

# Adherence to Antiretroviral Therapy among HIV-infected Patients in UBTH, Benin City, Nigeria

Type of Article: Original

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## ABSTRACT

### BACKGROUND

*Evidence from clinical studies has shown that for most HIV positive patients near perfect adherence ( $\geq 95\%$ ) are required for virological suppression and clinical success. This degree of adherence is far greater than that commonly associated with other chronic diseases and this is quite difficult for most patients to maintain over the course of a lifelong illness. The study was therefore carried out to determine the level of adherence to antiretroviral therapy and to identify predictors of adherence and non-adherence.*

### METHODOLOGY

*A descriptive cross-sectional study design was utilized for the study and it was carried out over a period of four months (Oct 2007 to Feb 2008). Systematic sampling was used to select 273 HIV positive patients receiving treatment at PEPFAR clinic, UBTH, Benin City. An interviewer administered questionnaire was used to collect data. Adherence was assessed using patients self-report on the percentage of prescribed doses taken within a one month period. Adherence score of 95% was taken as the cut-off point. Data analysis was by SPSS version 15.0, and the level of significance was set at  $p < 0.05$ .*

### RESULTS

*The level of adherence to antiretroviral chemotherapy was 241(88.3%). The most*

*common reason for non-adherence to chemotherapy was being busy 38(30.4%) and forgetfulness 33(26.4%), whereas adherence was associated with the duration of treatment.*

### CONCLUSION

*Adherence level in the study was 88.3%, whereas the optimal adherence required to achieve clinical success is  $\geq 95\%$ . This adherence gap remains a source of concern, therefore adherence counseling is strongly recommended.*

### KEYWORDS

*Adherence; antiretroviral therapy; Benin City, Nigeria.*

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### INTRODUCTION

According to United Nations Programme on HIV/AIDS(UNAIDS) an estimated 33.4 million persons in the world have HIV/AIDS and nearly two-thirds of them live in sub-Saharan Africa.<sup>1</sup>The prevalence of HIV/AIDS in these countries vary between 5-15%, although some countries in the Southern part of Africa have prevalence as high as 40%<sup>1,2,3</sup>. Combination therapies of antiretroviral drugs are the treatment of choice in the management of HIV/AIDS. They are known to affect viral suppression, reduce HIV related morbidity and mortality, delay progression to AIDS and improve survival. They are not known to effect cure hence the patients are placed on medications (antiretroviral) on a lifelong

basis<sup>45</sup>. Adherence to antiretroviral (ARV) drugs is therefore an important predictor in the successful management of HIV/AIDS. It needs to be assessed and addressed prior to instituting therapy in order to optimize disease outcomes and avoid the consequences of non-adherence which includes; development of resistant viral strains, drug failure, progression of disease etc. Adherence is affected by a combination of factors such as medication related issues, patient related issues which will include personal behavior and attitudes, socio-cultural challenges, economic issues, patient – health care provider relationship as well as the system of care<sup>6,7,8</sup>.

Adherence has been defined as the extent to which a patient takes medication or intervention correctly as has been prescribed. Various methods have been employed in assessing adherence and the level of adherence is specific not only to place and patient group but also to the method used in measuring adherence<sup>9,10</sup>. The method that can be used are the direct methods which will include the use of biological markers, body fluid assay e.t.c and the indirect method which will include use of self-reports, interview, pill counts, pharmacy records, computerized medication caps and viral load monitoring. Although a combination of these methods may be employed, patient self – report is the most widely used especially in resource-limited setting such as ours. It is also pertinent to note that they all have their merits and demerits; however there is no gold standard of measure<sup>11-13</sup>. Results of studies carried out in different parts of the world have shown that the average rate of adherence varied between 45-100% for the developing countries and 20-100% for developed countries<sup>8,14,15</sup>. Evidence from clinical studies have also shown that for most patients near perfect adherence (95%) is required for virologic suppression and clinical success. This degree of adherence is far greater than that commonly associated with other chronic diseases and this is quite difficult for most patients to maintain over the course of a lifelong illness<sup>16, 17</sup>. In view of this, the study was therefore carried out to determine the

level of adherence to antiretroviral therapy and to identify the predictors of adherence/non-adherence and to seek ways of improving the rate of adherence to antiretroviral therapy, in order to achieve sustained virologic suppression and clinical success among these HIV-positive patients.

