**Original Article**

# Association Between Socio-Demographic Factors and Adherence to Treatment by HIV Patients Undergoing Anti-Retroviral Treatment at The University of *Calabar* Teaching Hospital, *Calabar, Nigeria*

**Paul Madukwe Ekperi**[*1], **Wike Young Nyejirime**[2], **Uduonu Ekezie**[3] **and Chinonye Peace**[2]

[1]Institute for Development Studies, University of Nigeria Enugu Campus, Enugu State, Nigeria
[2]Department of Human Physiology, University of Nigeria Enugu Campus, Enugu State, Nigeria
[3]Department of Medical Rehabilitation, University of Nigeria Enugu Campus, Enugu State, Nigeria

## ABSTRACT

Adherence has been shown to be a major predictor of viral suppression of HIV replication, emergence of ART drug resistance, disease progressions, and death. This study examined the association between demographic factors and adherence to treatment (clinic appointment and drug prescription) by HIV patients undergoing ART in University of *Calabar* Teaching Hospital, *Calabar, Nigeria. The study further examined the reasons for non-adherence to treatment.* A cross-sectional descriptive survey was adopted for the study and a structured questionnaire used to elicit information from four hundred respondents who fits into the inclusion criteria. Descriptive statistics such as frequencies, percentages and tables where used to analyze and present data collected on demographic characteristics. The association
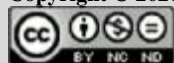
between respondents' demographic characteristics and adherence to clinic appointment and prescribed drugs were analyzed inferentially using Pearson Chi-square test of association. Older HIV patients were found to adhere to clinic appointment and drug prescription than the younger patients. However, females were found to adhere to treatment more than the males. Furthermore, level of education was found to determine or influence adherence as HIV patients with formal education had higher adherence rate than those without formal education. Top on the list of the reasons for non-adherence to clinic appointment were distance, forgetfulness, cost of prescribed drugs, fear of been seen and religious beliefs. There is need for quality counseling for HIV patients undertaking ART to understand the implication of non-adherence. The government and health centers should give priority to improving adherence level to ART programme through free drug provision and constant follow up on HIV patients. Furthermore, the campaign against the stigmization of HIV patients should be intensified.

**Keywords:** Socio-demographic, Adherence, HIV patients, ART, UCTH

## INTRODUCTION

Sub-Saharan Africa contains just over 10% of the world's population but is home to nearly two thirds of the world's HIV/AIDS cases. An estimated 3.2 million people in Africa became newly infected with HIV in 2005, while 2.4 million adults and children died of AIDS (UNAIDS, 2005). Sub-Saharan Africa is the epicenter of the HIV/AIDS pandemic and faces an unprecedented devastation.

Nigeria has the second largest HIV epidemic in the world. Although HIV prevalence among adults is much less (2.8%) than other sub-Saharan African countries such as South Africa (18.8%) and Zambia (11.5%), the size of Nigeria's population means 3.1 million people were living with HIV in 2017 (UNAIDS, 2018). Six states in Nigeria account for 41% of people living with HIV, including Kaduna, Akwa Ibom, Benue, Lagos, Oyo, and Kano (NACA, 2017). HIV prevalence is highest in Nigeria's southern states (known as the South South Zone), and stands at 5.5%. It is lowest in the southeast (the South East Zone) where there is a prevalence of 1.8%. There are higher rates of HIV in rural areas (4%) than in urban ones (3%).

The Federal Government of Nigeria initiated the national Anti-Retro Viral (AVR) program in January 2002 as part of an expanded response to care and support for PLWHA. Under this program, 10,000 adults and 5000 children were treated with a 3-drug ARV combination; 2 NRTI (lamivudine + stavudine) and 1 NNRT (nevirapine). The program began in February 2002 involving 25 treatment centers across the 6 geopolitical zones of the country and was subsidized at a cost of US$ 10 a month for each patient. Unfortunately, in 2004 the program suffered a major setback when it was hit by a shortage of the US$ 3.5 million worth of drugs imported from India. During this time, many patients were off drugs for up to 3 months, which created a

structurally-induced non-adherence problem in the national ARV drug program. Eventually, the program was resumed when another US$ 3.8 million worth of drugs was ordered and received (Idigbe EO, Adewole TA, Eisen G, et al. 2006, Lambo, 2005).

