

# Epidemiology and Clinical Parameters of Adult Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome at the Initiation of Antiretroviral Therapy in South Eastern Nigeria

Eleje GU, Ele PU<sup>1</sup>, Okocha EC<sup>2</sup>, Iloduba UC<sup>3</sup>

Departments of Obstetrics and Gynecology, <sup>1</sup>Medicine, <sup>2</sup>Hematology, and <sup>3</sup>Pediatrics, Nnamdi Azikiwe University Teaching Hospital, PMB 5025, Nnewi, Anambra State, Nigeria

## Address for correspondence:

Dr. George Uchenna Eleje,  
Department of Obstetrics and  
Gynecology, Nnamdi Azikiwe  
University Teaching Hospital, PMB  
5025, Nnewi, Anambra State, Nigeria.  
E-mail: georgel21@yahoo.com

## Abstract

**Background:** Human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) has continued to ravage the teeming populations in Nigeria, with disastrous consequences. Despite many studies and progress on HIV/AIDS in Africa, the data on the status of the patients at the commencement of therapy is lacking. **Aim:** The aim of this study is to determine the demographic, clinical and some laboratory features of adult HIV/AIDS patients, seen at the commencement of antiretroviral therapy (ART) in Nnamdi Azikiwe University Teaching Hospital, Nnewi, south-east Nigeria between July 2002 and October 2004. **Subjects and Methods:** The study was a cross-sectional, descriptive study. Adult patients living with HIV/AIDS were studied using an interview administered questionnaire. Data was analyzed using Epi Info 2008 version 3.5.1. **Results:** A total of 400 respondents participated in this study. The mean age was 36.8 (8.8) years. Almost 60% patients were married and the HIV concordance rate was 53.3% (136/255). Nearly 30% of the families had at least one child positive for HIV. The most common associated risky behavior was injection administered in patent medicine stores 74.5%(302/400) and the most common clinical symptom was respiratory. Of the 400 patients recruited in this study, 19 (4.8%) were lost to follow-up on the 6 months' visit, giving a follow-up rate of 95.2% (381/400). There was statistically significant difference in the mean body weight ( $P = 0.02$ ), mean total white blood cell count ( $P < 0.001$ ) and mean CD4<sup>+</sup> count ( $P < 0.001$ ) at presentation and after 6 months of ART therapy. **Conclusion:** HIV/AIDS patients present late and body weight, CD4<sup>+</sup> count and total white blood cell count seemed to recover quickly on commencement of ART. The prevalence of concordance among couples and mother to child transmission rates tended to be high. Administration of injectable at patent medicine stores and multiple sexual partners are the most significant risk factors.

**Keywords:** Clinical patterns, CD4 counts, Epidemiology, Respiratory

## Introduction

The human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) pandemic is the most challenging

public health problem confronting developing countries today.<sup>[1]</sup> The number of people living with HIV/AIDS was around 34 million world-wide in 2010.<sup>[1]</sup> Sub-Saharan Africa has remained the most affected region in the global AIDS epidemic; with an estimated 22.5 million people living with HIV, nearly 70% of the global share.<sup>[1]</sup>

However, the health status of HIV positive individuals at the time of commencement of antiretroviral therapy (ART) plays a crucial role in the success of treatment.<sup>[2-6]</sup> HIV positive individuals with advanced HIV disease at the time of ART initiation are less likely to respond to treatment, are

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more likely to pose financial strain on health services and have a higher mortality rate compared to those who initiate earlier.<sup>[2-4,7-10]</sup>

In addition, late presentation poses a higher cumulative risk of HIV transmission to others, considering that earlier presentation and HIV-suppressive treatment might otherwise reduce viral load and risk of transmission.<sup>[5]</sup> A large proportion of HIV infected individuals in the developing world, roughly 15-43%, present at clinics for care with advanced or severe disease (World Health Organization stage 3 or 4 or CD4 lymphocyte count  $\leq 200$  cells/uL).<sup>[7]</sup>

Despite many studies on HIV/AIDS in Nigeria, the data on the status of the clients at the commencement of therapy is lacking. The pattern at the commencement of therapy is not clearly studied in Nigeria. Exploring the epidemiological and clinical patterns at the initiation of highly active antiretroviral therapy (HAART) in people living with HIV/AIDS will help decision makers to know where emphasis needs to be laid in educating the populace and legislation that needs to be put in place to check the spread of the virus.