## METHODOLOGY

The study was carried out in PEPFAR clinic of University of Benin Teaching Hospital (UBTH), Benin City, Nigeria. The hospital is located on a 150-acre site along the Benin-Lagos express way; about 8km from the city centre. A descriptive cross-sectional study design was utilized and the study was carried out over a period of four months (Oct 2007 to Feb2008). A minimum sample size of 273 was calculated using the appropriate formulae for sample size determination<sup>18</sup>. All HIV positive adult persons ( $\geq 18$ years) who had received chemotherapy for at least one month before the commencement of the study were included in the study and all HIV positive patients who were not up to 18years of age and had not received antiretroviral for up to one month were excluded from the study including non-consenting PLHIV. Systematic sampling method was then used to select respondents on each clinic day using the hospital appointment list as the sampling frame until the required number of respondents was recruited. Adherence was assessed using patients self-report and the level of adherence was expressed quantitatively as the percentage of prescribed doses taken over the number of doses prescribed within a one month period. An adherence score of 95% was taken as the cut off point for adherence. Ethical clearance was sought and obtained from the UBTH ethical committee before the commencement of the study. Informed consent was also obtained from each participant before administration of the questionnaire. Data was collected using structured, interviewer administered questionnaire and analyzed using SPSS version 15.0. Chi square statistical test of association was carried out where applicable and the level of significance was set at  $p < 0.05$ .

## RESULT

A total of 273 respondents were surveyed, their ages ranged from 19-70years with a higher proportion 107(39.2%) of them being within the 30-39years age bracket. The mean age of the respondents was 36.5 9.2 years. Majority of the respondents 187(68.5%) are females and most of them 141(51.6%) were married. The predominant religion was Christianity 265(97.1%) and a higher proportion of the respondents 158(57.9%) had secondary education. Using the UK Registrar's social classification majority of the respondents were in social class five 113 (41.4%).

Using 95% as the cut off mark point for adherence, 241 (88.3%) of the respondents were adherent (Figure 1)

The reasons for not adhering to ARV chemotherapy were being away from home 38(30.4%), forgetfulness 33(26.4%), being busy 30(24.0%), being too ill 6(4.8%), others 18(14.4%), others include; cost of transportation, fear of being identified with the disease, adverse effect of the drugs, taking too many drugs, etc. (Table 2)

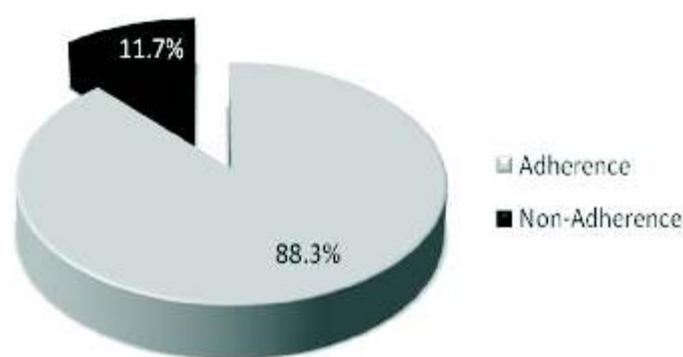
Respondents who were adherent and had secondary level of education were 142 (89.9%) compared to 16 (10.1%) who were not adherent. This difference was not statistically significant ( $P = 0.266$ ). Respondents who used psychoactive substance such as alcohol and were adherent were 63(85.1%), compared to 11(14.9%) who were not adherent. This observed difference was not statistically significant ( $P=0.397$ ) (Table 3)

Respondents who had correct perception of the benefit of HIV antiretroviral chemotherapy and were adherent were 196 (89.9%) compared to 22(10.1%) who were not adherent. This difference was not statistically significant ( $P=0.249$ ). Respondents who had received chemotherapy for 5 months and above and were adherent were 11(68.8%) compared to 5 (31.2%) who were not adherent. The observed difference was statistically significant.

