Lipid Profile Of Medical Laboratory Students Of Abia State University Uturu

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Abstract: Dyslipidemia is defined as abnormal high level of lipid in the blood and it is recognized as a major risk factor for development and progression of cardiovascular disease. It emerges as one of the most common risk factors. It represents a significant public health problem, and because of its complications had attracted so much attention. The study is aimed at evaluating the plasma lipids of apparently healthy Medical Laboratory Science Students Uturu (ABSU). One hundred subjects comprising of forty-five (45) males and fifty-five- (55) females aged 18-35 years were randomly selected for this study. Lipid profile was measured using automated analyzer. The data obtained were analyzed using Statistical Package for Social Science (SPSS version 25) and one-way analysis of variance (ANOVA). This study showed a Mean ± SD concentration of plasma lipids in TC, TG, LDL, and HDL in the population; male (3.52±0.12, 0.95±0.12, 1.01±0.22, 1.46±0.02) respectively, while in females (4.11±0.12, 0.75±0.12, 2.01±0.21, 1.45±0.02) . Decreased levels of HDL values less than 0.91mmol/L was considered as a risk factor for cardiovascular disease. There were 19 subjects with decreased HDL giving a prevalence of 19% and 5% had elevated LDL. The study showed that lipids profile and systolic blood pressure are significantly higher in females then in males. We therefore urge that Lipid profile should be included as part of the routine biochemical laboratory test for Medical Laboratory Students to enable detection and identification of students at risk of developing cardiovascular disorders.

Keywords: Dyslipidemia, Lipid profile, Cardiovascular disease, Biochemical laboratory test and Lipoproteins.

I.   INTRODUCTION

In the developing region of the world, non-communicable diseases are replacing the traditional enemies such as infectious diseases as the leading cause of morbidity in adults, with time non-communicable such as hyperlipidemia are expected to account for more than 70 % of mortality in the developing world (Igboh, et al, 2013).Dyslipidemia is defined as abnormal high level of lipid in the blood. Different types of lipids and lipoproteins have been identified.

Dyslipidemia is a single strong risk factor for the development of cardiovascular disease, and atherosclerosis is the most common culprit. It has been described as a disease of the economically advanced societies, but recently, it has found its way into the semi-urban societies and among its dwellers, who are at the increasing risk of developing cardiovascular at any incident (Olamoyegun *et al.,* 2016).

The atherogenic dyslipidaemic profile is characterized by elevated TG, low HDL-C and a preponderance of small, hence LDL-C particles (Keating, 2011).

For several decades' profound demographic and economic changes that meant developing countries have witnessed has created completely new conditions in terms of lifestyle. With urbanization and economic development then emerged a nutritional transition characterized by a shift to a higher caloric content of diet and/or to the reduction of physical activity, and whose consequences are changes in the body composition of the individuals and elevated blood lipid levels. (Chen *et. al.,* 2014) Prospective and retrospective studies have shown that cardiovascular risk factors, namely: obesity, lipids, unhealthy diet and sedentary lifestyle, have their route in childhood and tend to reach into adulthood (Ugwuja et al, 2013)

The continuous modernization and technological advancement of the developing world has brought rapid lifestyle changes which result to the consumption of fast food, caloric heavy diets and sedentary lifestyle, which is known to have a major impact on the development of Cardiovascular diseases and chronic diseases. Many investigators have pointed out that excessive intake of dietary saturated fat and especially cholesterol increases the serum cholesterol, thus leading to a high risk in the development of Cardiovascular diseases (Forouzanfar *et. al.,* 2015).

Heavy calorie diets rich in fat, because it is palatable, is seen among the students, hence, early identification, and diagnosis of dyslipidemia at its earliest stage among the populace is a worthwhile cardiovascular preventive measure.

II. MATERIALS AND METHODS

The study was carried out at the Chemical Pathology Laboratory of Abia State University Teaching Hospital (ABSUTH). The study was conducted on 100 apparently healthy students who were willing to participate and these subjects were grouped into five according to their ages.

All respondents for lipid profile were asked to do an overnight fasting of 12 hours. And 7 millilitres (7ml) of fasting blood samples were collected by venepuncture techniques from the antecubital vein into a sterile container under aseptic conditions and was stored in lithium heparin bottle for lipid assay. The blood samples were spun in the centrifuge at 4000 rpm for 5 minutes. The plasma was separated from cells with the aid of a Pasteur pipette and stored frozen prior to analysis.

PLASMA GLUCOSE ESTIMATION

METHOD: Plasma glucose was estimated using the method of Trinder (Trinder, 1969).

HIGH DENSITY LIPOPROTEIN CHOLESTEROL (HDL-C) ESTIMATION

METHOD: Based on the enzymatic end point method (Lopez-Virella *et al.,* 1977).

PLASMA TOTAL CHOLESTEROL ESTIMATION (TC)

METHOD: based on the enzymatic end point method as described by Trinder (Trinder, 1969).

PLASMA TRIGLYCERIDE ESTIMATION

METHOD: Triglyceride was determined using the Agape Triglyceride kit (Product No: 51410002) which used enzymatic method (Tietz, 1995).