The purpose of this study is to determine the demographic, clinical and some laboratory features of adult patients living with HIV/AIDS as seen at the commencement of ART in Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, south-east Nigeria between July 2002 and October 2004.

## Subjects and Methods

This study was a cross-sectional descriptive survey, carried out between July 2002 and October 2004 (a 28-month period). The respondents were the adult HIV/AIDS patients seen at Antiretroviral Disease Clinic of Nnamdi Azikiwe University Teaching Hospital (NAUTH), The adult anti-retroviral clinic (ARVD) clinic of Nnamdi Azikiwe University Teaching Hospital NAUTH serves the State and its environs.

Informed consent was obtained from all patients after having had the aims of the study explained to them. A total of 400 patients were interviewed during the study period.

New Adult patients seen at general out-patient clinic of the hospital for the 28-months study period were 1900. Sample size was derived using 43%<sup>7</sup> prevalence of HIV infected individuals in the developing world who present at clinics for care with advanced or severe disease giving 485. To achieve a 90% response rate, 485 was divided by 0.9 to give 539. However, only 400 agreed to participate in the study giving 74.2% response rate.

Over the 28-month study period, the researchers attended the out-patient ARVD clinic and through the case files extracted information as soon as the patients had been seen by the doctors in charge. These patients were also interviewed before they

exited the health facility. A total of 4 medical students were recruited and trained in the correct use of the questionnaire. A pilot questionnaire was pre-tested on 10 subjects and the relevant corrections made.

The diagnosis of HIV/AIDS was accepted when two enzymes linked immunosorbent assays (ELISA) for antibodies are positive to HIV-1 and HIV-2. Samples that tested positive in the first test (screening) were subjected to the second rapid ELISA. Only samples that were found to be reactive in both ELISA tests were considered positive.

Only positive patients whose CD4<sup>+</sup> counts were  $\leq 350$  cells/ $\mu$ L were included in the study and all were placed on ART. They were then followed-up monthly as out-patients. The CD4<sup>+</sup> counts and full blood counts were repeated after 6 months of ART and their body weight determined at each monthly check-up.

Permission to conduct this study was sought from and granted by the study hospital's Ethical Committee. Data analysis was performed using Epi Info 2008 (v 3.5.1; Epi Info, Centers for Disease Control and Prevention, Atlanta, GA) and STATA/IC software version 10 (USA). Comparative analysis was performed using Student's *t*-test and/or Chi-square test where applicable. A  $P < 0.05$  was taken as significant.

## Results

Of the 400 patients that participated in this study, 61.3% (245/400) were females and 38.7% (155/400) were males. This gives a female:male ratio of 1.6:1. The mean age of the patients was 36.8 (8.8) years (range is 18-59 years). As many as 59.5% (238/400) were married, 13.5% (14/400) were widowers, 3.3% (13/400) were separated while 36.3% (145/400) were single. Of these 400 subjects, 98.5% (394/400) were of the Igbo ethnic group of Nigeria.

Table 1 illustrates the occupation of the clients. Of the 255 patients who were married, divorced or separated, the majority, 53.3% (136/255) of these couples were HIV seropositive concordant, 9.8% (25/255) of the couples were discordant while 36.9% (94/255) spouses of these couples did not know their HIV status.

The majority, 71.5% (286/400) of the patients had children. Of the 286 patients that had children, 29.7% (85/286) of them had at least one child living with HIV/AIDS, 55.9% (160/286) had no child living with the disease; the status of the other children were not known [Table 2]. Up to 51.5% (206/400) patients were secondary school graduates; followed by primary 29.8% (119/400) and tertiary 18.8% (75/400).