( $P=0.044$ ) (Table 4)

**Table 1:** Socio-demographic characteristics of respondents

Variables	Total n(%)
<b>Age (years)</b>	
< 20	15(5.5)
20-29	53(19.4)
30-39	107(39.2)
40-49	72(26.4)
50-59	17(6.2)
>59	9(3.3)
<b>Sex</b>	
Male	86 (31.5)
Female	187 (68.5)
<b>Marital status</b>	
Single	74(27.1)
Married	141(51.6)
Divorced/separated	25(9.2)
Widowed	33(12.1)
<b>Religion</b>	
Christianity	265(97.1)
Muslim	6(2.2)
Traditional religion	1(0.4)
Pagan	1(0.4)
<b>Social class</b>	
Social class I	1(0.4)
Social class 3	56(20.5)
Social class 4	103(37.7)
Social class 5	113(41.4)
<b>Level of Education</b>	
None	8 (2.9)
Primary	47 (17.2)
Secondary	158 (57.9)
Tertiary	60 (22.0)



**Figure 1: Level of adherence**

Using adherence level of 95% as the cut off, 241(88.3%) of the respondents were adherent.

**Table 2:** Reasons for missing medication

Respondents	Freq (%)
Forgetfulness	33(26.4)
Being busy	30(24.0)
Being away from home	38(30.4)
Being too ill	6(4.8)
Others	18(14.4)

\*\*Multiple Response

**Table 3:** Adherence and some variables

Variable	Adherence	Non - Adherence	Total (%)
Level of Education			
None	8(100.0)	0(0.0)	8 (100.0)
Primary	38(80.9)	9(19.1)	47(100.0)
Secondary	142(89.9)	16(10.1)	158(100.0)
Tertiary	53(88.3)	7(11.7)	60(100.0)
Total	241(88.3)	32(11.7)	273(100.0)
P = 0.266			
Substance use			
Yes	63(85.1)	11(14.9)	74(100.0)
No	178(89.4)	21(10.6)	199(100)
Total	241(88.3)	32(11.7)	273(100.0)
P = 0.397			

**Table 4:** Adherence and some variables

Variable	Adherence	Non - Adherence	Total (%)
Perception of benefit of therapy			
Incorrect	45(81.8)	10(18.2)	55(100.0)
Correct	196(89.9)	22(10.1)	218(100.0)
Total	241(88.3)	32(11.7)	273(100.0)
P = 0.249			
Duration of Treatment (months)			
1-2	177(89.4)	21(10.6)	198(100.0)
3-4	53(89.8)	6(10.2)	59(100.0)
≥5	11(68.8)	5(31.2)	16(100.0)
Total	241(88.3)	32(11.7)	273(100.0)
P = 0.044			

## DISCUSSION

Majority of the respondents fell within the age bracket of 30-39years with a mean age of 36.59.2years. This is similar to that found in studies carried out in Benin, Nigeria with a mean age of 36.3±7.9years<sup>14</sup>, Bangalore, India where the mean age of respondents was 39.982years<sup>19</sup>, and in Calabar, south-south,

Nigeria where the mean age was recorded as 35.7±9.32 years<sup>20</sup> and 39.1±9.6 years in Ile-Ife, Nigeria<sup>21</sup>. These findings are not different from what has been documented in literature that the incidence of HIV/AIDS is highest between 20-49years of age. HIV is known to affect the economically viable age group, hence the far reaching effect of the disease on the socio-economy of the families and societies affected<sup>20-22</sup>. Most of the respondents (97.1%) were Christians; this is expected as the study was carried out in South-South geo-political zone of the country where the predominant religion is Christianity.

Majority 41.4% of the respondents belonged to social class 5. These persons had low level of education, hence poor access to health information as a result; their ignorance can further predispose them to high risk behavior hence higher chances of acquiring HIV/AIDS.

Furthermore over two-thirds of the study participants were females, it is similar to the findings of the study conducted in Calabar, Nigeria where about 68.6% of the study participants were females<sup>20</sup> and in Benin, Nigeria where over 52% of the participants were also females<sup>14</sup>. These findings are not different from what has been documented earlier. For instance statistics from CDC showed that at the end of the year 2010, one in four persons living with HIV/AIDS were women. This has been attributed to the physiological structure of the female reproductive organ where the seminal fluid can stay for as long as four days and over, such that the virus in the semen makes longer contact with the lining of the female reproductive tract, hence greater chances of the woman acquiring the virus quite unlike in the males where the male reproductive organ makes minimal contact with an infected partner just during the intercourse.