LOW DENSITY LIPOPROTEIN ESTIMATION

METHOD: LDL-cholesterol was calculated in mmol/L using Friedewald equation (Friedewald *et al.,* 1972).

ATHEROGENIC INDEX OF PLASMA (AIP)

METHOD: The atherogenic index was calculated as the logarithm of ratio of triglycerides to HDL (Dobiasova, 2004).

ATHEROGENIC COEFFICIENT

METHOD: Atherogenic coefficient was calculated as the ratio of total cholesterol (TC) minus high density lipoprotein (HDL) to high density lipoprotein (HDL) (Olamoyegun *et al.,* 2016).

Data was analyzed using Statistical Package for Social sciences (SPSS version 25). The difference between the groups were compared using one-way analysis of variance (ANOVA) and student "t"-test with a P value equal to or less than 0.05 ($P =< 0.05$) which was considered as being statistically significant. Results were expressed as Mean ± SD (Standard Deviation) which were calculated.

III. RESULT AND DISCUSSION

Parameters	Male Students	Female Students	Total	P-value	Sig
TG	2.52±0.12	2.11±0.12	4.972±1.210	0.001	Sig
TC	0.11±0.12	0.12±0.21	1.0169±0.429	0.003	Sig
LDL	1.01±0.22	1.01±0.21	1.202±1.04	0.000	Sig
HDL	1.46±0.02	1.45±0.02	2.954±1.043	0.002	Sig
Calc f	1.22±3.56	1.23±3.57	1.25±3.55	0.567	Ns
Cal c	1.08±3.49	1.08±3.45	1.09±3.33	0.432	Ns

Key
TG - Triglycerides
TC- Total Cholesterol
LDL- Low Density Lipoprotein
HDL- High Density Lipoprotein
Sig- Significance
Ns- Not significant
Crit f- Critical F Value
Calc f-
Calculated F value
P value <0.005 is significant
Table 4: Represents comparison of Mean ± Standard Deviation of TC, TG, LDL and HDL levels of Medical Laboratory Students

Parameters	18-24	24-30	30-35	P-value	Sig
TC	4.293±1.105	4.1571±0.653	4.79±0.691	0.000	Sig
TG	0.935±0.498	1.207±0.603	1.07±0.541	0.003	Sig
LDL	2.93±0.646	2.314±0.760	3.59±0.90	0.000	Sig
HDL	0.441±0.56	1.371±0.375	0.97±0.283	0.001	Sig

Key
TG - Triglycerides
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Sig- Significance
Ns- Not significant
Crit f- Critical F Value
Calc f- Calculated F value
P value <0.005 is significant

Table 2: Represents comparison of Mean ± Standard Deviation of TC, TG, LDL and HDL levels of Medical Laboratory Students by Age

The current study revealed a mean total cholesterol, TG, HDL and LDL plasma values that correspond with the desirable range of lipid according to National Cholesterol Education Programme (NCEP, 2002). The, derivable range of the lipid parameters recorded in this study does not necessarily indicate freedom from cardiovascular risk. The figures generated were similar with that reported by Ngwogu, *et al.,* (2013). However, the values were higher than the Canadian Caucasian values as reported by Idemudia *et al.,* (2018).

The mean TC, TG and LDL were significantly higher in females than the males. HDL was significantly higher in males. These values were in agreement with values reported by Olamoyegun *et al.,* (2016) and Ngwogu et al., (2013). Nevertheless, this was not similar with the values reported by National Cholesterol Education Programme (NCEP, 2002). This may be related to the fact, that women have high fatty tissue compared to men.

There was decrease in plasma TC, TG and LDL with increase in age. However, there was sharp increase in these lipid parameters between the ages 30-35 except HDL that decreased at the same group. In this study, it was observed that dyslipidemia exists amount students. This leads to abnormal weight, dyslipidemia and eventually, this may dispose persons to cardiovascular risk. However, increase intake of dietary fat and carbohydrate rich foods, sedentary lifestyle, and reduction in physical activity has been implicated in high incidence of dyslipidemia adulthood (Ugwuja,et al, 2013). The figures obtained were in agreement with the study conducted by Ngwogu *et al.*, (2013) and Olamoyegun *et al.,* (2016) in Aba and Edo respectively. Equally noted, was that the Castelli risk indices, body mean index, blood pressure and Atherogenic coefficient were not significant in the study. This correlates with values obtained by Olamoyegun, *et al.,* (2016).

Incidentally, Atherogenic index of plasma which is a logarithm of the ratio of TG to HDL takes into consideration the balance between Atherogenic and protective lipids. The average Atherogenic index of plasma obtained in this study indicates low risk for cardiovascular disease. The atherogenic index of plasma level was significantly higher in females and compared to males. This does not correlate with the Caucasian value reported by Olamoyegun *et al.,* (2016).

The lipid profile of medical laboratory students of Abia State University Uturu showed elevated LDL and low HDL and there is need for urgent medical education. Thus, the use of these studied indices should be encouraged to complement the existing profile of test for identifying high risk individuals for coronary artery disease and effective management.

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