Up to 19.0% (76/400) of patients had been transfused, 298 (74.5%) patients received drug injections in patent medicine stores while 365 (91.3%) patients had been sexually exposed,

**Table 1: The occupation of the adult HIV/AIDS patients**

Occupation	Frequency	Percentage
Trading	224	56.0
Driving	20	5.0
Civil servant	48	12.0
Unemployed	47	11.8
Student	23	5.8
Artisan	38	9.5
Total	400.0	100.0

HIV: Human immunodeficiency virus, AIDS: Acquired immunodeficiency syndrome

**Table 2: The number of children of adult HIV/AIDS patients suffering from HIV/AIDS**

Children	Frequency	Percentage
HIV seropositive	85	29.8
HIV seronegative	160	55.9
HIV status not known	41	14.3
Total	286	100.0

HIV: Human immunodeficiency virus, AIDS: Acquired immunodeficiency syndrome

**Table 3: Risky behavior indulged in by the patients**

Risky behavior	Frequency	Proportion
Drug injection at patent		
Medicine stores	298	74.5
Multiple sexual partners	267	66.8
Unscreened blood transfusion	76	19.2

with 267 (66.8%) having multiple sexual partners [Table 3]. None of the patients gave a history of prior intravenous drug use. However, of the number that had prior sexual exposure, 348 (95.3%) were heterosexuals. Furthermore, 330 (90.4%) of them did not use condom regularly. A total of 23 (5.8%) patients had opportunistic infections.

Of the 400 patients recruited in this study, 19 (4.8%) were lost to follow-up on the 6 months' visit. Therefore, the follow-up rate was 95.2% (381/400). There was no documented mortality and the specific causes of the loss to follow-up could not be determined. The mean weight of the patients on presentation was 60.6 (12.9) kg (range: 48-114 kg) while their mean body weight after 6 months of antiretroviral treatment was 62.7 (13.1) kg (range: 69-350 kg). The difference was statistically significant ( $t = -2.25, P = 0.02$ ).

The mean CD4<sup>+</sup> count, mean packed cell volume (PCV) and mean total white blood cell count of the patients were: 156.7 (93.0) cells/ $\mu$ l (range is 101-350 cells/ $\mu$ l), 31.9 (5.8)% and 4.5 (1.7) cells/ $\text{mm}^3$  respectively. After 6 months on therapy, these parameters became 301.1 (37.5) cells/ $\mu$ l (range was 209-550 cells/ $\mu$ l) ( $t = -28.20, P < 0.001$ ), 32.2 (5.8) % ( $t = -0.72, P = 0.47$ ) and 5.2 (0.2) cells/ $\text{mm}^3$  ( $t = -7.98, P < 0.001$ ) respectively.

## Discussion

The epidemiological features of adult HIV/AIDS seen at the study site's hospital in our data set is intriguing; these include a high prevalence of both mothers to child transmission (29.7%) and concordance for HIV seropositivity among couples (53.5%). Also interesting is our finding that parenteral injections administered in patent medicine stores and multiple sexual partners may be the most important routes of transmission of HIV in the study center and environs. These have implications for the future direction and policy actions. The majority (60%) of the affected subjects were females. This was similar to the current UNAIDS report in Nigeria.<sup>[11]</sup> This may have a extremely serious impact, especially in the issue of mother to child transmission of HIV/AIDS.

This study has revealed that the mean age of those that sought ART was 36.8 (8.8) years. However, studies from Nigeria reveal that the majority of those affected by HIV fall within the age brackets 20-24 years.<sup>[12]</sup> This is probably because of late presentation for clinical care. Studies clearly show that patients in developing countries present late for diagnosis and clinical care.<sup>[12]</sup> The reasons for this include poverty, stigmatization and ignorance.<sup>[12]</sup> Our findings clearly show that this is the same with HIV/AIDS presentation. Therefore to bring change, government policy must focus on eradication of poverty, stigmatization and ignorance.<sup>[13]</sup>

This survey has also shown that approximately 60% of the study populations were married, with more than 80% of them having children. Of these children, almost 30% tested HIV positive. This figure is alarming and this will invariably affect the future man power and Nigerian economy if nothing is done. Therefore, the strategy of prevention of mother to child transmission in our country Nigeria needs to be strengthened.

Most of the study population (>95%) indulged in risky sexual behavior. This is in line with other studies in Nigeria.<sup>[12]</sup> The factors that could contribute to this may include a lack of information about health and HIV, high levels of sexually transmitted infections, low levels of condom use and poverty. Our data set seems to suggest that blood transfusion was not the main mode of transmission, but it can be responsible for up to 10% of all HIV infections.<sup>[14]</sup> Almost 20% of our study subjects have had a history of blood transfusion. As there is no coordinated national blood supply system, blood is not routinely tested for HIV. Also, a study in 2005 found that 4% of blood donors in Lagos were HIV positive.<sup>[14]</sup> The report involving baby Eniola is a testimony to this fact.<sup>[14]</sup> In addition, the use of unsterilized syringes to dispense drug injections in patent medicine stores may be a very important transmission route as more than 75% of our study subjects had engaged in this type of risky behavior. It is noteworthy that the population is educated on the consequences of this risky behavior and policies are made to discourage this behavior.

