

Sociodemographic and Clinical Characteristics of Highly Active Antiretroviral Treatment-Naïve Human Immunodeficiency Virus-Seropositive Patients in Uyo, Nigeria: Are the Demographics Changing?

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Abstract

Background: Human immunodeficiency virus (HIV) infection poses a great health and economic burden, especially in developing nations where a high burden of disease has been described. A previous study in Uyo shows that some characteristics associated with a higher prevalence of HIV infection include female gender, exposure to tertiary level of education, and late disease presentation. This study aimed at determining the sociodemographic and the clinical characteristics of highly active antiretroviral treatment-naïve (HAART-naïve) HIV-seropositive patients at Uyo, Nigeria. **Materials and Methods:** This was a cross-sectional comparative study of 210 respondents, composed of 105 HAART-naïve HIV-seropositive patients (subjects) and an equal number of sex- and age-matched HIV-negative individuals (controls). Data were collected using pretested interviewer-administered questionnaires and hospital records. Anthropometry and blood pressure (BP) were measured for all the respondents, while clinical and immunologic staging were done for subjects. Data obtained were analyzed using SPSS v 20. $P \leq 0.05$ was taken as statistically significant. **Results:** The mean age of the respondents was 34.5 ± 9.2 years, and the male-to-female ratio was 1:2.3, with no difference between the subjects and controls ($P = 0.880$ for age and $P = 0.943$ for gender). Mean body mass index and mean diastolic BP were significantly lower in the subjects ($P < 0.001$ and 0.037 , respectively). Female gender, secondary level of educational attainment, and unskilled employment were significantly associated with HIV infection. Majority of the respondents presented in clinical Stage 1 or 2 disease, with CD4 count >350 cells/ml. **Conclusion:** The burden of HIV infection is higher in females and in those with sociodemographic characteristics suggestive of lower socioeconomic status, however, majority of these appeared to present in early disease.

Keywords: Highly active antiretroviral treatment-naïve, human immunodeficiency virus seropositive, sociodemographic, Uyo

BACKGROUND

Human immunodeficiency virus (HIV) infection, the cause of acquired immune deficiency syndrome (AIDS), causes a great public health and developmental challenge.^{1,2} Since its first detection over 35 years ago, approximately 35 million people worldwide have been affected and millions have died from it, with sub-Saharan Africa being the worst affected region.³⁻⁵ Globally, an estimated 37.9 million people, aged 15 years and above, were living with HIV/AIDS in 2018.⁶ Nigeria has a prevalence of HIV/AIDS of 1.4% presently which shows a remarkable drop from 3.4% reported previously. Akwa Ibom State has the highest prevalence (5.6%) of HIV at present,

though this is a drop from the previous 6.5% reported for the state.^{7,8} About 15 years ago, a study in Uyo demonstrated that HIV/AIDS is more prevalent in the young, in females, in

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the unmarried, and in those with tertiary level of education, with majority presenting in late disease.⁹ In the past few years, targeted HIV prevention programs which involve a complementary combination of behavioral, biomedical, and structural strategies have led to changes in the HIV infection trend, including its sociodemographics.¹⁰

This study sets out to determine the sociodemographics and clinical characteristics of highly active antiretroviral treatment (HAART)-naïve HIV-seropositive patients in Uyo and compare the same with HIV-seronegative respondents as well as determine if the sociodemographics are changing. This will aid in disease surveillance, prevention, and control.

MATERIALS AND METHODS

Study area

The study was done at the HIV clinic of the University of Uyo Teaching Hospital (UUTH), Uyo, Akwa Ibom State, Nigeria. The UUTH is a 500-bedded hospital situated in Uyo, the capital of Akwa Ibom State, and serves as the main tertiary hospital in the state. From UUTH hospital records, approximately eighty new cases of HIV infection are seen monthly at the UUTH.

Sample size determination

The sample size was calculated using the formula for comparison of two groups in a cross-sectional study: $n = 2(z^2pq/d^2)$,¹¹ where

n = the desired sample size

z = standard normal deviate, set at 1.96 which corresponds to 95% confidence level.

