Full Length Research Paper

Assessment of highly active antiretroviral therapy (HAART) adherence among HIV patients in a tertiary health institution in Nigeria

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The introduction of highly active antiretroviral therapy (HAART) in the management of HIV lead to a substancial decline in human immunodeficiency virus (HIV) mortality. However, the optimization of patients response to this therapy is highly dependent on medication adherence. The objective of this study is to identify the determinants of adherence to HAART and HIV/AIDS patients' adherence in a selected HIV clinic. This was a descriptive cross-sectional study using an interviewer administered questionnaire. The pretested questionnaires were distributed to 400 patients that met stated inclusion criteria. The instrument was divided into sections that inquired on the demographic characteristics of the patients and factors affecting adherence. Data collected were analysed using statistical package for social sciences (SPSS) and presented in tables and figures. The result of the study indicated that the extent of availability of HAART at the clinic was not satisfactory as well as the patients' knowledge and awareness about the disease. The study further reaveled a poor adherence to medication as 87% of the respondents indicated missing their doses at one time or the other and 37.11% showed less than 95% adherence. Factors that contributed to non-adherence include side effects, fasting and simply forgot among others. As high as 74.28% of the respondents said that adverse effects had great impact on their adherence and 94.03% indicated experiencing adverse effects as a result of HAART. The study identified poor availability of HAART and adverse effects to medication among others as strong contributing factors to non-adherence.

Key words: Adverse effects, availability of HAART, HAART, HIV, medication adherence, Nigeria, non-adherence.

INTRODUCTION

Human immunodeficiency virus (HIV) pandemic has continued to spread in the population, making HIV infection one of the global public health issues with great concern (UNAIDS, 2008), having claimed more than 36

million lives so far (World Health Organization (WHO), 2014). The world wide estimate of persons living with HIV infection as at 2012 was 35.3 (32.1 to 38.8) million with 32.1 million being adults and 3.3 million are children less than 15 years (WHO, 2014). According to WHO release, sub-saharan Africa is the most affected region with nearly 1 in every 20 adult. However, in Nigeria, the HIV prevalence rate has dropped from 3.6 to 3.4% as recorded in 2007 (Olokor, 2013).

The introduction of highly active antiretroviral therapy (HAART) in the management of HIV/AIDS brought hope to the people infected with this disease. HAART involves the combination of medications known to be efficacious in the treatment of HIV infections, regardless of the viral subtype. These drugs have dramatically altered the natural progression of HIV infection and significantly, improved the qaulity of life of infected people (Seseen, 2009), resulting in about 80% decline in AIDS death rate between 1990 and 2003 in the United States (WHO, 2014). However, HAART requires strict adherence for the attainment of optimal clinical and survival benefits (North et al., 2011). Despite the advances in antiretroviral therapy, resistance development still poises major challenge in HIV management because 70 to 95% adherence to ART regimen is required to achieve optimal result (Nachega et al., 2010) and to prevent emmergence of resistant strains.

Medication adherence in general could be defined as the patients conformance with the providers recommendations with respect to timing, dosage and frequencies of medication-taking within the specified length of time. It is therefore being estimated that 50% of patients do not take medications as prescribed and increasing adherence may have greater effect on health than improvement in specific medical therapy (Brown and Bussell, 2011) especially in HIV/AIDS patient. Therefore, the main objective of this study is to determine the prevalence and determinants of adherence to HAART and their impact on patients in one of the major HIV clinic sites in Nigeria.

METHODOLOGY

Study site

This is a descriptive cross sectional study conducted in a tertiary health institution in Nigeria, University of Nigeria Teaching Hospital (UNTH), Enugu State, Nigeria. UNTH is one of the referral hospitals in Nigeria located at the South-East region of the country. The hospital site covers an area of about 200 acres while the entire parcel of land is about 306 hectares. It has over 500 beds with about 21 clinical departments and 6 care centres. The antiretroviral clinic was established and funded by the federal government in 2002 to provide antiretroviral drugs to an initial 10,000 adults and 5,000 children nationwide at subscidized rate. The clinic opens daily at 8.00 am from Monday to Friday.

Patient inclusion and exclusion criteria

Patients numbering 400 were randomly selected from HIV/AIDS patients attending clinic at the teaching hospital. This include civil servants, traders, students, artisans, health workers, military among others. Patients were eligible for the study if they have been on ART for at least 6 months and greater than or equal to 18 years of age. Patients that were recently initiated on ART or have been on it but for less than 6 months and those with serious complications like psychosis were excluded from the study.

