Umudim, and Nnewichi. Known for its industries, Nnewi houses Nigeria's first indigenous car manufacturing plant and the first wholly made-in-Nigeria motorcycle, the 'Naseni M1.' The city's population has grown significantly from 391,227 in 2006 to over 1.2 million in 2023, making it one of Africa's fastest-growing cities, (NewsWireNGR, 2022).

Geographically, Nnewi is situated in the tropical rainforest region, known for both rich agricultural land and business trade, despite facing soil erosion challenges. The literacy rate in the city is 88.8%, with males at 93.2% and females at 84.2%. The local economy revolves around agriculture, commerce, and manufacturing industries, such as Ibeto Group and Omata Holdings.

Hope Specialist Hospital, the site of the study specializes in cardiac and diabetic care. They run Clincs three times a week and manages emergencies, treating an average of 26 patients per clinic day.

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Study Design: A comparative cross-sectional analytical study design was used.

Study Population: The study population consisted of hypertensive and diabetic patients accessing care at Hope Specialist Hospital in Otolo, Nnewi, Anambra State.

Inclusion Criteria: Previously diagnosed hypertensive and diabetic patients accessing care in Hope Specialist Hospital Otolo Nnewi, Anambra State for at least 12 clinic visits (i.e. 4 weeks).

*Exclusion Criteria***:** Hypertensive and diabetic patients accessing care in Hope Specialist Hospital Otolo Nnewi, Anambra State who met the above criteria but were too ill to participate (for the purpose of this study, too ill to participate were patients that had breathlessness / shortness of breath, cancer, severe weakness, stroke or blindness).

Sample Size Determination:

The minimum sample size for the study was calculated using Wang and Chow, (2007) formula for calculating sample size for cross sectional comparative studies

$n = (Z\alpha/2 + Z\beta)^2 * (p1(1-p1) + p2(1-p2)) / (p1 - p2)^2$

Where:

n = sample size

$Z\alpha/2$ = critical value of the standard normal distribution at $\alpha/2$ (e.g., for a 95% confidence level, $\alpha = 0.05$ and $Z\alpha/2 = 1.96$

$Z\beta$ = critical value of the standard normal distribution at β (e.g, for a power of 80%, $\beta = 0.2$ and $Z\beta = 0.84$

p1 = proportion of people with dyslipidemia in the hypertensive group – 96.1% (Onyegbutulem *et al.*, 2021).

p2 = proportion of people with dyslipidemia in the diabetic group – 77.5% (Bruno, 2015).

$n = (1.96 + 0.84)^2 \text{ x } (0.961(1-0.961) + 0.775(1-0.775)) / (0.961 - 0.775)^2$

$(2.8)^2 \text{ x } 0.0375 + 0.1744(0.186)^2$

$= \frac{7.84 \times 0.2119}{0.035}$

$= 47.5$

n = 48.

Adjusting for possible non-response (f) of 10%

n = no (1-f)

n = 48 (1-0.1)

n = 53.3 persons.

For the two populations, the sample size will be multiplied by 2;

53.3 x 2 = 106.6 persons thus approximated to 107 persons.

Sampling Technique:

All the hypertensive and diabetic patients accessing care from Hope Specialist Hospital Otolo Nnewi within the study period who met the inclusion criteria were enrolled consecutively into the study until the sample size was met.

Study Instruments:

Quantitative Study Instrument: A pre-tested semi-structured interviewer-administered questionnaire was used to collect information on the socio-demographic characteristics, medical history, lifestyle factors, symptoms, treatment and access to healthcare.

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Laboratory measurement instrument: In this study, various laboratory instruments were used to assess health parameters related to hypertension, diabetes, and dyslipidemia. Blood pressure was measured using an Accoson mercury sphygmomanometer and Littmann stethoscope. Blood glucose levels were monitored with a Finetest Glucometer and test strips. Dyslipidemia was assessed using a lipid profile test, which required equipment such as an incubator, spectrophotometer, and pipettes. Manufacturer's instructions were followed strictly, Burtis, Ashwood, Bruns, (2005). Blood samples were processed following strict protocols to ensure accuracy. These instruments provided reliable data on blood pressure, glucose, and lipid profiles, essential for understanding the prevalence and treatment of dyslipidemia in hypertensives and diabetics in Nnewi.