P = Prevalence of HIV in Akwa Ibom State in 2012, taken as 6.5%⁸

$q = 1 - p$, d = degree of precision = 5% = 0.05

Applying the above,

$$\frac{2\{1.96^2 \times 0.065 \times 0.935\}}{(0.05)^2}$$

= 186.

An estimated minimum sample size of 186 was calculated. This was increased to 220 to take care of nonresponse rate of 20%. However, a total of 210 respondents were studied, comprising 105 HAART-naïve HIV-seropositive patients and an equal number of age- and sex-matched HIV-seronegative respondents.

Ethical consideration

Ethical approval for the study was obtained from the Health Research Ethical Committee of the UUTH, Uyo. Informed consent was obtained from each of the respondents before the collection of their data. Respondents names were not written on the questionnaires to ensure confidentiality. The study was not invasive. All respondents were educated on the aim and benefits of the study before recruitment. Datastores were encrypted to prevent unauthorized access.

Study population

The study population consisted of all HIV-seropositive patients diagnosed with double enzyme-linked immunosorbent assay (ELISA), who were HAART naïve and who presented at the HIV clinic of the UUTH. A total of 210 respondents were studied, comprising 105 in the subject group and 105 controls.

The control group consisted of healthy age- and sex-matched volunteers from among the staff and students of affiliated institutions with the UUTH as well as patients' relatives who gave consent to participate in the study and who were HIV negative, following voluntary counseling and testing.

Inclusion and exclusion criteria

Inclusion criteria included a diagnosis of HIV/AIDS by double ELISA and being 18 years and above. Exclusion criteria included exposure to HAART, pregnancy, severe illness, chronic kidney disease, and/or chronic Liver disease.

Sampling technique

A simple random sampling technique (balloting) was used to select the respondents. An average of 150 HIV-positive clients, both old and new, are seen weekly at the clinic. Every fourth patient who met the inclusion criteria and did not meet any of the exclusion criteria was selected. An average of 10 respondents were selected weekly from the clinic days, which runs four times a week, from Monday to Thursday.

Data collection

Data were obtained with the use of interviewer-administered structured questionnaires and hospital records. The questionnaires were administered to the respondents by trained health-care providers, who were five in number. Clinical assessment which included general physical and systemic examination and anthropometric measurements (height, weight, waist circumference, and hip circumference) were done for each respondent in both the subject and the control groups. Duration since diagnosis of HIV infection was recorded for each subject. Clinical stage was assigned to them using the WHO staging system.¹² Blood pressure (BP) was measured with Accoson™ mercury sphygmomanometer of appropriate cuff size. An average of two readings was taken: one on the 1st day of contact with them and the other reading on the 2nd day of contact with them. The recent CD4⁺ counts (within a period of 6 months) of each of the respondents in the study group were retrieved from their folders and recorded in the questionnaires. Data collection was done from October 2016 to March 2017.

Data management

Data analysis was done using SPSS version 20 statistical software (SPSS Inc., Chicago, Ill, USA). The baseline sociodemographic and clinical characteristics of the respondents were analyzed. Mean \pm standard deviation (SD) was computed for normally distributed continuous variables and median and their corresponding interquartile range for continuous variables that were not normally distributed. Proportions of the categorical variable were computed.

Differences in anthropometric and clinical characteristics between subjects and controls were analyzed using Student's *t*-test, while differences in proportions were tested using Chi-square. $P \leq 0.05$ was taken as statistically significant.