Although specific income data were not available, the majority of the patients appeared to be from the lower socio-economic class. The probability is that patients in higher socio-economic groups may not want to attend a public anti-retroviral disease (ARD) clinic because of issues of stigmatization.

The HIV sero-discordance rate observed in this study was 9.8%. Among our patients, conception is usually an issue and many practice unsafe measures to conceive.<sup>[15,16]</sup> It is recommended that HIV discordant couples who want to achieve pregnancy should practice timed intercourse and post exposure prophylaxis. We believe that proper focused education will solve this problem.

The mean body weight of 60.6 (12.9) kg as shown from our finding was low. This is explained by the fact that weight loss is a common feature of HIV/AIDS. However, the weight of 62.7 (13.1) kg after 6 months of treatment, which is different statistically from the initial body weight, may suggest that despite late presentation of patients, retard of response to ART may not occur, especially when patients are taking the medications as prescribed.<sup>[1,2]</sup> Similar report has been reported by Olawumi *et al.*<sup>[17]</sup> in Ilorin, Nigeria, where the HAART regime is associated with the increase in CD4 count and weight gain with increases in CD4 count and weight correlated with duration of therapy. It is noteworthy that the population be educated concerning this.

The CD4<sup>+</sup> count is the main indicator of immune function in HIV infected patients and this value is used to determine when to initiate ART. It is well-known that HIV-positive patients with CD4<sup>+</sup> lymphocyte counts less than 200 cells/ml are severely immunocompromised. The mean level of CD4<sup>+</sup> count of 156.7 (93.0) cells/ $\mu$ l corroborates the fact that most of our patients present late. Although, the value of mean PCV did not significantly change after 6 months of antiretroviral (ARV) therapy, the value of the mean CD4<sup>+</sup> count and mean total white blood cell count did. Similar finding was reported by Olawumi *et al.*<sup>[17]</sup> This finding was interesting and suggested that in spite of late presentation, there is a tendency for the CD4<sup>+</sup> count levels and white blood cell count to respond immediately on initiation of ARV therapy. Therefore, in developing countries where many patients may not be able to afford to pay for CD4 cell counts and viral load tests, which are the traditional markers for HIV disease, total white blood cell count and body weight determination would be a very useful surrogate test for predicting severity of HIV infection and for clinical monitoring of response to ART. However, this observation needs to be validated using a larger cohort of patients. Nutritional deficiency may account to non-significant change in PCV levels.

This study had some limitations that could have influenced the findings. The study relies on clients' self-report of historical events (recall biases could have been present). The study could not determine the AIDS related complication in the women

studied. The complications may relate to the opportunistic infections that can occur in patients with HIV infection as well as development of cancers such as Kaposi's sarcoma, lymphoma and cervical carcinoma. None of these was revealed in our study.

In conclusion, HIV/AIDS is an important disease condition in the study environment. The main risky behaviors were multiple sexual partners, without proper condom use and the use of unsterilized needles in patent medicine stores. Furthermore, the patients tended to present late, although body weight, CD4<sup>+</sup> count and total white blood cell count recover early on commencement of ART. Prevalence of concordance among couples and mother to child transmission rates tended to be high. Efforts to expand education of patients, especially as to the use of unsterilized needles in patent medicine stores (presently not highlighted in any educational program); early intervention, voluntary counseling and testing, targeted prevention and treatment activities should be strengthened. In developing countries where many patients may not be able to meet the expense of paying for CD4 cell counts and viral load tests, which are the traditional markers for HIV disease, total white blood cell count and body weight determination would be a very valuable surrogate test for predicting severity of HIV infection and for clinical monitoring of response to ART. However, this observation needs to be validated using a larger cohort of patients. Further studies should be done to quantify the potential risk of HIV transmission that is inherent in use of unsterilized needles in patent medicine stores in our communities.

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