The level of adherence in the study is 88.3% and it is similar to that found in some sub-Saharan African countries such as Kenya and Cameroun. In a study carried out in Kenya the adherence level was found to be 82.0%<sup>17</sup> and

87.0% in a Cameroonian study<sup>25</sup>. The adherence level was however found to be lower in some developed countries; for instance in a study conducted in North America the level of adherence was (55.0%)<sup>26</sup> and in California, USA it was found to be (50.0%)<sup>8</sup>. The rate of adherence obtained in a study is largely dependent upon the method used in measuring it. Evidence from previous studies have shown that self-reported adherence measure tended to produce estimates of adherence that are 10-20% higher than those of direct methods of measure such as electronic drug monitoring, however the direct methods of measure are quite expensive hence are rarely used in poor resource setting such as ours.

Adherence in the study was dependent upon the duration of treatment, while another study carried out in the same centre but at different time intervals found that adherence was dependent on educational level of the participants and side effects of the drugs<sup>14</sup>.

Adherence in the study was lower than the 95% threshold required for virologic suppression and clinical success, this 88.3% adherence rate identified in the study can lead to the development of drug resistance and treatment failure. Various factors were however found to be responsible for this and they include; being away from home (30.4%), forgetfulness (26.4%) and being busy (24.0%) etc. The result of the study is similar to the findings a survey conducted in Ethiopia where the main reasons for non-adherence was forgetfulness (79.8%)<sup>27</sup>. A Kenyan study also showed that the main reason for non-adherence was being busy and forgetfulness (38.0%)<sup>17</sup>. Similarly the main reasons for non-adherence from the Calabar study was being busy (43.8%), and forgetfulness (31.1%)<sup>20</sup>. A study carried out in Vietnam also identified being busy at work (33.0%), and forgetfulness (21.5%), as some of the reasons for non-adherence<sup>26</sup>. Different studies carried out in different parts of the globe have identified various factors as being responsible for non-adherence. These factors are largely; socio-

economic factors, health care factors, social capital, cultural methods of health care and disease, personal characteristics, psychological factors, clinical factors, anti-retroviral regimen, etc.

Since the level of adherence from the study is lower than the required 95% adherence rate necessary to achieve virological suppression and clinical success, and more so forgetfulness and being away have been identified as the main reasons for non-adherence, there is therefore need to employ strategies like reminders on the popular cell phones that will constantly remind the patient to take his/her medication. Close family relatives should be identified during adherence counseling and incorporated into the patient's management profile prior to the commencement of ART since adherence to chemotherapy has a bearing on the success or failure of the antiretroviral programme.

Some major limitations of assessing ART adherence by self-report are recall bias and social desirability bias; however these biases were minimized by limiting adherence assessment to a one-month period, limiting interviewers to persons who are not affiliated with UBTH PEPFAR clinic and also validating patients responses by counting the pills remaining from the previous month's prescription by a health care worker when they come for their visits.

## CONCLUSION

Adherence level identified in the study is sub-optimal, being lower than the 95% adherence level required to achieve virological suppression and clinical success. There is therefore need to employ the use of mobile phones reminders, treatment partners and continual adherence counseling, since being busy and forgetfulness have been identified as the main reasons for non-adherence.