RESULTS

A total of 210 respondents were studied, consisting of 105 subjects and 105 controls. There were 63 males and 147 females studied, giving a male-to-female ratio of 1:2.3, which was similar in the subjects and controls. The mean age \pm SD of the respondents was 34.5 ± 9.2 years, which was similar in both the subjects and controls. The sociodemographic characteristics of the respondents are shown in Table 1. Majority of the respondents in both the subject and control groups were single (45.7% of subjects and 59% of controls). The trend in marital status is similar in both the groups, with majority of the respondents being single (45.7% of the subjects and 59% of the control group). There were more respondents that were either widowed or separated among the subject group (15.2% and 6.7%), respectively, than the control group (1% and 3.8%). Majority of the subjects (51.4%) had unskilled employment as against skilled employment (78.1%), which was most common among the controls. In terms of the highest education level, the subjects attained mainly primary (18.1% vs. 1.0%) and secondary education (44.8% vs. 20%), while the controls attained mainly tertiary education (79% vs. 35.2%). The mean body mass index (BMI) was significantly lower in the subjects when compared with the controls ($P < 0.001$). Mean diastolic BP was also significantly lower in the subjects than the controls ($P = 0.037$).

Other sociodemographic characteristics are shown in Table 1.

Table 2 compares the age and sex distribution of the subjects and controls. The distribution of age and gender shows that the subjects and controls were matched for age and sex.

Table 3 shows the clinical staging, immunologic staging, and duration since diagnosis of HIV infection. Majority of the HIV-positive respondents presented in either Stage 1 or Stage 2 clinical staging (73.3%), with the highest being Stage 1 (43.8%). Majority of the respondents (65.7%) had CD4⁺cell count >350 cells/m³, which suggested early disease, while 34.3% had CD4⁺cell count <350 cells/m³, suggesting late disease. Majority of the respondents (45.7%) were diagnosed to have HIV infection within 1–3 months before enrollment into the study.

DISCUSSION

This study was aimed at assessing the sociodemographic and clinical characteristics of HAART-naïve HIV-seropositive clients in Uyo, Akwa Ibom State, Nigeria. It shows that HIV infection is more common in the young and in females among those presenting at the UUTH. The peak age of HIV infection of 25–39 years observed in this study is similar

to what was observed in previous studies in Nigeria, where HIV infection was shown to affect mainly young people between the ages of 25 and 39 years.^{13,14} A previous study on the sociodemographic characteristics of HIV-positive patients in Uyo showed that the most affected age range was 31–43 years, with females being significantly more affected than males (51.3% vs. 46.9%).⁹ This is similar to what was observed in our study, however, the married and those who attained tertiary education were the most affected in the previous study, unlike in our study where those with lower educational attainment (secondary and primary school) and those who are single were more affected than those who had tertiary education and the married. This trend may be due to improved awareness and education about HIV and AIDs leading to less risky sexual behaviors, which may be practiced more by the well educated and well informed, who are also likely to be more financially empowered than the poorly educated ones. Lack of financial empowerment may expose the less educated to risky sexual behaviors such as rape and commercial sex work. Fear of stigmatization may, however, cause highly educated patients to assess care from other states or other centers within Akwa Ibom State, thereby leading to underreporting of the disease burden in them. However, the participants in this study were HAART naïve, with majority newly diagnosed. This study shows that more females are infected with HIV, which is similar to what was observed in a previous study in Uyo.⁹ Several studies have demonstrated a higher prevalence of HIV infection among women in underdeveloped countries, as shown in this study.¹⁵⁻¹⁷ Reasons adduced to be responsible include polygamy, low financial empowerment, and higher biological susceptibility to HIV infection.¹³⁻¹⁵ The lower level of educational attainment may also explain this. HIV infection is a disease that has been shown to be linked with poor social and economic status.^{7,16} Young people, especially if not well informed, may engage in unhealthy sexual practices, and this is likely to make them vulnerable to HIV infection. The trend in marital status was similar in both the subjects and controls, with majority being single. Previous studies have also demonstrated that HIV infection is more common in those who are single.^{13,14} The trend in level of education and occupation suggests that the HIV-positive respondents belonged to subcategories that tend to suggest lower socioeconomic status. This is similar to what was observed in previous studies conducted in both developed and developing countries, including Nigeria.^{13-15,17} Low educational attainment and low income have been associated with a higher risk of HIV infection. Poor people in some settings, especially in resource-poor settings, have been shown to undertake particular risky practices, for example, earlier sexual exposure or reliance on commercial sex.^{13-15,17} The current trend in the sociodemographics of HIV/AIDS in Akwa Ibom State may be attributed to more awareness of the disease among those with higher socioeconomic status who are also likely to be married, advanced in age, and resident in urban areas. The mean BMI of the HIV-positive respondents was significantly lower than that of the controls. The mean

