LIPID PROFILE OF NEWLY DIAGNOSED TREATMENT NAÏVE HIV PATIENTS IN PORT HARCOURT, RIVERS STATE, NIGERIA

PUGHIKUMO DIBO T.[1], PUGHIKUMO OGHO C.[2], ONYEBUAGU PETER C.[1]

[1]*Departments of Human Physiology, Faculty of Basic Medical Sciences, Niger Delta University, Amassoma, Bayelsa State, Nigeria;*

[2]*Departments of Haematology, Niger Delta University Teaching Hospital Okolobiri, Bayelsa state Nigeria.*

Corresponding author: Pughikumo Dibo T.
Email: dibopughikumo@yahoo.ca
Phone No: +2348087871246

ABSTRACT
BACKGROUND
HIV/AIDS is known to destroy the body's immune system producing several complications one of which is lypodystrophy. Most anti-retroviral drugs especially the protease inhibitors are lypodystrophic. This constitutes a dual predisposition to cardiovascular disorders.

A positive correlation has been established between the development of lypodystrophy, cardiac abnormalities and raised plasma TCH and LDL and a negative one with raised HDL[1].

METHODS: This study assessed the lipid parameters (LDL, HDL, TGH and TCH) of newly diagnosed HIV subjects as compared to HIV apparently negative healthy controls. The lipid profile for 150 HIV positive, treatment naïve subjects were compared to that of 42 healthy controls.

RESULTS
The mean LDL, HDL, TCH, and TGH for the treatment na¿ve HIV subjects were, 1.08 ± 0.82, 1.29 ± 0.56, 4.45 ± 2.29, 1.27 ± 0.66mmol/l respectively while that for controls were, 1.40 ± 0.69, 1.12 ± 0.58, 2.94 ± 0.86, 0.97 ± 0.43mmol/l respectively.

The treatment naive HIV subjects had a low mean (0.28) which is an index for cardiovascular disease. The mean concentrations of the lipid parameters stratified by gender showed no differences in HDL and TGH, however, the male subjects had a significantly higher LDL and TCH than the female subjects.

CONCLUSION
The lipid profile of the controls was within normal limits. A minimal cardiovascular risk was noted amongst the subjects. This study underscores the need for lipid profile as a baseline and also for periodic monitoring of treatment.

BACKGROUND
Research on the lipid profile of the HIV infected population in our environment is limited. In the development of lypodystrophy and cardiac abnormalities, a positive correlation has been established with plasma TCH and LDL cholesterol concentration and a negative correlation with plasma HDL cholesterol [1]. In HIV infection, continuous viral replication leads to immune mediated destruction of the key immuneffector cells, (CD4+ lymphocyte) leading to a myriad of complications such as metabolic abnormalities (Glucose intolerance, Lipid derangements and fat maldistribution) [2]. Fat maldistribution is often referred to as lypodystrophy and in combination with insulin resistance and hyperlipidemia is called lypodystrophy syndrome [2,3].

Anti-retroviral drugs in use have also been implicated in the emergence of lypodystrophy. Both nucleoside analogues and protease inhibitors have been implicated and also predispose the subjects to cardiovascular problems [4,5]. The principal concerns that arise are possible increased risks of premature atherosclerosis and cardiovascular disease [6]. In addition to these concerns, in Nigeria, the only drugs available to most patients are principally those implicated in the pathogenesis of lypodystrophy syndrome. It is therefore pertinent that newly diagnosed patients do a baseline lipid profile so that patients already at risk of developing dyslipidemia and subsequent cardiovascular abnormalities can be identified and necessary treatment modifications made.

METHODS
A total of 192 adult Nigerians, 97 males (50.5%) and 95 females (49.5%) who met the inclusion criteria for the study were recruited after obtaining informed consent. Subjects

were made up of newly diagnosed HIV subjects who came to the University of Port Harcourt teaching hospital between 2006 and 2008 to complete their investigations before commencement of therapy. The subjects were 150, (64 were males and 34 were females). Only males and non-pregnant females above 15 years of age, with HIV positivity confirmed by the managing physicians using the ELISA technique who were anti-retroviral drug naïve and were willing to give informed consent were included in the study.

Forty two apparently healthy adults (33 males and 9 females) acted as controls. They were drawn from patient relatives and hospital staff. Their lipid parameters were estimated (HDL, LDL, TGH and TCH). Similar inclusion and exclusion criteria as stated above were used.