Sample size and sampling procedures

A minimal sample size of 400 patients were determined using the Fraud Williams model of sample size determination. Patients were recruited into the study after signing an informed consent which was written in English and interpreted in the native language for some patients. The survey instrument (pre-tested) was an interviewer-administered questionnaire. They were tested and validated. The instrument were divided into sections that inquired on the demographic characteristics of the patients, knowledge and awareness of the patients about their condition and then, the extent of availability of HAART at the institution. Also included is a section that determined the extent of adherence to HAART which was measured by assessing doses taken or missed relative to prescribed, using self reported method of adherence assessment.

Data analysis

The descriptive statistics of the variables were analysed using Statistical Package for Social Sciences (SPSS) version 18. Data presentations were in form of tables, pie charts and bar charts. The degree of adherence by individual patients was estimated using patient self report. The level of adherence by individual patients were classified into those with less than 95% adherence, those with equal to 95% adherence and those with more than 95% adherence. Non-adherence patients are defined in this study as those with less than 95% adherence. The prevalence of non-adherence was estimated for those who reported to have ever missed their doses and those who missed more than 5% of their medication.

Ethical clearance

Ethical clearance was obtained from the ethics committee of UNTH and approved on the 3rd day of August, 2009 with approval number, NUREC/05/01/2008B.

RESULTS

Out of the 400 copies of the questionnaires distributed to the patients, 318 were correctly filled and returned giving a response rate of 79.5%. The demographic characteristics of the respondents are as presented in Table 1. The result of the study showed that 173 patients making up 54.4% of the patients interviewed were females while, 45.6% were male. Majority of the respondents fall within the age group 30 to 39 (40.9%), followed by 40 to 49 with 29.2%, while 66.7% of the respondents were married, 13.5% were single, 9.7% divorced and 10.1% widowed. On their level of education, the study revealed that almost half of the respondents (45.3%) had secondary education and 32.4% had tertiary education. Only about 4.7% had no education at all with 17.6% having only primary education. The study further revealed that majority of the respondents were Ibos with 39.3% being employed and 9.4% unemployed. More so,

Table 1. Demographic characteristics of the respondents.

Variable	No. of respondents (%)
Sex	
Male	145 (45.6)
Female	173 (54.4)
Age	
10-19	3 (0.9)
20-29	42 (13.2)
30-39	130 (40.9)
40-49	93 (29.2)
≥50	50 (13.7)
Marital status	
Single	43 (13.5)
Married	212 (66.7)
Divorced	31 (9.7)
Widowed	32 (10.1)
Level of education	
None	15 (4.7)
Primary School	56 (17.6)
Secondary School	144 (45.3)
Tertiary	103 (32.4)
Occupation	
Civil Servant	95 (29.9)
Artisans	42 (13.2)
Trader	131 (41.2)
Soldier	20 (6.4)
Unemployed	30 (9.4)
Income	
<4500	135 (42.8)
≥4500	182 (57.2)

41.2 and 13.2% of the respondents were traders and artisans, respectively. On income status, 57.2% of the respondents said they live above #4,500 income per month while 42.8% indicated that they lived below this.

On inquiry into the knowledge and awareness of the patients about their condition as presented in Table 2, only 57.23% of the respondents knew the full meaning of AIDS while 60.38% knew that AIDS is caused by a virus. Similarly, 57.23% of the respondents had an extensive knowledge of mode of HIV transmission while 23.59% had a moderate knowledge. However, only about 7.55% of the respondents had a poor knowledge of this HIV transmission mode. About one-third of the respondents indicated knowing the devastating effects of HIV/AIDS and about half indicated not being aware of those effects. Furthermore, only 44.60% of the respondents knew the full meaning of HAART and exactly the same percent (44.60%) correctly indicated that HAART is used for treating HIV/AIDS. On the extent of availability of HAART at the teaching hospital, 58.18% of the respondents indicated that HAART is always available while 41.82% had a contrary opinion indicating that HAART is not always available at the centre.

Only 13.21% of our respondents indicated that they have never missed a dose of their medication, 14.46% indicated missing their dose once a month, 18.24% missed twice a month while 37.11% indicated that they had missed more than four times a month as shown in Table 3. More so, the result showed that 37.11% of the study population had less than 95% adherence to HAART and 68.29% had greater than 95% adherence to HAART medication.

