



Impact of 1 Year of Large-Scale Antiretroviral Drug Treatment on the Anthropometric Profiles and Treatment Outcomes of HIV-Adult Patients in the Rural District Hospital of Eastern Nigeria

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

The study aimed at assessing the evolution of body mass index of (BMI) and treatment outcome of Human immunodeficiency virus (HIV) adult-patients who were on antiretroviral therapy (ART) over a period of one year in a community district hospital with high prevalence of HIV attendance. One year retrospective follow-up study of the recruited patients was carried out using data collected from their treatment cards. One hundred and fifty-one patients were recruited for the study but eleven patients dropped as a result of clinical emergencies and breach of study protocol. Ninety-two (66%) were females and the rest adult males. Study patients were on four different World Health Organization

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(WHO) clinical stages at various numerical strengths. There were significant ($p>0.05$) synchronized linear increment of BMI and positive treatment outcomes following treatment with antiretroviral therapy (ART).

Keywords: Body mass index; human immunodeficiency virus; antiretroviral therapy.

1. INTRODUCTION

Joint United Nations Programme on HIV/AIDS (UNAIDS) estimates that by mid 1998, over 30 million people were living with HIV/AIDS, [1]. More than 90% of these people live in developing countries, where majority of the infected population have no access to any kind of medicaments and discrimination also is very high. While international agencies and federal government of Nigeria supply both antiretroviral drugs and anti-parasitic drugs free of charge to the people living with the virus through health institutions, discrimination and poor coverage to hinterlands where the infection is more prevalent, pose a great challenge. The infection has continued to be a major global public health problem, having killed more than 35 million lives so far in 2017 while 940,000 people died of HIV-related causes globally, [2].

However, with increasingly widespread use of potent combination antiretroviral therapy (ART) since 1996, substantial improved prognosis of people infected with HIV in sub-Saharan Africa has been observed. Administration of ART to people living with HIV and monitoring and evaluation of HIV/AIDS treatment programmes critically depend on regular and complete patient follow-up. Individual treatment decisions can then be made in the light of clinical and laboratory results, and treatment response, complication and mortality rates can be accurately estimated at the programme level, [3].

Body weight of people living with HIV has been an important diagnostic and evaluation measure. Low body mass index (BMI) is recognized as one of the first criteria for the clinical definition of AIDS. The current WHO clinical staging of the infection also includes moderate unexplained weight loss (<10%) presumed or measured body weight while clinical stage 2 is unexplained severe weight loss (>10%) of body weight or BMI < 18.5kg/m². Clinical stages 3 & 4 are unexplained severe wasting syndrome which is used to define advanced HIV infection, [4].

The BMI of people living with HIV infection is an important predictor of ART outcome, [5,6]

including the prediction of the CD4 cells change, [7] and death [8,9]. A negative change in BMI of patients was also found to be an dependent predictor of drop-out from care or non-response to the first line of treatment regimen and therefore, may demand need to change to second line treatment regimen. However, the BMI of patients with HIV is dependent on gender and also affected by drugs used to treat opportunistic infections such as isoniazid, cotrimoxazole, CD4 cells count and socio-economic profile.

Using data from a district health institution designated for diagnosis and management of HIV infection, we examine some anthropometric profiles of patients who have consistently been on ART for 1 year as an important and easily calculable tool to predict positive treatment outcome of HIV patients on ART.

2. MATERIALS AND METHODS

The correlation between gain in anthropometric status as a predictor of antiretroviral drugs (ARDs) efficiency was prospectively evaluated in all those who had been on ART over the period of March 13, 2012 to April 15, 2013 at Udi District Hospital in the Eastern geographical zone of Nigeria. This hospital is centrally situated and very proximate to Oji province where high prevalence of HIV infection had been reported. Screening and enrollment for the study began March 14, 2012 after approval of the protocol by the management of ethics hospital committee.

The study entails participants being willing to present themselves for weight, height and haematocrit evaluations. All the clients underwent anthropometrics measurement carried by a trained medical laboratory assistant. Clients' weights were measured without shoes, using seca scales, which had intervals of 0.5kg, height was measured to the nearest 0.1cm using a calibrated Scale consisting of a wooden platform with a scale and a sliding head piece. To reduce intra-individual error, weight and height were measured twice and the mean value was used for analysis. Weights for age; z-score was used

to denote underweight as an overall indicator for malnutrition. Height for; z-score was used as indicator for stunting (chronic malnutrition). Weight for height; z-score was used as an indicator for wasting (acute malnutrition). The z-scores were calculated based on median values of the National Centre for Health Statistics (NCHS). Blood from finger prick was used to evaluate haemoglobin status spectrophotometrically using Drabkins reagents. As outlined in the study protocol, participants (clients) must be willing and able to give informed consent, to access the drugs regularly without missing any appointments as prescribed by the care givers for the 12 months and without relocating their residence until the participants were followed-up for the 12 months and clients who were highly cachexic or debilitated by the infection were not recruited initially to minimize dropouts.