5mls of venous blood was collected from all subjects into Lithium Heparin bottles for lipid assay. The samples were separated and assayed within three hours of collection. Lipids were analyzed using the Commercial kits manufactured by Randox® was used was used for this assay. The results were analyzed using the SPSS version 15 for windows. The mean and standard deviation of the measured parameters were calculated. The student t-test was used as appropriate with a P value of <0.05 considered as statistically significant

RESULTS:
A total of 192 people participated in the study (150 subjects and 42 controls). 64 (42.7%) of the subjects were males and 86 (57.3%) were females. 9 (27.3%) of the controls were males while 33 (72.75) were females.

The mean triglyceride (TG) for the HIV positive treatment naïve subjects and that for the HIV negative subjects are shown on table 1. There is no statistically significant differences between both values, P = 0.005. The mean TG for the HIV positive treatment naïve female subjects and that for the healthy control female subjects are shown on table 3, and the mean for the HIV positive treatment naïve males and the HIV negative healthy control are shown on table 2.

LDL cholesterol values for the HIV positive treatment subjects were found not to be significantly different, P = 0.002. The mean for the HIV positive treatment naïve females and the healthy controls are shown on table 3.

The mean LDL cholesterol values for the HIV positive treatment naïve male subjects and for the HIV negative controls on table 2 shows a higher mean for the HIV positive subjects.

The mean HDL cholesterol values for HIV positive treatment naïve subjects and for the healthy controls in relation to their sexes are shown on tables 2 and 3. They were not significantly different (P=0.002).

The mean TCH for the HIV positive treatment naïve subjects and that for the HIV negative controls, (table 1) were found to be significantly different. The mean TCH for the HIV positive treatment naïve male subjects (table 4) and that for the male HIV negative controls were also found to be statistically significant. (P = 0.005).

The HIV positive treatment naïve male subjects were therefore noted to have higher mean LDL cholesterol and mean TCH as compared to the HIV positive treatment naïve female subjects**.**

DISCUSSION
There are scanty reports on the lipid profile of the HIV/AIDS population in our environment. The current study recruited 192 participants, 150 HIV positive and 42 HIV negative.

Though it was noted that the mean Total cholesterol levels for the treatment naïve HIV positive subjects 4.45 ± 2.29 mmol/l was found to be significantly different from the mean of the healthy negative controls 2.94 ± 0.86 mmol/l, it was however noted that the LDL cholesterol levels which is a better maker for cardiovascular risk factor is quite normal 1.08 ± 0.82 mmol/l. I.e. this mean value was similar to the values for the healthy controls, 1.40 ± 0.069 mmol/l mmol/l and for normal Caucasians 2.88 ± 0.05, though slightly lower than that gotten from studies on HIV treatment naïve Caucasians, 2.34 ± 3.90 mmol/l [7].

The study also noted that the high mean total cholesterol (TCH) level of 4.45 ± 2.29 mmol/l for the treatment naïve HIV positive subjects was similar to that from studies on treatment naïve HIV positive Caucasians, 4.45 ± 4.1 mmol/l, confirming the ravaging effect the HIV virus has on the lipid profile of infected individuals. On the other hand, the mean TCH for the healthy controls, 2.9 ± 0.86 mmol/l is lower than that obtained by Akpa *et al* in Port Harcourt and other studies in Benin and Jos (2.90 vs 4.76, 3.64, 3.54 mmol/l respectively) [7-9]. This might probably indicate that the stated rise in non-communicable diseases arising from increasing urbanization is not as expected.

The mean HDL cholesterol of 1.29 ± 0.55 mmol/l for the

HIV positive subjects is within normal range and is similar to that for HIV positive treatment naïve Caucasians 1.07 ± 1.3 mmol/l and the HIV negative healthy controls 1.12 ± 0.58 mmol/l However, when the mean HDL: HDL/TCH ratio is calculated for the HIV positive treatment naïve subjects, the value was low and similar to that for HIV positive treatment naïve Caucasians (0.28 Vs 0.24). The control however had a normal value of HDL: HDL/TCH ratio = 0.58. The place of HDL: HDL/TCH ratio in predicting cardiovascular risk is well documented, thus a normal mean TCH seen in the treatment naïve HIV positive subjects does not necessarily indicate freedom from cardiovascular risk because the low levels of HDL: HDL/TCH ratio indicates a possible minimal cardiovascular risk. The controls on the other hand had a good HDL: HDL/TCH ratio. This difference in HDL: HDL/TCH ratio between the HIV subjects and the healthy control subjects is possibly as a result of the destructive effects of the HIV virus on the immune system producing a host of metabolic complications.