Treatment adherence defined as the extent to which a person currently takes prescribed medication is widely agreed that in order to achieve an undetectable viral load and prevent the development of drug resistance, a person on ARV drugs needs to take at least 95% of the prescribed doses on time (Gill CJ, Hamer DH, Simon JL, Thea DM, Sabin LL, 2005). There is no gold standard to measure adherence. Commonly used methods include patient self-report, pill counts, pharmacy refill records, drug level monitoring, electronic drug monitoring, and physician assessment, each of which has advantages and disadvantages. The most commonly used method in resource-limited settings is self-report or pharmacy refill records (Chesney, 2006).

Adherence has been shown to be a major predictor of viral suppression of HIV replication, emergence of ART drug resistance, disease progressions, and death. Adherence monitoring and evaluation of ART are, therefore, essential public health surveillance tools in the prevention of HIV in high, middle, and low income countries (Mills, Nachega & Buchan, et al. 2006).

Efforts to reduce HIV-related morbidity and mortality require that HIV patients adhere to scheduled appointments and drug prescription. Regular attendance at scheduled medical appointments is necessary for medical treatment, behavioral interventions, and monitoring of CD4 counts and viral load levels. Individuals who miss medical appointments are more likely to have poorer HIV health status, including lower CD4 counts and higher viral loads (Berg et al, 2005). Studies examining appointment-keeping among adults with HIV infection report a substantial proportion of missed medical care appointments, with rates ranging from 12–36% (Catz *et al.,* 1995; Kissinger et a, 1995; Israelski et al, 2001). One study of HIV-infected adolescents found that they missed 33% of their scheduled appointments over a six-month period (Rothertham, 2012).

Factors have been identified by several studies for non- adherence of HIV patients to clinic appointments and drug prescription. These factors include transportation cost, busy schedule, forgetfulness, side effects of the drugs, illiteracy, and stigmatization, high pill burden, literacy level, negative perception towards ART medication, and non-availability of drugs at treatment site (Carter, 2005; Nyambura, 2009; Igwegbe, 2010).

The purpose of this study is to examine and establish if there is any statistical association that exists between demographic characteristics and adherence to clinic appointment and drug prescription by HIV patients.

## MATERIALS/METHODS

A cross-sectional descriptive survey was adopted for the study. The study was conducted at the University of *Calabar* Teaching Hospital, *Calabar*. Four hundred adult HIV patients were consecutively brought into the study based on the inclusion criteria of: adult patients willing to participate and those who have been on ART for at least one month.

A structured questionnaire was developed and used as instrument for data collection. The first part captured the demographic characteristics of the respondents while the second part captured their adherence to treatment expressed in terms of attendance to clinic visitation and adherence to prescribed drugs.

Having tested the instrument for data collection in a pilot study in another outpatient station and a Cronbach Alpha of 0.87 gotten via statistical analysis, the instrument was considered reliable for the study.

Descriptive statistics such as frequencies, percentages and tables where used to analyze and present data collected on demographic characteristics. The association between respondents' demographic characteristics and adherence to clinic visitation and prescribed drugs were analyzed inferentially using Pearson Chi-square test of association with $p \leq 0.05$. This was done with the aid of SPSS (version 17).

## RESULTS

Table 1 shows that 87 (21.8%) of the respondents were within the age range of 18 – 30years, 166 (41.5%) were 31 – 50years, 127 (31.7%) in 51-70years while 20 (5.0%) fall within the age group of 70 years and above.

Sex of the respondents showed that 300 (75.0%) were females while 100 (25.0%) were males.

On ethnic group, Igbo were 220 (55.0%), Yoruba 40 (10.0%), Hausa were 35 (8.6%), while others were 105 (26.4%).

