

## PREVALENCE OF DYSLIPIDAEMIA AMONGST APPARENTLY HEALTHY STAFF OF A TERTIARY HOSPITAL IN BENIN CITY.

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### ABSTRACT

Dyslipidaemia (DL) is an independent and modifiable risk factor for cardiovascular disease (CVD) which appears to be on the increase in Nigeria due to the adoption of 'westernised' lifestyles by Nigerians. CVD is associated with significant premature morbidity and mortality. Other risk factors for CVD include hypertension, obesity and diabetes mellitus. Screening for DL is often overlooked in apparently healthy Nigerians due to the fact that there is little public awareness on DL, which is largely asymptomatic. The aim of this study is to determine the serum lipid profile of apparently healthy staff of University of Benin Teaching Hospital (UBTH), Benin City. Consenting staff of UBTH who were apparently healthy were recruited for the study. Data extracted included the patient's age, sex, body mass index, weight, height, waist circumference, blood pressure and fasting lipid profile. Two hundred and two females and 102 males were included in the study. High-density lipoprotein cholesterol dyslipidaemias was found in 12.9% of female subjects and in 10.8% of male subjects. Total cholesterol dyslipidaemia, low-density lipoprotein cholesterol dyslipidaemia and triglyceride dyslipidaemia were found in 51.0%, 26.3% and 4.9% of the subjects respectively. There was no significant gender difference in the lipid profile of the study subjects. There is a high prevalence of total cholesterol dyslipidaemia and low-density lipoprotein cholesterol dyslipidaemia among apparently healthy staff of UBTH. Pre-employment and annual lipid profile screening should be instituted for early diagnosis and treatment of dyslipidaemias in order to minimize the risk of cardiovascular events.

### Introduction

Cardiovascular disease (CVD) due to atherosclerosis of the arterial vessel wall and to thrombosis is the leading cause of premature mortality and morbidity in the developed countries of Europe and the

United States<sup>1</sup>. Atherosclerosis causes a reduction of blood flow and inadequate delivery of oxygen and nutrients to various organs thereby resulting in myocardial infarction, stroke or peripheral vascular disease depending on the end-organ affected. The narrowing of the vessel wall is due to lipid deposition (derived from plasma lipoproteins and elevated plasma cholesterol) and cell proliferation. The risk factors for CVDs include cigarette smoking, lack of exercise, elevated blood pressure, type 2 diabetes mellitus, male gender, obesity and dyslipidaemia (DL)<sup>1-3</sup>. Dyslipidaemia was previously thought to be uncommon in Nigeria<sup>4,5</sup>. The

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“westernization” of the Nigerian populace has increased the risk for the development of DL and other risk factors for CVDs. There has been more public enlightenment on hypertension, diabetes mellitus than on dyslipidaemia as a risk factor for CVD. Despite its importance as an independent but modifiable risk factor for CVD, dyslipidaemia is seldom screened for among non-diabetic Nigerians. The aim of this study was to determine the lipid profile of a select group of apparently healthy Nigerians (staff of the University of Benin Teaching Hospital) who are on regular income (salaried) as they are more likely to maintain a “westernized” lifestyle than Nigerians in the rural communities.

#### Subjects and Methods

All consenting apparently healthy staff of the University of Benin Teaching Hospital was consecutively recruited for the study after detailed explanation of the aim of the study to them. All participants gave informed consent. Data documented included the patient's age, sex, body mass index (BMI), blood pressure, use of antihypertensive agents, fasting lipid profile (total cholesterol, triglyceride, high density lipoprotein cholesterol, low density lipoprotein cholesterol) and anthropometric indice including: height, weight, and waist circumference (WC) which was measured at midpoint between the lower rib margin and the iliac crests while the hip circumference was measured at the maximal point of the buttock (through both greater trochanters). Approval for this study was obtained from the Ethics Committee of the Hospital.

Persons known to have diabetes mellitus (which is regarded as a coronary heart disease equivalent<sup>1</sup>) or who were on lipid-lowering drugs were excluded from the study.

Statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS) version 16. The mean  $\pm$  SD values were calculated for all the variables. Comparison of means was done using t-test for continuous data and Chi-square test for categorical data. Level of statistical significance was set at  $p < 0.05$ .

#### Definition of terms

Using World Health Organization criteria<sup>6</sup>, dyslipidaemia was present if subject was receiving statin treatment or had plasma triglycerides (TG)  $150\text{mg/dL}$  ( $1.7\text{mmol/L}$ ), high density lipoprotein cholesterol (HDLc): men  $< 35\text{mg/dL}$  ( $0.9\text{mmol/L}$ ); women  $< 39\text{mg/dL}$  ( $1.0\text{mmol/L}$ ).

