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Dyslipidemia Among Adolescent Attending Rural And Urban School In Aba Area

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Abstract: ***The prevalence of cardiovascular diseases has been on the increase globally for the last few decades. Dyslipidemia, in conjunction with poor eating habits and sedentariness, constitute ideal conditions for the development of Heart disease. Therefore, the study is designed to carry out comparative analysis of lipid profile of adolescent attending rural and urban schools in Aba area. Hundred adolescent subjects aged 12-18 years were recruited for the study comprising of (50) adolescent from the urban population and (50) adolescent from the rural population of which (25) were females and (25) males in each group. Blood samples were collected by venipuncture and analyzed for lipid profile. Data obtained was analyzed using student's t-test, significance level for the analysis was at P-value equal to or less than 0.05 (P=<0.05). The main Serum TG (P=0.0424), weight (P=0.0188), and BMI (P=0.0244) were significantly higher than their rural counterpart. However, the mean value of TC (P=0.2521) was slightly higher in adolescent attending urban schools while HDL (P=0.2098), and LDL (P=0.5261) were slightly higher in adolescent attending rural schools. The percentage of adolescent attending urban schools with increased value of TC (P=0.2904) was higher than their rural counterpart; however, the difference was not statistically significant. The percentage of adolescent in urban schools with low HDL was higher in comparison with trial schools and the difference was slightly significant (P=0.045). The findings demonstrate the geographical location with respect to physical activity and nutritional Lifestyle seems to influence the lipid profile of adolescent attending urban schools were prone to dyslipidemia than those of their counterparts attending rural schools. It is therefore recommended that emphasis should be paid to lipid profile of children in urban areas for early prevention is far better than later cardiovascular diseases treatment.***

Keywords: Dyslipidemia, Cardiovascular, urbanization, Rural and lipid profile.

I. INTRODUCTION

Traditionally, the main health indicator used by health Personals had been mortality rates. Adolescents have been considered to have the lowest mortality among different age groups and have therefore received low priority in terms of nutritional assessment (Woodruff, 2000).

However, developing countries are undergoing nutrition transition leading to rapid changes in lifestyle and dietary habits (WHO, 2003). As the pace of urbanization increases,

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the population is more dependent on diets considered unhealthy and exacerbated by low physical activity. Urban people, especially in the developing countries, have sedentary lifestyle, no scope of physical organized sports, unhealthy food habits, and exposure to population that make them vulnerable to a double risk of both infection and cardiovascular heart problems. Therefore, there is increase in health issues, which in turn, has influenced mortality rate of these adolescents (Igboh et al ,2013).

One of the many health problems in the coronary artery disease (CAD), a disease entirety resulting from blockage of the coronary artery manifesting clinically as stable angina, unstable angina, myocardial infarction, great failure, arrhythmias and sudden death. While this is becoming more prevalent in developing countries, it is projected to rise considerably over the next decade (WHO, 2003).

The prevalence of cardiovascular diseases has been on the increase globally for the last few decades, Rapid urbanization and changes in the lifestyle, and modernization have been reported to increase the risk for developing chronic diseases such as heart diseases (Beaglehole *et al.,* 2007).

Incidentally, the primary prevention of cardiovascular diseases in adulthood, is the early detection of dyslipidemia in adolescence and this will reduce the chances of future complications, together with a change in lifestyle to healthier habits (Silva and Lima, 2015).

Therefore, Comparing the lipid profile of the urban and rural population will throw more light on the effect of environment and nutritional Lifestyle on the reflective lipid levels.

II. MATERIALS AND METHODS

A cross sectional study was conducted amount adolescents from urban and rural settings aged between 12-18 years attending schools in Aba South Local Government Area (Urban Population) and Obikabia community in Obingwa Local Government Area (rural population) both in Aba Area, Abia State, Nigeria.

The analysis of the samples was carried out at the Chemical Pathology Laboratory of Abia State University Teaching Hospital (ABSUTH), Umueze Road, Abayi, Aba found in Abia State, South East of geographical region of Nigeria.

A representative sample, a total of (100) adolescents aged 12-18 years was randomly selected from Aba South (urban population) and Obikabia community, Obingwa Local government area (rural population) both in Abia State for the analysis of lipid profile. The study subjects were made up of (50) test subjects from the urban population and (50) males for the urban and rural population respectively.