With regards to marital status, 213 (53.2%) were married, 130 (32.5%) were single, 39 (9.8%) were divorced, while 18 (4.5%). Based on religion, Christians were 300 (75.0%), 66 (16.5%) were Islam and other were 34 (8.5%)

On Educational attainment, those with tertiary education were 140 (35.0%), 116 (29.0%) had secondary education, 50 (12.5%) had primary education while 94 (23.5%) of the respondents had no formal education.

On occupation, 59 (14.8%) respondents were farmers, 139 (34.7%) were business men and women, 107 (26.7%) were civil servants, 73 (18.3%) were students while 22 (5.5%) were unemployed.

**Table 1: Demographic characteristics of respondents**      **(n = 400)**

| Variables | Frequency | Percent |
|---|---|---|
| **Age range** | | |
|     18-30years | 87 | 21.8 |
|     31-50years | 166 | 41.5 |
|     51-70years | 127 | 31.7 |
|     70 and above | 20 | 5.0 |
| | | |
| **Sex** | | |
|     Female | 300 | 75.0 |
|     Male | 100 | 25.0 |
| | | |
| **Ethnic group** | | |
| | 220 | 55.0 |
|     Igbo | 40 | 10.0 |
|     Yoruba | 35 | 8.6 |
|     Hausa | 105 | 26.4 |
|     Others | | |
| **Marital status** | | |
|     Married | 213 | 53.2 |
|     Single | 130 | 32.5 |
|     Divorced | 39 | 9.8 |
|     Widowed | 18 | 4.5 |
| **Religion** | | |
|     Islam | 66 | 16.5 |
|     Christian | 300 | 75.0 |
|     Others | 34 | 8.5 |
| **Educational attainment** | | |
|     No Formal | 94 | 23.5 |
|     Tertiary | 140 | 35.0 |
|     Secondary | 116 | 29.0 |
|     Primary | 50 | 12.5 |
| **Occupation** | | |
|     Farming | 59 | 14.8 |
|     Business | 139 | 34.7 |
|     Civil servant | 107 | 26.7 |
|     Student | 73 | 18.3 |
|     Unemployed | 22 | 5.5 |

**Table 2: Chi-square test of association between the socio-demographic variables (age, sex, marital status, educational attainment, occupation) and the adherence to treatment by HIV patients.**

| Variable | Variable option | Always | Sometimes | Total | $X^2$ | P-value |
|---|---|---|---|---|---|---|
| | | Adherence to clinic appointment and drug prescription | | (n = 400) | | |
| Age | 18 - 30years | 67(77.0) | 20(23.0) | 87 | | |
| | 31-50years | 128(77.1) | 38(22.9) | 166 | | |
| | 51-70years | 97(76.4) | 30(23.6) | 127 | 252.178 | 0.001 |
| | 71 and above | 15(75.0) | 5(25.0) | 20 | | |
| Sex | Female | 260(86.7) | 40(13.3) | 300 | | |
| | Male | 75(75.0) | 25(25.0) | 100 | 384.564 | 0.000 |
| Marital status | Married | 179(84.0) | 39(16.0) | 213 | | |
| | Single | 110(84.6) | 20(15.4) | 130 | | |
| | Divorced | 30(76.9) | 9(23.1) | 39 | 244.035 | 0.000 |
| | Widowed | 15(83.3) | 3(16.7) | 18 | | |
| Educational attainment | No formal | 80(85.1) | 14(14.9) | 94 | | |
| | Tertiary | 128(91.4) | 12(8.6) | 140 | | |
| | Secondary | 100(86.2) | 16(13.8) | 116 | 358.420 | 0.001 |
| | Primary | 35(70.0) | 15(30.0) | 50 | | |
| Occupation | Farming | 50(84.7) | 9(15.3) | 59 | | |
| | Business | 122(87.8) | 17(12.2) | 139 | | |
| | Civil servant | 84(78.5) | 23(21.5) | 107 | 357.157 | 0.000 |
| | Student | 46(63.0) | 27(37.0) | 73 | | |
| | Housewife | 17(77.3) | 5(22.7) | 22 | | |

Table 2 shows that there was significant association between the demographic characteristics and adherence to clinic appointment and drug prescription. With a p-value <0.05, there is a significant association between row and column variables.