The reasons for missing doses varied among the study population. The reasons given by the respondents are as presented in Table 4. Almost half of the study population (44.93%) mentioned side effects as the major reason for missing their dose. One hundred and eighteen patients making up 37.11% indicated missing their dose(s) due to fasting and 28.99% said that they simply forgot to take the medications. Other reasons mentioned include being away from home (26.09%), lived too far from where they collect the medications (23.55%), felt good and hence thought they were okay (20.30%), and tight schedules among others. To further ascertain the percentage of the population that has experienced side effect with their medication and the nature of the side effects experienced, almost all the respondents (94.03%) indicated experiencing one side effect or the other in the course of their medication and the side effects listed are as summarized in Figure 1. From the figure, a good number of the patients mentioned nausea (82.28%), rash (68.53%), diarrhoea (64.78%), vommiting (61.95%), dry mouth (60.16%), headache (56.29%) and dry skin among others. Others mentioned include malaise, insomnia, dizziness, change in taste perception and mental confussion.

Furthermore, on the impact of these adverse effects on adherence, 26% of the respondents indicated that experiencing these adverse effects does not in any way affect adherence to their medication. However, greater percentage of the population (74%) indicated that these adverse effects, to a large extent, affect their level of adherence. This is presented in Figure 2.

DISCUSSION

Adherence to HAART is the greatest patient-enabled predictor of treatment success and mortality for HIV patients who have access to drugs (Mills et al., 1996). This study finds a sub-optimal adherence to medical treatment with antiretroviral agents and this have been shown by most other studies to be associated with

Table 2. Knowledge and awareness.

Question	Option	Response (%)
Full meaning of AIDS	American Investigation Disease	52 (16.35)
	Acquired Immun Deficiency Syndrome	182 (57.23)
	Acquired Infectious Disease Series	45 (14.15)
	Acquired Infectious Disease Syndrome	39 (12.27)
HIV causative organism	Virus	192 (60.38)
	Bacteria	47 (14.78)
	Fungi	12 (3.77)
	Don't Know	67 (21.07)
Modes of transmission	Extensive knowledge	182 (57.23)
	Moderate knowledge	75 (23.59)
	Narrow knowledge	37 (11.63)
	Poor knowledge	24 (7.55)
Full meaning of HAART	Highly active antiretroviral therapy	142 (44.6)
	Human AIDS reactive therapy	43 (13.52)
	Highly acute revival treatment	72 (22.64)
What HAART is used for	Drugs for treating HIV/AIDS	142 (44.66)
	Drugs for treating malaria	72 (22.64)
	Drugs for treating diabetes	61 (19.18)
	Drugs for treating asthma	43 (13.52)
Extent of availability of HAART	Always available	185 (58.18)
	Not always Available	133 (41.82)

Table 3. Adherence to HAART.

| Question	Option	Response (%)
How many times you missed your medication	Once a month	46 (14.46)
	Three times a month	58 (18.24)
	Four times a month	54 (16.98)
	More than four times a month	118 (37.11)
	Never missed a dose	42 (13.21)

resistant virus, drug resistance and failure to achieve viral suppression (Ickovics and Meade, 2002; Singh et al., 1999).

The result of this study showed that greater percentage of the study population were female which may correlate with the fact that greater number of female population are being affected by HIV/AIDS in the society. According to a report by the Global Coalition on Women and AIDS in Sub-Saharan Africa, women make up 57% of adults living with HIV (UNICEF, 2008). The report further stated that women and girls are at increased risk of HIV infection biologically and that in an unprotected heterosexual intercourse, women are twice as likely as men to acquire HIV from an infected partner. With respect to influence of gender on adherence, there has been contraditory correlations between gender and adherence to HIV/AIDS medications as some studies found statistical significant relationship while others did not. Hence, Skhosoma et al. (2006) reported that being female is correlated with higher incidence of adherence. The age of the patients under study indicated that greater percentage of our respondents fall within the age groups, 30 to 39 and 40 to 49, which are the most active age groups. This is in line with a report from India which reported that majority of the reported HIV/AIDS cases have occured in the sexually active and economically productive 15 to 44 years age group (AIDS ONLINE). However, age has increased mortality, potential transmission of drug has

Table 4. Reasons for non adherence.

