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Comparative Assessment of Lipid Profile in Hypertensive and Normal Patients in Owerri Municipality

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Abstract

This study was conducted in Owerri Municipal between the months of February, 2014 to March, 2015. A total of 150 fasting blood samples were collected from normal and hypertensive patients. The samples were analyzed using standard biochemical methods. The mean level of cholesterol, triglyceride, and LDL (288 +0.33, 110 + o.33 and 89 + 0.73 mg/dl) in hypertensive patients showed and significant difference when compared with those of normal subjects (154 + 2.36, 46 + 0.91 and 32 + 0. 09mg/dl) at P<0.25. The study also revealed a significant difference in the mean value of HDL-cholesterol (24 + 0.74mg/dl) in hypertensives, when compared with normal subjects (86 + 0.34mg/dll) at P< 0.25. The data suggests that elevated plasma lipids are related to hypertension and other cardiovascular diseases. Therefore, regular monitory of lipid levels in hypertensives will enhance effective management of patients.

Keyword: Comparative Assessment, Lipid Profile, Hypertensive, Normal Patients, Owerri Municipality.

Introduction

High Blood Pressure is a medical condition in which the blood pressure in the arteries is persistently elevated.

It is a major risk factor for coronary artery disease, stroke, heart failure, peripheral vascular disease, vision loss etc.

Blood pressure is expressed by two measurements, the systolic and diastolic pressures which are the maximum and minimum pressures respectively.

Normal blood pressure at rest is within the range of 100-120 millimeter mercury (mmHg) systolic and 60-80mmdtg diastolic. High blood pressure is present if the resting blood pressure is persistently at or above 140/90mmttg for most adults.

Excessive consumption of diets risk in saturated fat increases the chances of coronary hearts disease (Reddy *et al* 2018).

Epidemiological and clinical studies conducted in western countries have shown that 10% of caloric consumption of a modern diet is in the form of fats. Such diet increases the potential for heart attacks (Anon 2024).

One major reason to arouse concern is that if population levels of coronary heart disease risk factors rise as consequences of adverse lifestyle changes accompany industrialization and urbanization, the rates of coronary heart disease mortality and morbidity could rise even higher than the rates predicted solely by demographic changes (Okoroiwu and Obeagu, 2022).

An increase in body weight, blood pressure, cholesterol, triglyceride, and low density lipoprotein cholesterol is widely associated with cardiovascular diseases, whereas increased High Density Lipoprotein (HDL) cholesterol protects the heart (Verdecchia *et al.,* 2023).

Lipids in the body are important not only for high energy, but because they contain the soluble vitamins and certain essential fatty acids (Lloyd-Jones *et al.,* 2022).

They serve as structural and functional elements of biomembranes, biochemical fuel, energy storage deposit and as insulator.

Elevated lipid levels always predisposes to arthrosclerosis, ischemic heart disease, hypertension and myocardial infection (Bremner, 2019).

Therefore, routine examination of lipid profile in hypertensive patients is always crucial for effective management.

MATERIALS AND METHODS

Study group: This group comprised (50 males and 30 females) hypertensive patients attending clinic at Imo State General Hospital Owerri, aged 45-65yrs.

Control group: This group also comprised of 70 (40 males and 30 females) volunteers aged 40-55yrs. Their blood pressure was determined using a sphygmomanometer.

A blood pressure of about 150mmttg and above was considered high.

All the subjects were fully informed of the purpose of the research and the written consent obtained as recommended by WHO (2020).

SPECIMEN COLLECTION

About 8ml of venous blood were collected from each subject, and allowed to clot. The serum samples were obtained by centrifuging the clotted blood sample in a wisperfuge (Model 684) centrifuge at 2000rpm for 5 minutes.

METHODOLOGY FOR TOTAL CHOLESTEROL

1. The centrifuge tubes were set up labeled as follows test, standard and blank
2. Into the tubes, 0.1ml of plasma, standards and distilled water were added to their respective tubes.
3. After that, 4ml of fecl2 was added to all the tubes, mixed and incubated at room temperature
4. The supernatantsl were added to 3 new sets of test tubes, followed by the addition of 0.1ml of conc H2s04 and incubated for 25mins. in the dark.

$$\text{Cholesterol mg/100ml} = \frac{\text{Absorbance of test}}{\text{Absorbance of std}} \text{ X Conc of std}$$

METHODOLOGY FOR TRIGLYCERIDE

1. Three long test tubes were set up labeled, standard test and blank.
2. Then 0.5ml of serum, standard and distilled water were added to their respective tubes.
3. Also 2ml of heptane, followed by 2ml of Isopripanol and 1.8ml of sulphuric acid were added to all the tubes.
4. The tubes were mixed and allowed for 30minutes to separate without centrifugation.
5. Thereafter, 3 new sets of tests tubes were set, followed by the addition of 2ml of their respective supernatants and 2.6ml of saponification reagent.
6. The tubes were mixed and allowed to stand at room temperature for 5minutes.
7. After that, 1.5ml of metaperiodate was added to each of the tubes and incubated in a water bath for 30minutes.