Pretesting: The instruments of data collection for this study were pre-tested on 15 hypertensive and diabetic clinic attendants with dyslipidemia to determine their reactions to research questions. The research assistants took part in the pre-testing of the study instruments to assess the success of the training and to consolidate on the gains from the training as well as to fine tune the research instruments.

Data Management and Analysis: The collected data were cross-checked for any data collection or coding errors. They were then entered into the International Business Machines - Statistical Package for Social Sciences (IBM-SPSS) version 22software (2013) for analysis. Frequency distribution of all relevant variables was developed. Continuous variables were displayed as means ± standard deviations (SD). Frequencies of variables were determined by univariate analysis, while bivariate analysis was employed in testing for associations between the variables using Chi-Square test and Fishers exact test as appropriate for proportions and Student's t-test for means. Level of statistical significance was set at p-value ≤ 0.05.

Confidentiality: The data collected in this study was securely managed and protected from unauthorized access, misuse, disclosure, alteration, loss, or theft, ensuring confidentiality and data integrity in accordance with ethical standards throughout the research process.

3. RESULTS

A total of 107 questionnaires were administered using face-to-face interviews on hypertensive and diabetic patients accessing care from Hope Specialist Hospital Otolo, Nnewi. One hundred questionnaires were completely filled and retrieved giving a response rate of 93.5%.

Table 1: Socio-Demographic Characteristics of the Respondents

Variable	Hypertensives (n = 50) n (%)	Diabetics (n = 50) n (%)	Total (n = 100) n (%)	Test Statistic	P-value
Age				**F = 1.38**	0.393
31 – 40	7 (14)	1 (2)	8 (8)		
41 – 50	11 (22)	12 (24)	23 (23)		
51 - 60	8 (16)	13 (26)	21 (21)		
61 – 70	16 (32)	17 (34)	33 (33)		
71 – 80	7 (14)	5 (10)	12 (12)		
81 – 90	1 (2)	2 (4)	3 (3)		
Mean age ± SD	57 ± 14.02	59 ± 11.75		**t = 0.23**	0.82
Gender				χ^2 = 2.154	0.142
Male	14 (60)	21 (60)	35		
Female	36 (55.4)	29 (44.6)	65		
Marital Status				χ^2 = 2.274	0.321
Single	4 (80)	1 (20)	5		
Married	38 (50)	38 (50)	76		
Widowed	8 (42.1)	11 (57.9)	19		
Educational Level				F =6.655	0.084

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None	3 (6)	3 (6)	6		
Primary	7 (14)	18 (36)	25		
Secondary	26 (52)	18 (36)	44		
Tertiary	14 (28)	11 (22)	25		
Residence					
Rural	18 (36)	19 (38)	37	$\chi^2 = 2.272$	0.686
Peri-Urban	21 (42)	18 (36)	39		
Urban	11 (22)	13 (26)	24		

***F = Fishers exact test; χ^2= Chi square test**

Table 1 summarized the socio-demographic characteristics of patients with hypertension and diabetes. Mean ages were 57.32 (hypertensive) and 59.54 (diabetic), with no significant age difference (p = 0.393). Most respondents were female (65%) and married (76%). Educational attainment included 43% with secondary education and 26% with tertiary education, with no significant differences found for marital status, education, or residence.

Table 2: Medical History of the Respondents

Variable	Hypertensives (n=50) n (%)	Diabetics (n = 50) n (%)	Total (n = 100) n (%)	Test Statistic	P-value
Previous known history of Respondents				92.308	0.00*
No	2 (4)	0 (0)	2		
Yes	48 (96)	50 (100)	98		
Those currently taking medication for hypertension/diabetes					
No	2 (4)	0 (0)	2		
Yes	48 (96)	50 (100)	98		
Diabetic/Non-diabetic				100.00	0.00*
Hypertensive/Non-hypertensive				92.308	0.00*

***Statistically significant (p < 0.05)**

Table 2 summarizes the distribution and Medical history showing that 96% of respondents (hypertensive and diabetic patients) already had prior knowledge of their health status and this difference achieved statistical significance of ($\chi2$ = 92.308; p < 0.01), while 98% of the patients were currently on medication for hypertension and diabetes and this difference achieved statistical significance of ($\chi2$ =92.308; p < 0.01 vs. $\chi2$ = 100.00; p < 0.01).