Other dyslipidaemia were defined as follows: Total cholesterol (TC)  $200\text{mg/dL}$  ( $5.18\text{mmol/L}$ ) and low density lipoprotein cholesterol (LDLc)  $150\text{mg/dL}$  ( $3.89\text{mmol/dL}$ )

Hypertension was present if systolic blood pressure  $140\text{mmHg}$  or diastolic blood pressure  $90\text{mmHg}$ , or if subject was on antihypertensive medication.

Abdominal obesity was defined as WC  $> 88\text{cm}$  in women and WC  $> 102\text{cm}$  in men while generalized obesity was BMI  $> 30\text{kg/m}^2$  in both gender.

#### Results

The study group consisted of 304 Nigerians who work in UBTH. The mean age of the study subjects was  $45.11 \pm 9.53$  years (min-max 23-65 years). Among the study subjects, 202(66.4%) were females, 87 (28.6%) were obese, 104 (34.2%) were overweight, 70 (23%) were hypertensive and 176 (57.9%) had dyslipidaemia..

The characteristics of the study subjects are summarized in Table I. The common

**Table 1: Characteristics of Hospital Workers in UBTH, Benin City.**

Parameter	Mean ±SD
Age(years)	45.11±9.53
BMI(kgm <sup>-2</sup> )	27.20±5.5
WC(cm)	88.12±10.62
SBP(mmHg)	116.49±18.67
DBP(mmHg)	75.77±12.23
TC(mmol/L)	5.28±1.20
TG(mmol/L)	1.07±0.37
HDLc(mmol/L)	1.62±0.60
LDLc(mmol/L)	3.21±1.16

BMI, body mass index; SBP, systolic blood pressure; DBP, diastolic blood pressure; WC, waist circumference; TC, total cholesterol; TG, triglyceride; HDLc, high density lipoprotein cholesterol; LDLc, low density lipoprotein cholesterol  
 FPG,fasting plasma glucose.

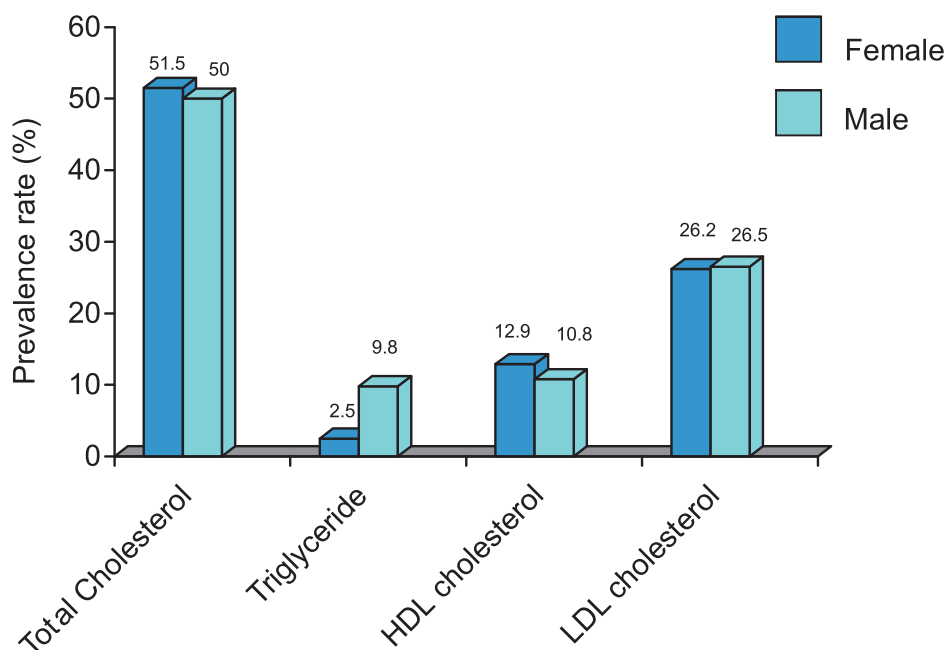


Figure 1: Types and Frequency of Dyslipidaemia among Hospital Workers in UBTH.