Variable	Respondents (%)
Simply forgot	80 (28.99)
Wanted to avoid side effects	124 (44.93)
Away from home	72 (26.09)
Lived too far away	65 (23.55)
Was fasting	118 (37.11)
Fell asleep/slept through dose time	41 (14.86)
Felt good and hence, no need for the drug	56 (20.30)
Ran out of pill	62 (22.46)
Unable to pay for transport	53 (19.20)
Do not like taking drugs	57 (20.65)
Do not want others to know about the drugs	46 (16.6)
Felt depressed, sad and unhappy	43 (15.58)
Doubts that the medications will work	29 (10.51)
Felt sick or ill	35 (12.68)
Had too many pills or tablets to take	61 (22.10)
Afraid of taking medications	23 (8.33)
Shared pills with others	14 (5.07)
Difficulty in fitting drug schedule with daily activities	68 (24.84)
Shame of getting refill	39 (14.13)
Lack of family support	43 (15.58)
Inadequate information about the drugs and how they work	20 (7.25)
Attitude of health workers	47 (17.03)
Lack of confidentiality at health centers	25 (9.08)
Active illicit drug/alcohol use	11 (3.99)
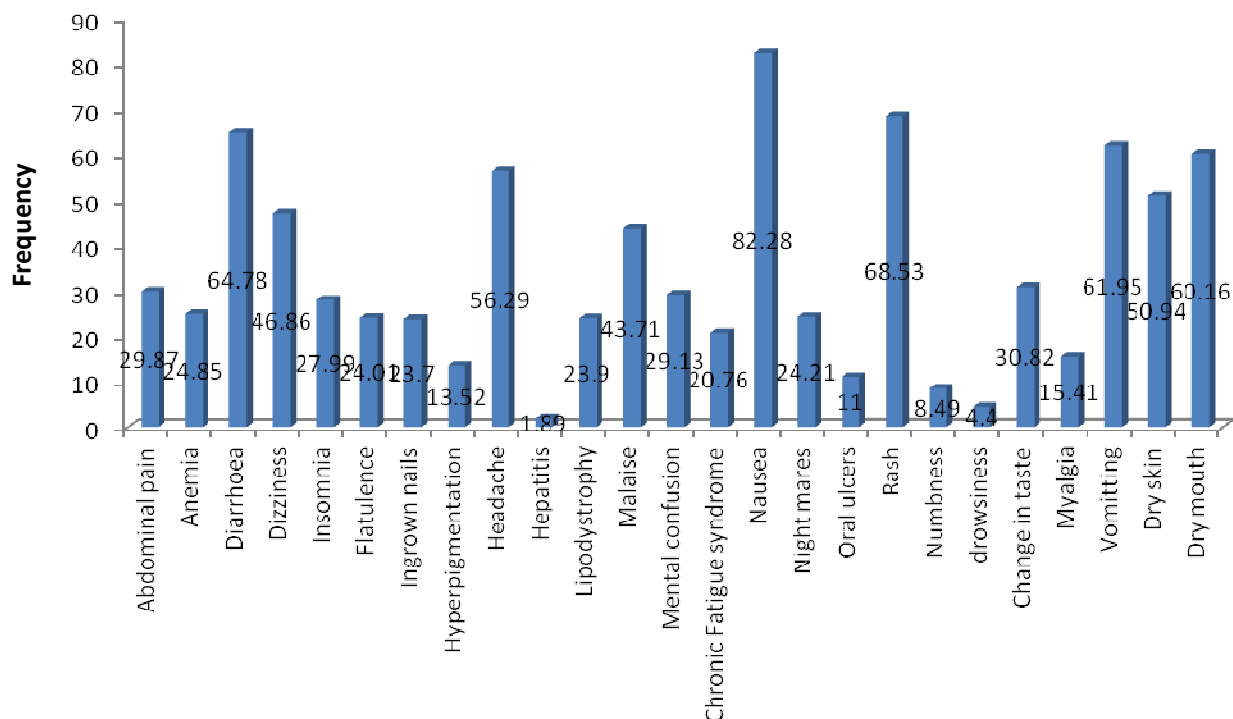
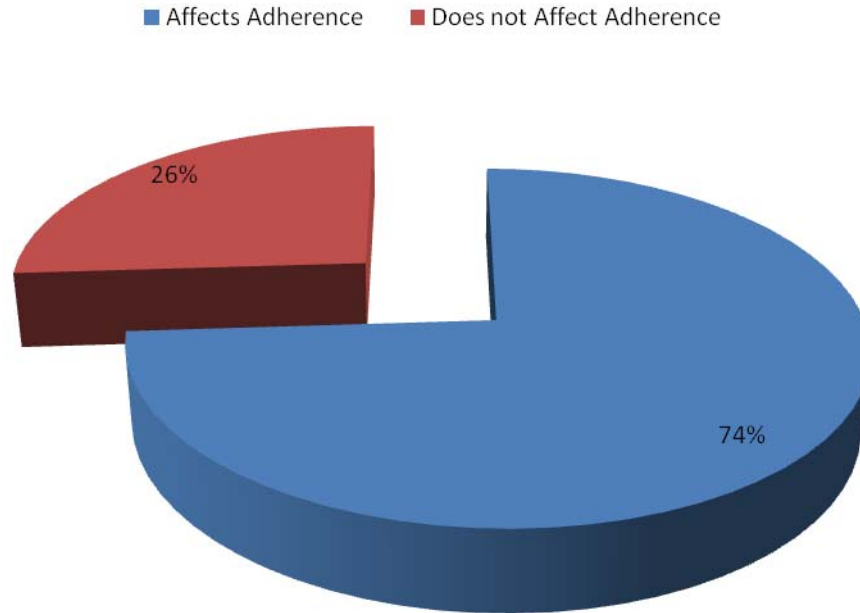**Figure 1.** Adverse effects experienced by the respondents.