The mean TGH for the HIV positive treatment naïve subjects was within normal limits and similar to values from other Nigerian studies on healthy Nigerians 1.27 ± 0.66 vs 0.79 ± 0.43-Kano, 1.42 ± 0.23-Ibadan but is however lower than values for untreated HIV positive Caucasians 4.13 ± 1.05 [5].

The mean concentrations of the lipid parameters stratified by gender showed no differences by gender in HDL and TGH, however, HIV positive treatment naive males had a significantly higher LDL 4.40 ± 2.91 mmol/l and TCH 6.52 ± 3.10 mmol/l than HIV positive females ,1.13 ±0.80 and 2.91 ± 0.97 mmol/l, Table IV.

TABLE 1: Mean lipid values of HIV positive treatment naïve subjects and negative controls (mmol/l)

LIPID TYPE	MEAN	
	HIV POSITIVE TREATMENT NAÏVE SUBJECTS	CONTROLS
TG (mmol/L)	1.27 ± 0.66	0.97 ± 0.43
LDL (mmol/L)	1.08 ± 0.82	1.40 ± 0.69
HDL (mmol/l)	1.29 ± 0.56	1.12 ± 0.58
TCH (mmol/L)	4.45 ± 2.29	2.94 ± 0.86

TABLE 2: Comparism of values TCH, HDL, LDL and TG for HIV positive males and healthy control males (mmol/l)

	HIV POSITIVE MALE	HEALTHY CONTROL	SIGNIFICANT DIFFERENCE
Mean TCH	6.59 ± 3.06	2.82 ± 0.88	Yes
Mean HDL	1.27 ± 0.45	1.02 ± 0.57	No
Mean LDL	4.40 ± 2.14	1.38 ± 0.70	Yes
Mean TG	1.28 ± 0.61	0.97 ± 0.45	No

TABLE 3: Comparism of values of TCH, HDL, LDL and TG for HIV positive females and healthy control females (mmol/l)

LIPID TYPE	HIV POSITIVE FEMALES	HEALTHY CONTROL FEMALES	SIGNIFICANT DIFFERENCE
Mean TCH (mmol/l)		3.37 ± 1.19	No
Mean HDL (mmol/l)	1.31 ± 0.63	1.46 ± 0.94	No
Mean LDL (mmol/l)	1.13 ± 0.80	1.48 ± 1.34	No
Mean TGH (mmol/l)	1.26 ± 0.69	0.93 ± 0.72	No

TABLE 4: Mean concentration of lipid parameters stratified by gender (mmol/l)

LIPID TYPE	HIV Positive	Healthy control Females	HIV Positive Treatment Naïve males	Healthy control Males
LDL (mmol/l)	1.13 ± 0.80	1.48 ± 1.34	4.40 ± 2.91	1.38 ± 0.70
HDL (mmol/l)	1.30 ± 0.63	1.56 ± 0.94	1.27 ± 0.45	1.02 ± 0.57
Tg (mmol/l)	1.26 ± 0.70	0.94 ± 0.72	1.28 ± 0.61	0.93 ± 0.45
TCH (mmol/l)	2.91 ± 0.97	3.37 ± 1.19	6.52 ± 3.10	2.82 ± 0.89

CONCLUSION

This study shows that, the lipid profile of the average Nigerian living within the Rivers state is within normal limits. It also showed a low HDL: HDL/TCH ratio in HIV positive subjects before therapy was initiated indicating the existence of a cardiovascular risk from HIV infection, consequently, although the cardiovascular risk in the HIV positive treatment-naive subjects is minimal, it is still important to monitor each patient closely by doing a baseline lipid analysis on each HIV positive subject before commencement of therapy. This is particularly important

because Nigeria is a resource poor country and so preventive medicine should be the key to reduce the financial burden on individuals already saddled with financial difficulties. Therefore healthcare practitioners should be advised on the need to do routine lipid profile on each patient before instituting therapy.

List of abbreviations

AIDS- Acquired immune deficiency syndrome

HDL - High density lipoprotein

HIV - Human immune deficiency virus

LDL- Low density lipoprotein cholesterol

TG - Triglyceride

TCH- Total cholesterol

SPSS-Statistical products and services

Authors' contributions

PDT conceived the study and carried out the assays for the lipid profile, POC participated in the design and co-ordination and helped to draft the manuscript and OPC participated in the design and performed the statistical analysis. All authors read and approved the final manuscript.

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