Table 3: Lifestyle Factors for Dyslipidaemia in Hypertension and Diabetes among the Respondents

Variable	Hypertension f (%)	Diabetes f (%)	Total	T - Statistics	P– Value
History of Smoking				$\chi^2 = 0.154$	$p = 0.695$
No	47 (50.5)	46 (49.5)	93		
Yes	3 (42.9)	4 (57.1)	7		
Alcohol consumption among respondents				$\chi^2 = 2.380$	$p = 0.123$
No	39 (54.9)	32 (34.1)	71		
Yes	11 (37.9)	18 (62.1)	29		
Frequency of Alcohol Consumption among Respondents				$\chi^2 = 14.890$	$p = 0.603$
1-5 bottles per week	3 (42.9)	4 (57.1)	7		
6-10 bottles per week	2 (28.6)	5 (71.4)	7		
11-15 bottles per week	4 (57.1)	3 (42.9)	7		
16-20 bottles per week	2 (33.3)	4 (66.7)	6		
More than 20 bottles	0 (0)	2 (100)	2		
History of regular exercise				$\chi^2 = 0.640$	$p = 0.424$
No	23 (46)	27 (54)	50		
Yes	27 (54)	23 (46)	50		

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Exercise carried out by the Respondents				$\chi^2 = 15.717$	$p = 0.676$
Jogging	7 (46.7)	8 (53.3)	15		
Walking	10 (56.4)	9 (47.4)	19		
Gym	4 (57.1)	3 (42.8)	7		
Jogging	7 (46.7)	8 (53.3)	15		
Walking	10 (56.4)	9 (47.4)	19		
Gym	4 (57.1)	3 (42.8)	7		
Weekend	5 (71.4)	2 (28.5)	2		
Farm work	1 (50)	1(50)	2		

Table 3 outlines the risk factors for dyslipidaemia amongst the respondents. Among individuals with hypertension (3) and diabetes (4), very few patients were smokers which indicated a non- significant association between smoking and the respondents ($\chi2 = 0.154$, $p = 0.695$), while 29% takes alcohol with no significant association ($\chi2 = 2.380$, $p = 0.123$). Half of the respondents (hypertensives and diabetics) engage in exercise out of which walking was the most engaged exercise with no significant association between exercise and the patients ($\chi2 = 0.640$, $p = 0.424$).

Table 4: Dietary Habits showing frequency of Consumption among the Respondents

Variable	Hypertension f (%)	Diabetes f (%)	Total	T - Statistics	P – Value
Frequency of Consumption of Fried or Fatty Foods				$\chi^2 = 2.067$	$p = 0.356$
Frequently	2 (100)	0 (0)	2		
Occasionally	29 (48.3)	31 (51.7)	60		
Rarely	19 (50)	19 (50)	38		
Consumption of Fruits and Vegetable				$\chi^2 = 12.442$	$p = 0.003$*
Frequently	23 (74.2)	6 (25.8)	29		
Occasionally	26 (41.9)	36 (58.1)	62		
Rarely	1 (14.3)	6 (85.7)	7		
Frequency of Consuming Sugary Beverages				$\chi^2 = 13.810$	$p = 0.001$*
Frequently	1 (100)	0 (0)	1		
Occasionally	28 (71.8)	11 (28.2)	39		
Rarely	21 (35)	39 (65)	60		
Frequency of Processed or Package Foods				$\chi^2 = 0.000$	$p = 1.000$
Frequently	0(0)	0 (0)	0		
Occasionally	26 (50)	26 (50)	52		
Rarely	24 (50)	24 (50)	48		
Frequency of Consumption of High-Salt Foods				$\chi^2 = 1.999$	$p = 0.157$
Frequently	0 (0)	0 (0)	0		
Occasionally	18 (41.9)	25 (58.1)	43		
Rarely	32 (56.1)	25 (43.9)	57		