Five millilitres (5mls) of Venous blood samples were collected from the fasting subjects into plain serum separation tubes which were centrifuged for 10 minutes at 3,000 revolutions per minute (rpm) for fasting lipids profile. The serum was carefully separated into plain tubes and was stored at -20 (degrees Celsius) for subsequent analysis.

SERUM TOTAL ESTIMATION (TC)

METHOD: Total cholesterol was determined using Agappe cholesterol kit based on the enzymatic end point method as defined by Trinder (Trinder, 1969).

SERUM TRIGLYCERIDE ESTIMATION

METHOD: Triglyceride was determined using the Agappe triglyceride kit based on the enzymatic method (Tietz, 1995).

The data obtained were analyzed using Microsoft office Excel 2007. The result of lipid profile obtained from subjects in both urban and rural populations were compared using the paired two-tailed Student's t-test. A P-value equal to or less than 0.05 (P<=0.05) was considered as statistically significant.

III. RESULTS AND DISCUSSION

Parameters	Rural (n=50)	Urban (n=50)	Calc. t	Crit. t	P (<=0.05)	Sig.
TC (mmol/L)	3.73±0.62	3.89±0.79	1.152	1.98	0.2521	NS
TG (mmol/L)	0.78±0.22	0.90±0.35	2.057	1.98	0.0424	Sig
HDL (mmol/L)	1.15±0.27	1.04±0.51	1.262	1.98	0.2098	NS
LDL (mmol/L)	2.50±0.91	2.40±0.69	0.636	1.98	0.5261	NS
Weight (Kg)	48.54±10.52	53.34±9.33	2.390	1.98	0.0188	Sig
Height (m)	1.64±0.08	1.64±0.07	0.373	1.98	0.7097	NS
BMI (Kg/m^2)	18.31±3.85	19.92±3.05	2.287	1.98	0.0244	Sig

Key
TG - Triglycerides
TC- Total Cholesterol
LDL- Low Density Lipoprotein
HDL- High Density Lipoprotein
BMI - Body Mass Index
Sig- Significance
Ns- Not significant
Crit f- Critical F Value
Calc f-
Calculated F value
P value <0.005 is significant

Table 1: Comparison of Mean ± Standard Deviation of Lipid profile and Anthropometric indices of adolescents attending rural and urban schools

	Males (n=25)	Females (n=25)	Calc. t	Crit. t	P (<=0.05)	Sig.
TC (mmol/L)	3.73±0.57	3.72±0.68	0.022	1.98	0.9824	NS
TG (mmol/L)	0.78±0.17	0.86±0.23	2.587	1.98	0.0128	Sig
HDL (mmol/L)	1.12±0.27	1.18±0.26	0.726	1.98	0.4711	NS
LDL(mmol/L)	2.10±0.72	2.90±0.91	3.350	1.98	0.0016	Sig
Weight (Kg)	46.16±12.01	49.32±10.68	0.963	1.98	0.3403	NS
Height (m)	1.68±0.07	1.59±0.06	5.036	1.98	0.000007	Sig
BMI (Kg/m^2)	17.30±3.81	19.33±3.61	1.894	1.98	0.0643	NS

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Crit f- Critical F Value
Calc f-
Calculated F value
P value <0.005 is significant

Table 2: Comparison of Mean ± Standard Deviation of Lipid profile and Anthropometric indices of adolescents attending rural schools by Gender

Parameters	Males (n=25)	Females(n= 25)	Calc. t	Crit . t	P (<=0.05)	Sig.
TC (mmol/L)	3.73±0.60	4.07±0.92	1.579	1.98	0.1210	NS
TG (mmol/L)	0.91±0.39	0.89±0.29	0.160	1.98	0.8733	NS
HDL (mmol/L)	1.05±0.56	1.04±0.46	0.054	1.98	0.9569	NS
LDL(mmol/L)	2.24±0.51	2.55±0.81	1.555	1.98	0.1265	NS
Weight (Kg)	58.68±8.69	53.0±9.92	0.253	1.98	0.8016	NS
Height (m)	1.68±0.08	1.61±0.03	4.155	1.98	0.000013	Sig
BMI (Kg/m^2)	1950±2.58	20.34±3.41	0.958	1.98	0.3430	NS

Key
TG - Triglyceride
TC- Total Cholesterol
LDL- Low Density Lipoprotein
HDL- High Density Lipoprotein
BMI - Body Mass Index
Sig- Significance
Ns- Not significant
Crit f- Critical F Value
Calc f-
Calculated F value
P value <0.005 is significant