## REFERENCES

1. United Nations programme on HIV/AIDS (UNAIDS) AIDS epidemic update. Geneva: Switzerland United Nations

- programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO); 2009.
2. Christensen J. AIDS in Africa; Dying by the numbers. <http://www.aids in Africa-dying by the number>. (Accessed on 05/01/2013)
  3. Haubrich RH, Little SJ, Carrier JS et al. The value of patient-reported adherence to anti-retroviral therapy in predicting virologic and immunologic response. *AIDS*. 1999; 13(9): 1099-1107.
  4. Bangsberg DR, Perry S, Charlebois ED, et al. Non-adherence to highly active antiretroviral therapy predicts progression to AIDS. *AIDS*. 2001; 15(9):1181-1183
  5. Amberbir A, Woldemichael L, Getachew S, et al, HIV-infected person: a prospective study in South west Ethiopia. *Biomed Central Journal of public health* 2008; 8: 265
  6. Sahay S, Reddy KS and Dhayarkar S. Optimize adherence to anti-retroviral therapy. *Indian J. Med. Rev.* 2012; 134 (6): 835-849.
  7. Orrell C, Bangsberg DR, Badri M et al. Adherence is not a barrier to successful antiretroviral therapy in South Africa. *Journal of acquired Immune deficiency syndromes*. 2003; 17: 1369-1375
  8. Chesney MA. Factors affecting adherence to antiretroviral therapy. *Clin. Infect. Dis.* 2000; 30 (2): 171-176
  9. Murri R, Ammassari A, De Luca A, et al. Self-reported non-adherence with antiretroviral drugs predicts persistent condition. *HIV Clin. Trials* 2001; 2 ( 4 ) : 323-329.
  10. Iliyasu Z, Kabir M, Abubakar IS, et al. Compliance to antiretroviral therapy among AIDS patients in Aminu Kano Teaching Hospital, Kano, Nigeria. *Nigerian Journal of Med.* 2005; 14: 290-294.
  11. Miller LG, Hays RD. Adherence to combination antiretroviral therapy: Synthesis of the literature and clinical implications. *AIDS Read.* 2000; 10 (13): 111-120.
  12. Daar ES, Cohen C, Remien R, et al. Improving adherence to antiretroviral therapy. *AIDS Read.* 2003; 13 (2) 78-82.
  13. Ammassari A, Trolta MP, Murri R, et al. Correlates and predictors of adherence to highly active antiretroviral therapy: Overview of published literature. *Journal of acquired Immune deff.Synd.* 2002; 31: 123–127.
  14. Erah PO and Arute JE. Adherence to HIV/AIDS patients to antiretroviral therapy in a tertiary health facility in Benin City. *Africa Journal of Pharmacy and Pharmacology.* 2008; 2(7): 145-152.
  15. Vreeman RC, Wiehe SE, Pearce EC, et al. A systematic review of paediatric adherence to antiretroviral therapy in low-and middle income countries *Pead.Infect. Dis. J.* 2008; 27 (8): 686-691.
  16. Vervoort SCJ, Borleffs JCC, Hoepelman AIM, et al. Adherence in antiretroviral therapy: a review of qualitative studies. *Int. J. of STD. AIDS.* 2007; 21: 271-281.
  17. Wakibi SN, Ng'ang'a ZW and Mbugua GG. Factors associated with non-adherence to highly active antiretroviral therapy in Nairobi, Kenya. *Journal of antimicrobial chemotherapy.* 2004; 53: 696-699.
  18. Araoye MO. Research methodology with statistics for health and social sciences. Eds. Nathadex: Ilorin; 2003. 118-119.
  19. Cauldbeck MB, O' Connor C, O'Connor MB, et al. Adherence to antiretroviral therapy among HIV patients in Bangalore, India. *AIDS research and therapy* 2009; 6: 7-11.
  20. Oku AO, Owoaje ET, Ige OK and Oyo-ita A. prevalence and determinants of adherence to HAART amongst PLHIV in a tertiary health facility in south-south, Nigeria. *BioMed Central infectious Disease.* 2013; 13: 401.
  21. Olowookere SA, Fatiregun AA, Adewole IF. Knowledge and attitudes regarding HIV/AIDS and antiretroviral therapy among patients at a Nigerian treatment clinic. *J Infect Dev Ctries.* 2012; 6(11):

809-816

22. United Nations Population Fund (UNFPA) Young people: preventing HIV/AIDS. Available at :- <http://www.unfpa.or/hiv/people.htm>. (Accessed 05/02/2013).
23. Centre for Disease Control and Prevention (CDC). HIV among youth. Available at:-<http://www.cdc.gov>CD Home> HIV/AIDS> tropics>(Accessed on 05/02/2013).
24. Federal Ministry of Health (FMOH). Guidelines for the use of antiretroviral drugs in Nigeria. Federal Ministry of health, Abuja, Nigeria; 2005.11-17.
25. Marcellin F Boyer S, Protopope SCU C, et al Determinants of unplanned antiretroviral treatment interruptions among people living with HIV in Yaounde; Cameroon. *Journal of trop. Med. And int. hlth.* 2008; 13 (2): 1470-1478
26. Mills EJ, Nachega JB, Buchan I. Adherence to antiretroviral therapy in sub-Saharan Africa and North America: a meta analysis of the published literature. *Clin.Infect. Dis.* 2005; 41 (2): 217-224.
27. Giday A, Shiferaw W. Factors affecting adherence of antiretroviral treatment among AIDS patients in an Ethiopian tertiary University Teaching Hospital. *Ethiop. Med. J.* 2010; 48 (3): 187-194.
28. Tran BX, Nguyen LT, Nguyen NH, Hoang QV and Hwang J. Determinants of antiretroviral treatment adherence among HIV/AIDS patients: a multisite study. *Global Health Action.* 2013; 6: 10. 340