***Statistically significant ($p < 0.05$)**

Table 4 summarizes the dietary habits of the respondents. About 48.3% of hypertensive and 52% of diabetic patients consumed fried/fatty meals ($p = 0.356$). Fruit and vegetable consumption showed a significant association with patients ($p = 0.003$). Diabetics (65%) and hypertensives (35%) rarely consumed sugary beverages, which was significantly linked to dyslipidemia ($p = 0.001$). High-salt and packaged food consumption showed no significant associations with hypertensive or diabetic patients ($p = 0.157$ and $p = 1.000$, respectively).

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Table 5: Prevalence of Dyslipidemia and Treatment Modalities among the Respondents

Variable	Hypertension f(%)	Diabetes f (%)	Total	T - Statistics	P –Value
History of Diagnosed of Dyslipidemia				$\chi^2 = 0.367$	$p = 0.545$
No	27 (47.4)	30 (52.6)	57		
Yes	23 (53.5)	20 (46.5)	43		
Treatment Modalities of Dyslipidemia				$\chi^2 = 0.367$	$p = 0.545$
No	27 (47.4)	30 (52.6)	57		
Yes	23 (53.5)	20 (46.5)	43		
Specific drugs taken				$\chi^2 = 5.9.10$	$p = 0.921$
Fibrates	9 (39.13)	5 (25)	14		
Statins	14 (60.87)	15 (75)	29		
Specific Side Effects Experienced from Dyslipidemia medication				$\chi^2 = 0.010$	$p = 0.315$
None	50 (50.5)	49 (49.5)	99		
Headache	0 (0)	1 (100)	1		

Table 5: The study analyzed dyslipidemia prevalence and treatment modalities. About 57% of hypertensive and diabetic patients were unaware of their medical status, with no significant association (p = 0.545). The same prevalence of both groups were already receiving treatment for dyslipidemia. Among hypertensives, 39.13% used fibrates and 60.87% used statins, while 25% of diabetics were on fibrates and 75% on statins. There was no significant association between type of medication and patient group (p = 0.921). Additionally, 50.5% of hypertensives and 49.5% of diabetics reported no side effects from dyslipidemia medications (p = 0.315).

Table 6: Awareness and Knowledge of the Relationship between Dyslipidemia, Hypertension and Diabetes.

Variable	Hypertension f (%)	Diabetes f (%)	Total	T - Statistics	P –Value
Are you aware of the relationship between dyslipidemia, hypertension and diabetes?				$\chi^2 = 1.131$	$p = 0.288$
No	19 (57.6)	14 (42.4)	33 (33)		
Yes	31 (46.3)	36 (53.7)	67 (67)		
Are you aware of the risk factors associated with dyslipidemia?				$\chi^2 = 1.871$	$p = 0.171$
No	16 (61.5)	10 (38.5)	26 (26)		

Table 6 evaluated respondents' awareness of the link between dyslipidemia, hypertension, and diabetes, with 67% affirming awareness, though no significant association was found (p = 0.288). Awareness of dyslipidemia risk factors also showed no significant link (p = 0.171). However, frequent (38%) and occasional (39%) healthcare visits were significantly associated with greater knowledge and awareness (p = 0.014). Patients who visited healthcare facilities more often had better awareness, suggesting this should be encouraged.

Table 7: Healthcare Utilization, Blood pressure, Sugar level and Lipid Profile results of the Respondents.

Variable	Hypertension f (%)	Diabetes f (%)	Total (%)	T - Statistics	P – Value
Description of Challenges in Accessing Healthcare				$\chi2 = 12.006$	p = 0.445
Financial constraints/having no money	9 (42.9)	12 (57.1)	21 (70)		
Busy schedule	2 (66.7)	1 (33.3)	3 (10)		
Distance/mobility issues	0 (0)	3 (100)	3 (10)		
Too busy with work	2 (66.7)	1 (33.3)	3 (10)		
Mean Blood Pressure					0.000*
Mean	115.60/92.60	113.16/74.40			
SD	17.06/13.52	10.90/7.86			