Table 1: Sociodemographics, anthropometric and blood pressure of the respondents

Variables	HIV subjects <i>n</i> (%)	Control <i>n</i> (%)	χ^2	<i>P</i> value
Sex				
Male	32 (30.5)	31 (29.5)	0.023	0.880
Female	73 (69.5)	74 (70.5)		
Age group			1.724	0.943
20-24	10 (9.5)	10 (9.5)		
25-29	24 (22.9)	29 (27.6)		
30-34	24 (22.9)	26 (24.8)		
35-39	19 (18.1)	13 (12.4)		
40-44	11 (10.5)	10 (9.5)		
45-49	6 (5.7)	6 (5.7)		
50 and above	11 (10.5)	11 (10.5)		
Marital status			16.058	0.001
Single	48 (45.7)	62 (59.0)		
Married	34 (32.4)	38 (36.2)		
Widowed	16 (15.2)	1 (1.0)		
Separated/divorced	7 (6.7)	4 (3.8)		
Occupation			57.686	< 0.001
Unemployed	21 (20.0)	14 (13.3)		
Unskilled	54 (51.4)	9 (8.6)		
Skilled	30 (28.6)	82 (78.1)		
Level of Education			45.775	< 0.001
Informal	2 (1.9)	0 (0.0)		
Primary	19 (18.1)	1 (1.0)		
Secondary	47 (44.8)	21 (20.0)		
Tertiary	37 (35.2)	83 (79.0)		
Anthrop/BP	HIV subjects Mean±SD	Controls Mean±SD	<i>T</i>	<i>P</i> value
BMI	23.39±4.42	26.32±4.35	4.825	<0.001
WC (cm)	83.03±10.61	85.02±10.17	1.388	0.167
HC (cm)	93.97±11.76	96.26±10.97	1.456	0.147
WHR	1.57±0.51	1.49±0.51	1.166	0.245
SBP (mmHg)	119.85±18.44	121.12±16.36	0.530	0.596
DBP (mmHg)	74.57±12.69	78.15±12.05	2.097	0.037

Table 2: Age and gender distribution of subjects and controls

Age group	Subject			Control			χ^2	<i>P</i> value
	Male <i>n</i> (%)	Female <i>n</i> (%)	Total <i>n</i> (%)	Male <i>n</i> (%)	Female <i>n</i> (%)	Total <i>n</i> (%)		
20-24	0 (0.0)	10 (13.7)	10 (9.5)	1 (3.2)	9 (12.2)	10 (9.5)	2.810	0.832
25-29	5 (15.6)	19 (26.0)	24 (22.9)	8 (25.8)	21 (28.4)	29 (27.6)		
30-34	12 (37.5)	12 (16.4)	24 (22.9)	12 (38.7)	14 (18.9)	26 (24.8)		
35-39	9 (28.1)	10 (13.7)	19 (18.1)	6 (19.4)	7 (9.5)	13 (12.4)		
40-44	2 (6.3)	9 (12.3)	11 (10.5)	1 (3.2)	9 (12.2)	10 (9.5)		
45-49	1 (3.1)	5 (6.8)	6 (5.7)	1 (3.2)	5 (6.8)	6 (5.7)		
≥50	3 (9.4)	8 (11.0)	11 (10.5)	2 (6.5)	9 (12.2)	11 (10.5)		
Total	32 (100.0)	73 (100.0)	105 (100.0)	31 (100.0)	74 (100.0)	105 (100.0)		

diastolic BP was also significantly lower in HIV-positive patients. Reasons that may be adduced for the lower mean BMI include lack of exposure to HAART and the HIV virus itself. Human immunodeficiency virus infection is known to cause variable degrees of weight loss, depending on the

immunologic status and the clinical staging.¹⁸ Treatment for HIV has been shown to improve weight in HIV-infected individuals.¹⁸ The lower mean diastolic BP observed in the HIV-positive respondents in this study may also be because they were not on treatment with HAART. Previous studies