3. RESULTS

A total of 140 adult patients aged between 22 and 58 years who were on ART treatment regimen were recruited in the study. Out of the number (140), 92 (66%) were female. At the beginning of the study, we started with 151 adult patients but 11 patients out of this number dropped out, following emergencies and non-adherence to the treatment regimen respectively. Greater number of the study population was self employed 57 (41%) while the least affected was unemployed populace (8%). Body weight and haemoglobin level of all the patients who adhered strictly to the study protocol were measured on each visit for the 1 year study period apart from the one taken at the recruitment day.

Most of the patients had formal education of different levels 125 (89%). Seventy (50%) patients had WHO clinical stage II, 38 (27%) had WHO stage I while 32 (23%) had WHO clinical stage III and IV. There were significant synchronized linear increment of BMI and positive treatment outcomes following treatment with antiretroviral therapy (ART). The baseline

socio-demographic characteristic of the study patient is shown in Table 1.

Table 1. Baseline socio-demographic characteristics of study patients with HIV on ART in Udi district hospital. Eastern Nigeria, January 2020- December 2020

Variables	Frequency	Percentage
Age (years)		
22-31	35	25
32-41	62	44
42-51	27	19
>51	16	11
Sex		
Female	92	66
Male	48	34
Educational status		
Non formal education	15	11
Primary education	55	39
Secondary education	52	37
Tertiary education	18	13
Occupation		
Government employed	25	18
Private employed	32	23
Self employed	57	41
Unemployed	11	8
Student	15	11
WHO stages		
Stage I	38	27
Stage II	70	50
Stage III and IV	32	23
Functional status		
Working	125	89
Ambulatory	15	11
CPT given (960mg)		
Yes	95	68
No	45	32
INH		
Yes	10	7
No	130	93

Note: CPT – Cotrimoxazole prophylaxis therapy
 ART – Antiretroviral therapy
 INH – Isoniazid

Table 2. Baseline pre- and post- treatments outcomes of the study patients

Hb (range in g/dl)	Pre- treatment Frequency	Post treatment Frequency	P-value
6 – 8	85	32	p> 0.05
9 – 11	50	83	
>11	5	25	„

Hb (range in g/dl)	Pre- treatment Frequency	Post treatment Frequency	P-value
Weight (kg)			
30 – 39	39	18	”
40 – 49	40	44	”
50 – 59	59	65	”
>59	8	13	”
LFT			
Bilirubin (mmol/l)			
Total < 0.5 – 1.0	139	140	P< 0.05
Conjugated <0.5	139	140	”
Total >1.0	1	0	”
Alanine transaminase – ALT(mmol/l)			
< 3- 15mol/l	140	140	”
Aspartate transaminase AST			
<3 -18	140	140	”
Urea (mmol/l)	140	140	”
Creatinine (mmol/l)	140	140	”
CD4 cells <100- 198	140		”
>250		140	”

4. DISCUSSION AND CONCLUSION

Clients presenting with autoimmune deficiency syndrome are at risk of developing severe anaemia, sarcoma, etc and dying. Oral ARD treatment is therefore often recommended to ensure rapid antiretroviral bioavailability, and thus expedite reduction of the infecting retroviral biomass and therefore tune-up cluster of differentiation type 1V (CD4) cells as sub population of T-lymphocytes, [10].

This study carried out in district hospital attended by a community earlier reported to have high prevalence of HIV infection, showed direct correlation between BMI of patients on ART over time and positive treatment outcomes. There is a BMI on enrollment of patients studied and their BMI on treatment over time. Absolute compliance to prescribed treatment regimen was found to be a significant prediction of positive BMI changes. Gradual increment in BMI of study patients is attributed to efficiency of ART on HIV virus. However, the BMI of ambulatory and bedridden patients did not improve in synchrony with the duration of treatment received. This is attributed to their inability to move about which prevent them from accessing nutrition and balanced diet of their choice. This class of patient is susceptible to minor infections and osteoporosis because of institutionalization, [11]. More so, ART related metabolic changes cause hyperlipidanaemia, insulin resistance diabetes which enhances average weight gain, [12].

The BMI of patients at WHO stages 111 and 1V did not improve. This finding corroborates a multicentre study in a resource-poor settings which shows individuals who had high clinical status (WHO stages 111 and 1V) had poorer weight gain when compared with weight change in patients at lower WHO stage [13,14].

The duration of ART treatment with addition of isoniazid prophylaxis therapy (IPT) and cotrimoxazole prophylaxis therapy (CPT) correlate positively with resolution of opportunistic infections with increase in CD4 cell counts. This is obvious in wellbeing of patients and increase in their appetite. These multivariable factors result in significant improvement in the haemoglobin values of the study patients when their baseline haemoglobin values was compared with their haemoglobin values over treatment period. Also it was found out that simultaneous administration of IPT and CPT with ART regimen optimizes efficiency and effectiveness of ART and expedite patients' wellbeing and reduce opportunistic infecting biomass.

CONSENT

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

Animal Ethic committee approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Author has declared that no competing interests exist.

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