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Mean Fasting Blood Sugar			0.00*
Mean	96.20	257.84	
SD	14.52	83.52	
Total Cholesterol Levels			0.102
Mean	158.52	176.40	
SD	56.23	52.01	
Mean Low-Density Lipoprotein Levels			0.379
Mean	96.10	125.48	
SD	39.94	231.47	
Mean High-Density Lipoprotein (HDL) Levels			0.05*
Mean	39.66	46.54	
SD	17.69	17.27	

***Statistically significant (p < 0.05)**

Table 7 below outlines respondents' utilization of healthcare among hypertensive and diabetic patients. Hypertensive individuals reported financial constraints (42.9%) and busy schedules (66.7%) as main challenges, while diabetics faced financial constraints (57.1%) and mobility issues (100%). No significant association was found between challenges and hypertension or diabetes ($\chi 2$ = 12.006, p = 0.445). Blood pressure and fasting blood sugar levels significantly differed between groups (p = 0.000), while cholesterol, triglycerides, and LDL levels did not. HDL levels showed a borderline significant difference (p = 0.052).

Table 8: The Prevalence of Dyslipidemia among Hypertensive and Diabetic Patients in a Referral Hospital in Nnewi, Southeast Nigeria.

Variable	Hypertension f (%)	Diabetes f (%)	Total	T - Statistics	P – Value
Prevalence of Dyslipidaemia				χ^2 = 0.367	*P* = 0.545
No	27 (47.4)	30 (52.6)	57 (57)		
Yes	23 (53.5)	20 (46.5)	43 (43)		

Table 8 examined dyslipidemia diagnosis among hypertensive and diabetic patients. For hypertensives, 47.4% were not diagnosed with dyslipidemia on initial presentation, while 53.5% were diagnosed prior to hospital presentation. Among diabetics, 52.6% lacked an initial dyslipidemia diagnosis, with 46.5% diagnosed beforehand. No significant association was found between dyslipidemia diagnosis and hypertension or diabetes status (p = 0.545).

Table 9: Association between Lipid Profile, Age, Blood Pressure and Dyslipidaemia

Variables	No	Yes	T-Test	P-Value
Age in years	60.7 ± 12.6	55.4 ± 12.9	-2.074	**0.041***
SBP (mmHg)	130.9 ± 24.1	134.4 ± 23.9	0.719	0.474
DBP (mmHg)	83.0 ± 15.0	84.2 ± 13.5	0.415	0.679
FBS (mg/dl)	189.2 ± 109.1	160.9 ± 87.2	- 1.399	0.165
TC (mg/dl)	162.2 ± 43.0	177.8 ± 62.3	1.422	0.160
TG (mg/dl)	137.3 ± 80.9	177.8 ± 76.2	2.546	**0.012***
LDL (mg/dl)	116.9 ± 217.2	104.3 ± 40.7	- 0.376	0.708
HDL (mg/dl)	44.3 ± 16.2	42.7 ± 18.6	- 0.462	0.645

***Statistically significant (p ≤ 0.05)**

In **Table 9** above, there was a statistically significant association between age and dyslipidaemia status (p = 0.041). Also, the association between TG and dyslipidaemia was statistically significant (p = 0.012) among the respondents. Other relationships were not statistically significant.