Calculation =

$$\text{Triglyceride mg/dl} = \frac{\text{Absorbance of teeeetest}}{\text{Absorbance of std}} \text{ X Conc of std}$$

METHODOLOGY FOR LOW DENSITY LIPOPROTEIN CHOLESTEROL (Modification of the frieldwalled formular 1972).

Calculation =

$$\text{LDL-c} = \text{Total cholesterol} - \text{HDL} - \text{chol} - \frac{\text{triglyceride}}{5}$$

METHODOLOGY FOR HIGH DENSITY LIPOPROTEIN CHOLESTEROL (Lopez et al 1977)

1. Into a long tube, 0.5ml of serum, 0.05ml of $mgcl_2$ and 0.05ml of phosphotingstic acid were added and allowed to stand for 60 minutes and centrifuged for 20 minutes.
2. After this, 3 bng test tubes were set up labeled, standard. test and blank.
3. 0.1ml of the supernatant of test, standard and blank were added to the respective tubes by the addition of 1ml of H2s04.
4. The tubes were mixed and incubated at room temperature in the dark for 25minutes and read at 540nm using a spectrophotometer.

Calculation =

$$\text{HDL – cholesterol mg/dl} = \frac{\text{Absorbance of test}}{\text{Absorbance of std}} \text{ X Conc of std}$$

Statistical analysis

Data obtained were summarized as mean + SD. The differences between individual groups were assessed by students t-test. A P- value of less than 0.05 was considered significant.

RESULTS

The result of the study revealed a mean and SD value of (2.88 + 0.33, 110 + 2.33, 89 + 0.73) for total cholesterol triglyceride, HDL-cholesterol and LDL cholesterol in hypertensive patients. There was a

significant different (P<0.05) in the mean value of cholesterol, triglyceride and LDL-cholesterol in hypertensives when compared with those of normal patients 154 + 2.36, 46 + 0.71, 32 + 0.19.
The study also revealed a significant difference in the mean and standard deviation values, of HDL-cholesterol in normal patients, when compared with hypertensives at P<0.05.

Table 1: Mean and SD values of lipid profile in hypertensive and normal patients.

Parameters	**Hypertensive Patients n = 80**	**Normal Patients n = 70**
	S.I unit = mg/dl	S.I unit = mg/dl
Total cholesterol	228 ± 0.33	154 ± 2.36
Triglyceride	110 ± 233	46 ± 0.91
HDL-cholesterol	89 ± 0.73	32 ± 0.19
LDL-cholesterol	24 ± 0.74	86 ± 0.3

Discussion

This work was designed to compare the lipid profile in hypertensive and normal patients.
The study revealed a significantly high level of total cholesterol, triglyceride and low density lipoprotein cholesterol and decreased HDL cholesterol in hypertensives, when compared with normal patients at P<0.05 (Abdulmajeed *et al.,* 2025).
This finding is in conformity with case control studies carried out in China where significantly higher values of total cholesterol, triglyceride and LDL-cholesterol were reported in hypertensives, coronary artery and heart disease patients than in controls (Pan, 2025).
The reported high level of total cholesterol, triglyceride, and low density lpoprotein cholesterol from the result of this study could be as a result of unhealthy diets especially saturated fats. This fact is supported by Anold *et al* (2019). They reported that hyperlipidaemia is always associated with diets rich in saturated fats.
The study also revealed a significantly low level of high density lipoprotein cholesterol among hypertensives when compared with normotensive patients.
This finding is in agreement with the reports of Anderson *et al* (2021).
They reported that high concentration of HDL cholesterol in the blood helps carry away cholesterol from the peripheral tissue to liver for metabolism.

Conclusion

Hyperlipidaemia has been identified as a risk factor in developing hypertension. Therefore the general public is advice to abstain from unhealthy diets especially excessive consumption of saturated food products.

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