Table 3: Clinical, Immunologic staging (CD4 count) and Duration since diagnosis of HIV infection

	Frequency	Percent
Clinical stage		
1	46	43.8
2	31	29.5
3	14	13.3
4	14	13.3
CD4 count		
Early disease (>350 cells/m ³)	69	65.7
Late disease (<350 cells/m ³)	36	34.3
Duration (months)		
1 – 3	48	45.7
4 – 12	17	16.2
>12	40	38.1

have demonstrated that hypertension in HIV infection is more prevalent in HAART-treated individuals when compared with HAART-naïve patients and correlated positively with BMI-defined obesity.¹⁹⁻²² The explanation for this is partly due to the improvement in BMI associated with HAART. Our study, however, did not include HAART-treated individuals, and the mean BMI was significantly lower than that of the control group.

Increased waist–hip ratio has been shown to be a feature of the HIV lipodystrophy syndrome.²³ The higher mean WHR observed in the subjects, though not significant, may be due to the effect of HIV infection on fat redistribution. Waist–hip ratio may be a better indicator of obesity in HIV infection, especially when advanced, since marked weight loss as seen in the disease is capable of affecting BMI, waist circumference, and hip circumference as in our study, where these parameters were lower than in the controls. Further studies are needed on the sensitivity of the anthropometric indices, namely WHR, BMI, and WC, in assessing for obesity in HIV-infected individuals.

Majority of the HIV-positive respondents presented at an early clinical stage of the disease (clinical Stages 1 and 2), with the highest number in Stage 1 disease, likewise majority had a CD4 cell count of >350 cells/m², which also suggest early disease. Duration since diagnosis was within 1 year for most patients, with the highest number being 1–3 months. This is in contrast with previous observation in Akwa Ibom, where majority of the respondents presented late, with CD4 cell count <300 cells/ml.⁹ The early presentation observed in our study may be attributed to improved surveillance, improved testing, and education by the various HIV prevention and treatment programs in Akwa Ibom State, which make residents living with HIV to be identified and treated early. Early presentation and early treatment will improve survival and reduce mortality and morbidity associated with the disease as well as control the transmission. This will contribute in reducing the burden of the disease in Akwa Ibom State and in Nigeria.