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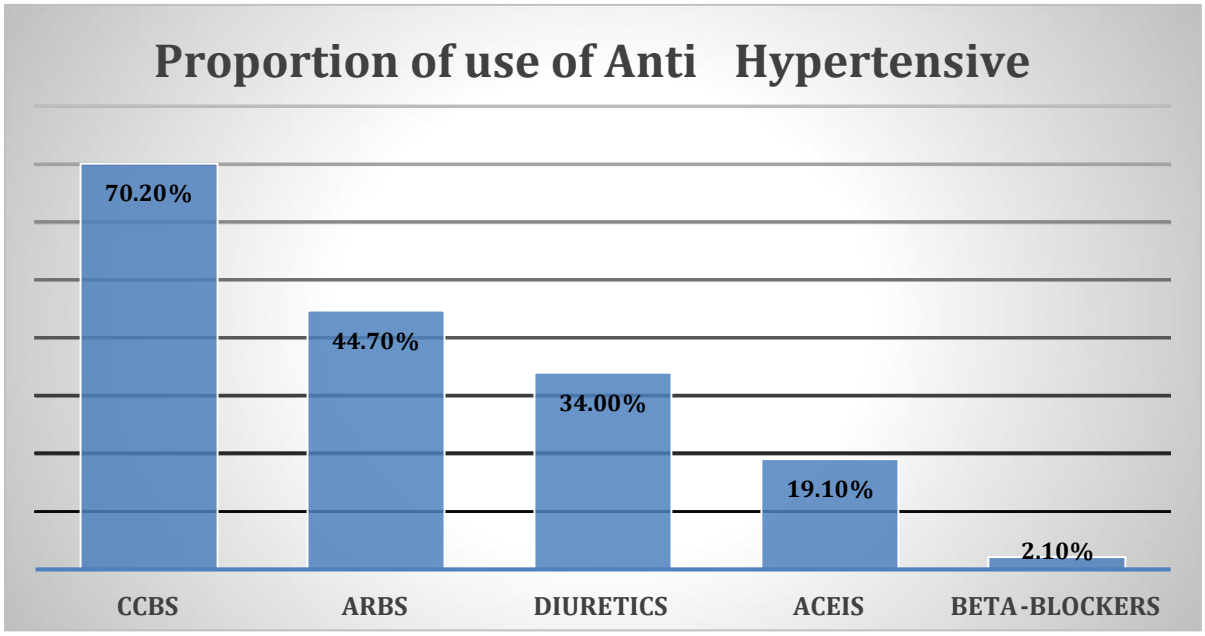

Figure 1: Use of anti-hypertensive among the participants [CCBS= Calcium channel blockers, ARBS = Angiotensin receptor blockers, ACEIS = Angiotensin- converting enzyme inhibitors]

Figure 1 above summarized that Calcium channel blockers (70.20%) were the most commonly used group of anti-hypertensive, an appreciable number of them used Angiotensin Receptor Blockers (44.7%), Diuretics (34.0%) and Beta-blockers the least used (2.10%) while Biguanides (88.00%) were the most used group of antidiabetics, followed by sulfonylureas (80.00%), then thiazolidinediones (20.00%) and lastly insulin (14.00%) the least group used amongst the respondents.