**Table 2: Comparison of Characteristics of Hospital Workers in UBTH by Sex mean±SD**

Variables	Males	Females	p-value
Age(years)	46.56±10.33	44.38±9.04	0.07
BMI(kgm <sup>-2</sup> )	24.64±4.26	28.50 ±5.66	0.001
WC(cm)	85.74 ±10.94	89.32±10.27	0.006
SBP(mmHg)	119.51 ±19.31	114.95 ±18.18	0.049
DBP(mmHg)	78.04 ±11.61	74.63 ±12.40	0.019
TC(mmol/L)	5.09 ±1.19	5.37 ±1.20	0.061
TG(mmol/L)	1.12 ±0.42	1.042 ±0.34	0.130
HDLc(mmol/L)	1.56 ±0.64	1.65 ±0.59	0.246
LDLc(mmol/L)	3.04 ±1.24	3.30± 1.12	0.084
FPG(mmol/L)	4.91 ±0.60	4.78 ±0.50	0.067

BMI, body mass index; SBP, systolic blood pressure; DBP, diastolic blood pressure; WC, waist circumference; TC, total cholesterol; TG, triglyceride; HDLc, high density lipoprotein cholesterol; LDLc, low density lipoprotein cholesterol  
FPG,fasting plasma glucose.

types and frequency of dyslipidaemia in the study subjects are summarized in Figure 1. Total cholesterol DL and LDLc dyslipidaemias were commonest types found in our study subjects. There was no significant difference in mean serum lipid levels (Table 2) between male and female subjects. There was a significant correlation between TC and BMI ( $r = 0.18$ ,  $p = 0.002$ ) and between LDL and BMI ( $r = 0.15$ ,  $p = 0.01$ ). Systolic blood pressure and diastolic blood pressure were significantly higher in the male subjects than in female subjects while waist circumference and body mass index were larger in the female subjects.

#### Discussion

This study documented a high prevalence of dyslipidaemia (57.9%) which is much higher than the 4.0% documented in the National Non-communicable Disease Survey<sup>4</sup>. The commonest types of dyslipidaemia we found were elevated total cholesterol and elevated LDL cholesterol dyslipidaemias. High plasma cholesterol levels are linked with increased risk for CVD. The Multiple Risk Factor Intervention Trial showed that there is increased risk at levels above 5.2mmol/L (200mg/dL)<sup>7</sup>. The frequency of elevated total cholesterol dyslipidaemia was higher in our study than in the report by Odenigbo et al.<sup>8</sup> (elevated total cholesterol DL: 51% vs 23%) while the frequency of elevated LDL cholesterol and reduced HDL cholesterol DL were lower (elevated LDL cholesterol: 26.3% vs 51% and reduced HDL cholesterol DL: 14.8% vs 60%).

The mean total cholesterol of  $5.28 \pm 1.20$  mmol/L, HDL cholesterol of  $1.62 \pm 0.60$  mmol/L and LDL cholesterol levels of  $3.21 \pm 1.16$  mmol/L found in our study subjects were generally higher than those of other Nigerian studies<sup>9,12</sup> except that of

Osuji et al<sup>13</sup> who found a mean total cholesterol level that was comparable to our finding ( $5.29 \pm 1.76$  mmol/L vs  $5.28 \pm 1.20$  mmol/L). There was no significant gender difference in the lipid profile of our subjects which is similar to findings in previous Nigerian studies<sup>11,12</sup>. The mean LDL cholesterol of  $3.21 \pm 1.16$  mmol/L and triglyceride of  $1.07 \pm 0.37$  mmol/L levels in our study were less than those in Caucasians<sup>14</sup>.

The reasons for the higher lipid levels in our study subjects compared to those in previous studies in Nigerians are not known with certainty as Nigerians living in the Southern part of the country consume diets with similar fat and carbohydrate contents. Palm oil which is rich in saturated fatty acids is commonly consumed in this region. Lack of physical activity and consumption of diets high in carbohydrate and fat have been documented as contributing factors to the poor health status of some affluent Nigerians<sup>15</sup>. Urbanization in the developing countries has resulted in emergence of fast food eateries where high dense foods are sold; improved transportation systems and use of computers which encourage sedentary lifestyles. This pattern of behavior encourages development of obesity which occurred in 28.6% of our study subjects. Public enlightenment on healthful nutrition and the benefits of regular exercises is needful. Studies have shown beneficial effects of low fat diet and regular exercise on lipid profile<sup>16,17</sup>.

Drugs are available for the treatment of dyslipidaemia. These include the statins<sup>18</sup> and the fibric acids<sup>19</sup>. These drugs are able to lower elevated total cholesterol, triglyceride and LDL cholesterol levels and raise HDL cholesterol. Treatment of dyslipidaemia has been shown to lower

mortality due to CVD. Elevation of 7.5% in HDL-c, together with a reduction in LDL-c to a target of < 2.0 mmol/L was the minimum requirement for plaque regression<sup>20</sup>.

In conclusion, our study showed that elevated total cholesterol and elevated LDL-cholesterol dyslipidaemias were common among apparently healthy Nigerians working at UBTH. The combination of elevated total cholesterol and elevated LDL-cholesterol dyslipidaemias, obesity and hypertension among the hospital staffs put them at increased risk of cardiovascular events. The Management of the hospital should institute pre-employment and annual serum lipid profile screening for early diagnosis and treatment of dyslipidaemias in order to minimize the risk of cardiovascular events.

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