CONCLUSION

Majority of the HIV-positive respondents in our study belong to a subgroup that suggests lower socioeconomic status, though presentation was at early stages of the disease. The HIV preventive programs in Akwa Ibom State should be targeted at improving the socioeconomic status of residents through educational empowerment, provision of job opportunities, and skills acquisition program. This, however, requires the support and participation of the government as well as nongovernmental organizations. Waist–hip ratio may be a better indicator of obesity in advanced HIV/AIDS.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Joint United Nations Programme on HIV/AIDS (UNAIDS) Core Slides. Global Summary of the AIDS Epidemic 2016. Available from: <http://www.unaids.org>. [Last accessed on 2017 Oct 20].
2. Joint United Nations Programme on HIV/AIDS (UNAIDS) Global Report Annexes 2012. Available from: <http://www.unaids.org>. [Last accessed on 2015 Jul 12].
3. Joint United Nations Programme on HIV/AIDS (UNAIDS). AIDS at 30: Nations at the Crossroads 2011. Available from: <http://www.unaids.org>. [Last accessed on 2015 Jul 08].
4. Guha P, Sardar P. Prevalence of Paediatric HIV Infection in Eastern India-First Report; 2011.
5. Nsimba SE, Irunde H, Comoro C. Barriers to ARV adherence among HIV/AIDS positive persons taking anti-retroviral therapy in two tanzanian regions 8-12 months after program initiation. *J AIDS Clin Res* 2010;1:111.
6. Joint United Nations Programme on HIV/AIDS (UNAIDS). Fact Sheet 2018. Available from: <http://www.unaids.org>. [Last accessed on 2019 Dec 15].
7. National HIV/AIDS Indicator and Impact Survey. National Summary Sheet. March 2019. Available from: <http://www.naca.gov.ng>. [Last accessed on 2019 Nov 20].
8. Programmatic Findings: National HIV/AIDS and Reproductive Health Survey (NARHS); 2012.
9. Opara DC, Umoh IB, John M. Sociodemographic and anthropometric variables of persons living with HIV/AIDS in Uyo, South-Southern Nigeria. *Pak J Nutr* 2007;6:547-57.
10. HIV and AIDS Preventive Programme Overview 2019. Available from: <http://www.avert.org>. [Last accessed on 2020 Jan 10].
11. Paikh M, Hazra A, Mukherjee, Gogtay N. In: *Research Methodology Simplified, Every Clinician, a Researcher*. 1st ed. Mumbai: Medknow Publications; 2010. p. 112.
12. The Revised WHO Clinical Staging of HIV/AIDS and Case Definition; 2007.
13. Ogunmola OJ, Oladosu YO, Olamoyegun MA. Relationship between socioeconomic status and HIV infection in a rural tertiary health center. *HIV AIDS (Auckl)* 2014;6:61-7.
14. National Agency for the Control of AIDS (NACA) United Nations General Assembly Special Session (UNGASS) Country Progress Report: Nigeria. Reporting Period: January 2008–December 2009. Abuja, Nigeria: NACA; 2010. Available from: http://data.unaids.org/Pub/report/2010/Nigeria_2010country_progress_report_en.pdf. [Last accessed on 2016 Dec 10].
15. Quinn TC, Overbaugh J. HIV/AIDS in women: An expanding epidemic. *Science* 2005;308:1582-3.

16. Perry MJ. Gender, race and economic perspectives on the social epidemiology of HIV infection: Implications for prevention. *J Prim Prev* 1998;19:97-104.
17. Hargreaves JR. Socioeconomic status and risk of HIV infection in an urban population in Kenya. *Trop Med Int Health* 2002;7:793-802.
18. Palella FJ Jr., Delaney KM, Moorman AC, Loveless MO, Fuhrer J, Satten GA, *et al.* Declining morbidity and mortality among patients with advanced human immunodeficiency virus infection. HIV outpatient study investigators. *N Engl J Med* 1998;338:853-60.
19. Muhammad S, Sani MU, Okeahialam BN. Cardiovascular disease risk factors among HIV-infected Nigerians receiving highly active antiretroviral therapy. *Niger Med J* 2013;54:185-90.
20. Bergersen BM, Sandvik L, Dunlop O, Birkeland K, Bruun JN. Prevalence of hypertension in HIV-positive patients on highly active retroviral therapy (HAART) compared with HAART-naïve and HIV-negative controls: Results from a Norwegian study of 721 patients. *Eur J Clin Microbiol Infect Dis* 2003;22:731-6.
21. Peck RN, Shedafa R, Kalluvya S, Downs JA, Todd J, Suthanthiran M, *et al.* Hypertension, kidney disease, HIV and antiretroviral therapy among Tanzanian adults: A cross-sectional study. *BMC Med* 2014;12:125.
22. Dimala CA, Atashili J, Mbuagbaw JC, Wilfred A, Monekosso GL. Prevalence of hypertension in HIV/AIDS patients on highly active antiretroviral therapy (HAART) compared with HAART-naïve patients at the Limbe regional hospital, cameroon. *PLoS One* 2016;11:e0148100.
23. Meininger G, Hadigan C, Rietschel P, Grinspoon S. Body-composition measurements as predictors of glucose and insulin abnormalities in HIV-positive men. *Am J Clin Nutr* 2002;76:460-5.