**Factors Responsible For Non-Adherence To Treatment By Hiv Patients**

Table 3 shows that 130 (32.5%) of the respondents stated that distance was responsible for their non-adherence. 95 (23.8%) said it was lack of time, 31(7.8%) said their religious faith was responsible, 7 (1.8) said it was the attitude of health workers, 57(14.3%) said it was the fear of been stigmatized, 32(8.0%) said it was the cost of getting the drugs, while 48(12.0%).

**Table 3 showing reasons for non-adherence to clinic appointment and drug prescription by HIV patients**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | Distance | 130 | 32.5 |
| | Lack of time | 95 | 23.8 |
| | Religious Faith | 31 | 7.8 |
| | Attitude of health workers | 7 | 1.8 |
| | Fear of been stigmatized | 57 | 14.3 |
| | Cost of drugs | 32 | 8.0 |
| | Forgetfulness | 48 | 12.0 |
| | Total | 400 | 100.0 |

## DISCUSSION

Adherence has often been reported to be a major issue in management of chronic diseases such as HIV. Some HIV studies indicate that high levels of adherence are necessary for viral suppression, prevention of resistance, and disease progression (Bangsberg *et al*, 2001).

The effects of socio-demographic factors on adherence have also been analyzed. Some studies have found associations between increased adherence rates and patients who are older, male and/or have a higher income. Findings from this study support the above claim that age played a vital role in determining adherence. Older HIV patients were found to adhere to clinic appointment and drug prescription than the younger patients. However, females were found to adhere to treatment more than the males. This finding is similar to that of Manmeet *et al.,* (2012).

Furthermore, level of education was found to determine or influence adherence as HIV patients with formal education had higher adherence rate than those without formal education. This is supported by Bangsberg *et al,* (2001) who observed that literate patients are more aware of the implications of treatment adherence than the illiterate ones and so would most likely adhere more.

Top on the list of the reasons for non-adherence to clinic appointment was Distance. Patients who had easy access to ART clinics were more adherent than those who spent long hours travelling to treatment facilities. This is similar to the finding of Charurat *et al.,* 2010; Shumba *et al.,* 2013 and Nozaki *et al.,* 2011). Cost of purchasing prescribed drugs also affected adherence to treatment by HIV patients. This is also accompanied by forgetfulness as noted by the respondents. Wanchu *et al.,* (2007) have shown in their study that the major reasons for non-adherence was financial constraints, forgetting to take the medication, drug toxicity, lack of access to drug, fear of getting immune to the benefit of the drug, and to avoid side effects. Not having

money to travel to ART centre and drug purchase and forgetting to take the medication were the major reasons for non-adherence in the African setting.

Fear of been seen and religious beliefs where other factors that was found to influence adherence. Kitara and Aloyo (2012) observed that despite the massive HIV/AIDS public enlightenment campaigns, yet stigmatization of HIV patients still exist and has constituted a major reason for low adherence to clinic visit and counseling by HIV patients.

## CONCLUSION

Demographic characteristics were found to influence adherence to clinic appointment and drug prescription by HIV patients. There is need for quality counseling for HIV patients undertaking ART to understand the implication of non-adherence. Furthermore, the government and health centers should give priority to improving adherence level to ART programme. The programme should be made free, accessible and qualitative.

## REFERENCES

A. O. Igwegbe, J. O. Ugboaja, and L. A. Nwajiaku, "Prevalence and determination of non-adherence to antiretroviral therapy among HIV positive pregnant women in Nnewi, Nigeria," International Journal of Medicine and Medical Sciences, vol. 2, no. 8, pp. 238–245, 2010.

A. W. Nyambura, Factors that influence non-adherence to antiretroviral therapy among HIV/AIDS patients in central province, Kenya [Ph.D. thesis], 2009, http://www.who.int/hiv/.

Bangsberg DR, Perry S, Charlebois ED, Clark RA, Roberston M, Zolopa AR, et al. Non-adherence to highly active antiretroviral therapy predicts progression to AIDS. AIDS. 2001; 15:1181–3.