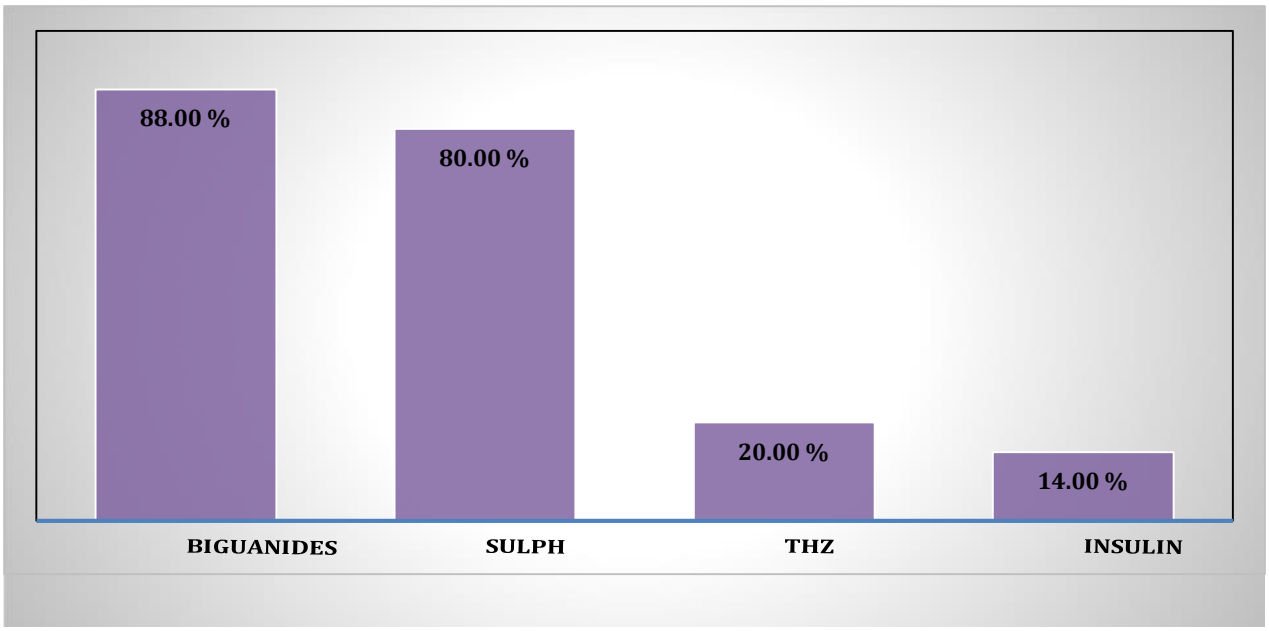

Figure 2: Use of anti-diabetics among the participants [Biguanides (metformin), SULPH = sulfonylureas, THZ = thiazolidinediones].

Figure 2 showed that Biguanides (88.00%) were the most commonly used group of antidiabetics, followed by sulfonylureas (80.00%), then thiazolidinediones (20.00%) and insulin (14.00%) the least commonly used group amongst the respondents.

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4. DISCUSSIONS

This study aimed to assess the prevalence and treatment of dyslipidemia among hypertensive and diabetic patients in a referral Hospital in Nnewi, Southeast Nigeria, providing critical insights into the characteristics of the patient population and treatment practices.

The mean age of hypertensive (57.32 years) and diabetic patients (59.54 years) showed no significant difference, suggesting age may not be a determining factor in distinguishing between these conditions in the studied population. Gender distribution revealed no significant association between gender and either hypertension or diabetes, with 60% of male patients and 55% of female patients having hypertension. Similar findings were reflected in dyslipidemia awareness, where 55% of hypertensive and 47% of diabetic patients were aware of their dyslipidemic status, but there was no statistically significant association between disease status and awareness. This indicates that awareness of dyslipidemia remains low, a concern also raised in other studies, (Kim. S. J, Kwon. O. D. and Kim. K, 2021). highlighting the need for better patient education. Comparatively, Ali *et al.,* (2023) found a much higher prevalence of dyslipidemia (89%) among Bangladeshi adults with no notable variation between genders. Similarly, in rural China, Sun *et al.,* (2014) reported a high prevalence of dyslipidemia with varying lipid abnormalities, suggesting that different populations may experience different forms of dyslipidemia due to genetic, lifestyle, or environmental factors. These variations were not fully explored in the current study, but they hint at the need for region-specific interventions and screening practices for dyslipidemia. Oguejiofor *et al.,* (2012) reported a higher prevalence of dyslipidemia among diabetic Nigerians, similar to findings in the current study, where diabetic patients were more likely to be dyslipidemic.

Marital and educational statuses were analyzed in this study to explore their relationship with hypertension and diabetes. Among single individuals, hypertension was more common, while diabetes was more common among the widowed. The influence of marital status on health conditions such as hypertension and diabetes is less established, though some studies Ramezankhani. A, Azizi. F and Hadaegh .F. (2019) suggest that social and emotional support may play a role in disease management. In contrast, the educational level showed potential trends toward an association with disease status, with those possessing primary education more likely to have diabetes and those with secondary and tertiary education having a more balanced prevalence of dyslipidemia amongst hypertensives and diabetics. This suggests that higher education levels may influence better health literacy and awareness, potentially leading to earlier detection and better management of chronic conditions like hypertension and diabetes, though statistical significance was not achieved.

Treatment of dyslipidemia showed a clear preference for statins, with hypertensive patients using them at a rate of 60.87% and diabetic patients at 75%, while fibrates were less commonly used. This aligns with the American Diabetes Association's guidelines, (2017) which recommend statins as the primary therapy for managing dyslipidemia and reducing cardiovascular risk in patients with diabetes. Similarly, Alwhaibi *et al.,* (2019) noted a high adherence to statin therapy among diabetic patients, primarily atorvastatin and simvastatin, and emphasized the importance of high-intensity statins for patients with a high risk of atherosclerotic cardiovascular disease (ASCVD). The findings from this study, along with Osuji *et al.,* (2012), further suggest that statins are the most effective treatment for dyslipidemia, especially in populations with a high prevalence of hypertension and diabetes. However, despite the common use of statins, both this study and Alwhaibi *et al.,* (2019) found no significant association between statin use and achieving the LDL-cholesterol goal. This could point to factors like adherence, the type of statin used, or lifestyle factors influencing treatment outcomes.