Table 3: Comparison of Mean ± Standard Deviation of Lipid profile and Anthropometric indices of adolescents attending urban schools by Gender

Variables	Total % (n)	Rural % (n)	Urban % (n)	P(=<0.05)	Sig
Elevated TC (mmol/L)	12(6)	4(2)	8(4)	0.2904	NS
Elevated TG (mmol/L)	0(0)	0(0)	0(0)	—	—
Elevated LDL (mmol/L)	18(9)	14(8)	4(2)	0.2365	NS
Low HDL (mmol/L)	38(19)	12(6)	26(13)	0.045	Sig

Key
TG - Triglyceride
TC- Total Cholesterol
LDL- Low Density Lipoprotein
HDL- High Density Lipoprotein
Sig- Significance
Ns- Not significant

Table 4: Percentage indices of dyslipidemia in the adolescents attending rural and urban schools

In this study, a better lipid profile of the rural adolescents compared to urban adolescents was observed. Several factors might be associated with these biochemical differences between the two population groups which may be based on their socio-economic status, dietary habits, physical activities and means of livelihood (Gupta *et al.*, 2008). This was explained by the finding of this study, as adolescent living in the urban area had significant (P=<0.05) higher of serum TG, weight, and BMI. There was no significant difference (P>=0.05) in the mean value of TC, HDL, LDL and Height.

However, the mean value of TC was slightly higher in adolescent attending urban schools while HDL and LDL were slightly higher in adolescent attending rural schools. Equally, noted was that rural females have significantly (P=< 0.05) higher levels of TG and LDL while the height was significantly lower compared to their male counterpart. There was no significant difference in the mean value of TC, HDL and Weight among the sexes in urban too (Gharbi *et al.*, 2010).

The percentage of adolescent attending urban schools with increased value of TC was higher than their rural counterparts, the percentage of adolescent attending rural school with elevated LDL is higher than their urban counterparts; however, the difference was not statistically significant. The percentage of adolescent in urban schools with low HDL was higher in comparison with the adolescent attending rural schools and the difference was statistically significant (P=0.05). This is consistent with a study by (Gharbi *et al.*, 2010).

This study is also consistent with earlier studies of (Patel, *et al.*, 2015) which reported modernization associated reduced physical activities of urban populations and it is responsible for higher level of plasma cholesterol compared to their rural counterparts. Incidentally, those Living in rural areas have higher levels of physical activities with less exposure to sedentary behaviours compared to adolescents living in urban areas. This more active lifestyle may be associated with participation in the labour market, consistent mainly of physical labour in subsistence agriculture (Gupta *et al.*, 2008) and common household activities and farm work. Casual association between regular physical activity and reduced prevalence of chronic diseases such as coronary heart disease, hypertension, diabetes mellitus and osteoporosis were also reported (Gupta *et al.*, 2008).

Dietary habit is another factor recognized to be associated with lipoprotein status. In Aba Area, rural population generally consume plant protein more often than animal protein due to easy access to locally grown, fresh, and low-cost vegetables which they have grown in their farms in most cases. On the other hand, urban population, usually with higher income, consume higher amounts of animal protein, fat dairy products including junk and fast foods. (Das *et al.*, 2012).

Vegetable diets contain less saturated fat and cholesterol, and greater amounts of dietary fiber, and their consumption helps lower the level of Serum cholesterol. In the other hand, animal protein, fat dairy products, junk and fast foods are rich in both saturated and unsaturated fat then vegetable-based diet; its consumption in excessive amount, contributes to higher Serum lipoprotein. Evolution of lifestyle-associated

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morbidities are indeed drastically higher in developed countries because of consumption of diets with less fiber and high in lipids.

Characteristics of lipid profile of urban population; including their dietary habits and physical activities, are factors that may lead to dyslipidemia (Hoffman *et al.*, 2009). This current study does reveal that lipid profiles of adolescents in the urban population may predispose them to cardiovascular disease when compared to the rural population and this was mainly based on geographical location with respect to physical activity and nutritional Lifestyle.

Because of increasing prevalence of chronic diseases, particularly cardiovascular, resulting from dyslipidemia this study clearly indicates the need for prevention of hyperlipidemia among adolescents attending schools in Aba area.

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