Berg MB, Safren SA, Mimiaga MJ, Grasso C, Boswell S, Mayer KH. Nonadherence to medical appointments is associated with increased plasma HIV RNA and decreased CD4 cell counts in a community-based HIV primary care clinic. AIDS Care. 2005;17:902–907.

Catz SL, McClure JB, Jones GN, Brantley PJ. Predictors of outpatient medical appointment attendance among persons with HIV. AIDS Care. 1999;11:361–373.

Charurat, M, Oyegunle, M, Benjamin, R, Habib, A, Eze, E, Ele, II, Ajayi, S, Eng, M & Mondal, P. 2010. Patient retention and adherence to antiretroviral in a large antiretroviral therapy program in Nigeria: a longitudinal analysis for risk factors.

From: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2868044 (accessed 25 March 2013).

Chesney MA. The elusive gold standard: future perspectives for HIV adherence assessment and intervention. J Acquir Immune Defic Syndr. 2006;43( Suppl 1):S3–S9.

Gill CJ, Hamer DH, Simon JL, Thea DM, Sabin LL. No room for complacency about adherence to antiretroviral therapy in sub-Saharan Africa. AIDS. 2005;19:1243–1249.

Idigbe EO, Adewole TA, Eisen G, et al. Management of HIV-1 infection with combination of Nevirapine, Stavudine, and Lamivudine; a preliminary report on the Nigerian antiretroviral program. J Acquir Immune Defic Syndr. 2005;40(1):65–69. 15.

Israelski D, Gore-Felton C, Power R, Wood MJ, Koopman C. Sociodemographic characteristics associated with medical appointment adherence among HIV-seropositive patients seeking treatment in a county outpatient facility. Preventive Medicine. 2001;33:470–475.

Kissinger P, Cohen D, Brandon W, Rice J, Morse A, Clark R. Compliance with Public-Sector Hiv Medical-Care. Journal of the National Medical Association. 1995;87(1):19–24.

Kitara and Aloyo (2012). HIV/AIDS Stigmatization, the Reason for Poor Access to HIV Counseling and Testing (HCT) Among the Youths in Gulu (Uganda) Afr. J. Infect. Dis. (2012) 6(1): 12 - 20

Lambo E. Nigeria has established 74 ARV treatment centers nationwide. HIV/AIDS News. 2006 March 15.

M. Carter, "Adherence. Information series for HIV positive people. NAM," 2005, http://www.aidsmap.com/Adherence/cat/1464/.

Mills EJ, Nachega JB, Buchan I, et al. Adherence to antiretroviral therapy in sub-Saharan Africa and North America: A meta-analysis. JAMA. 2006; 296(6):679–690.

NACA (2017) 'National Strategic Framework on HIV and AIDS: 2017 -2021' [pdf

Nozaki, I, Dube, C, Kakimoto, K, Yamada, N & Simpungwee, JB. 2011. Social factors affecting ART adherence in rural settings in Zambia. From: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3144480/ (accessed 14 December 2018)

Rotheram-Borus MJ, Murphy DA, Coleman CL, Kennedy M, Reid MH, Cline TR. Risk acts, health care, and medical adherence among HIV+ youths in care over time. AIDS and Behavior: 2012; 199;1:43–52.

Shumba, C, Atuhaire, R, Imakit, R, Atukunda, R & Memiah, P. 2013. Missed doses and missed appointments: adherence to ART among adult patients in Uganda.

Page116

ISRN AIDS. Article ID 270914. From: http://www.hindawi.com/ism/aids/2013/270914/ref (accessed 15 March 2013).

UNAIDS (2005) Report on the global AIDS Epidemic. Available at: www.unaids.org Accessed January 15, 2019.

UNAIDS (2017) Data Book [pdf]

UNAIDS 'AIDSinfo' [Accessed October 2018]

Wanchu A, Kaur R, Bambery P, Singh S. Adherence to generic reverse transcriptase inhibitor-based antiretroviral medication at a Tertiary Center in North India. AIDS Behav. 2007;11:99–102.

WHO. World health statistics 2007. Geneva, Switzerland: World Health Organization; 2007