Regarding LDL levels, hypertensive individuals had a mean LDL level of 96.10 mg/dL, while diabetic individuals had a higher mean LDL level of 125.48 mg/dL. Although no significant difference was found between these two groups, diabetic patients tend to have more pronounced lipid abnormalities, as reflected in their higher LDL levels. This mirrors findings from other studies, Bahiru, Hsiao, Phillipson, and Watson, (2021), where dyslipidemia is more prevalent and severe among diabetic populations, underscoring the need for more aggressive treatment strategies in these patients.

The factors influencing dyslipidemia prevalence, as seen in this study and others, Abudjara *et al.,* (2018) include a combination of genetic, socio-demographic, and lifestyle factors. Abudjara *et al.,* (2018) pointed out differences in hypertriglyceridemia between males and females in Jordan, suggesting that gender-specific factors such as hormonal differences and lifestyle choices could contribute to variations in dyslipidemia patterns. However, other factors like age, duration of diabetes, hypertension, and obesity were not significantly associated with dyslipidemia in the study by Bello-Ovosi *et al.,* (2019). This reinforces the notion that dyslipidemia is a multifactorial condition, influenced by a wide range of determinants that may vary across populations.

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In conclusion, this study highlights the high prevalence of dyslipidemia among hypertensive and diabetic patients in Nnewi, the reliance on statins for treatment, and the lack of significant associations between demographic factors like gender and awareness levels. It also reinforces the complexity of dyslipidemia, as it cannot be attributed to a single risk factor but rather a combination of variables that requires a nuanced approach to treatment and prevention. Further research, especially focusing on statin effectiveness and adherence in this population, would provide deeper insights into optimal dyslipidemia management strategies.

Limitations and strength of the Study: The study was conducted on hypertensive and diabetic patients in a referral hospital in Nnewi have several limitations. First, the study's findings may not be generalizable beyond the specific population as dyslipidemia awareness was low, even those who were aware didn't know the complications of dyslipidemia in their condition and were not on drugs yet, limiting the broader applicability of the results.

Secondly, reliance on self-reported data for certain lifestyle factors (e.g., diet, medication adherence) may introduce recall bias or inaccuracies however, this was overcomed by assuring them of the confidentiality of the study and that the aim of the study was to improve overall well being and reduce complications of dyslipidemia in their condition like stroke, kidney failure, heart failure and death.

5. CONCLUSIONS

This study examines the prevalence and treatment of dyslipidemia among hypertensive and diabetic patients, emphasizing the need for better education and awareness. Dyslipidemia was prevalent in both groups, yet awareness was low, with 55% of hypertensive and 47% of diabetic patients aware of their condition. Statins were the most commonly prescribed treatment, though no significant association was found between statin use and achieving LDL targets, pointing to potential issues with adherence or treatment effectiveness. While lifestyle factors like smoking and alcohol consumption showed no significant associations, dietary habits played a crucial role, with notable differences in the consumption of fruits, vegetables, sugary drinks, and fatty foods. The study also revealed differences in blood pressure, fasting blood sugar, and HDL levels between the two patient groups. The findings highlight the importance of enhanced education, dietary interventions, and healthcare access to manage dyslipidemia and reduce cardiovascular risk.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study has been examined and approved by the Nnamdi Azikiwe University Teaching Hospital Ethics Committee. Permission to carry out the study was obtained from the Medical Director of Hope Specialist Hospital Otolo Nnewi. Verbal informed consent was obtained from each participant for the conduct and publication of this research study and assurance of confidentiality given. Study participants were free to refuse or withdraw from the study at any time without any penalty. All authors hereby declare that the study has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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