Figure 2. Impact of adverse effects on patient adherence.

been shown to have effect on adherence, higher age is positively correlated with adherence but decreases as the age increases (UNAIDS, 2008). More of the study population were married compared to the unmarried and divorced. This is in line with reports from Kenya which shows that HIV infections are highest among married couples and those in stable relationships (Kaiser et al., 2011).

Education to a greater extent determines ones exposure and level of understanding vis-a-vis knowledge. Education is key to an effective response to HIV/AIDS. No doubt many studies demostrated that education has a strong correlation to adherence. Hence, studies by Johnson et al. (2009) in South Africa demostrated that HIV risk in those who had completed secondary education was significantly lower than in those who had only primary education. The study further showed that HIV risk increased by 8% per annum in young women with no secondary education. Studies also show that educated women are more likely to know how to prevent HIV infection, to delay sexual activity and to take measures to protect themselves. From our result, almost half of the study population had secondary education and 32.4% had tertiary education with just only 4.7% not having any form of education. It is important to note that lack of education may have affected some patients and their going to the hospital for registration and hence, the lower number of the uneducated seen in this study. Meanwhile, in a systematic review of literature by Falagas et al. (2008) on socio-economic status (SES) as a determinant of adherence to treatment in HIV infected patients, income, level of education and employment status showed significant association with level of adherence.

Studies have shown relationship between HIV and HAART knowledge with adherence (Olubusoye and Mechesha, 2008; Murray et al., 2009). Hence, Jones et al. (2013) stated that literacy for health information is a key contributor to health status and HIV-specific health literacy may impact adherence. An enquiry into the respondents knowledge about HIV/AIDS and HAART showed that most of them did not show good knowledge of these. Only 57.23% correctly indicated the full meaning of HIV while 42.77% did not. Further more, 60.38% indicated that virus is the causative organism of HIV while 47.80% stated that they knew the devastating effects of HIV/AIDS. On the mode of HIV transmission, 42.74% showed poor knowledge of this. This result seem to agree with the work done by Chersich et al. (2013) where majority of the study population lacked knowledge about the modes of HIV transmission. Also, less than half of the population correctly mentioned the full meaning of HAART and what it is used for.

Almost half of the patients said that HAART is always available in the hospital. Meanwhile, studies have shown strong correlation between drug availability at the treatment center and adherence (UNAIDS, 2008). Non-availability of HAART at one time or the other may even bring about more discouragement to the patients and therefore, is one of the most common reasons for nonadherence.

A major concern with ART in resource limited settings

is the emmergence of drug resistant viral strains due to sub-optimal adherence and the transmission of these resistant viral strains in the population (Blower et al., 2003). Self report is a subjective measure of adherence and is the most commonly used measure of adherence research in Africa (UNAIDS, 2008). One of the methods used in the self reports is reported missed doses. Hence, our study determined the extent of adherence to HAART using this method and found out that 13.21% of the patients never missed a dose of their medication while the other 86.79% had missed at least a dose with as high as 37.11% indicating missing a dose for more than four times a month. Meanwhile, very high levels of adherence (>95%) are required for ART to be effective and to prevent the emergence of resistant viral strains (Paterson et al., 2000). Hence, our result indicated that 68.29% of the respondents indicated greater than 95% adherence to their HAART while 31.71% showed less than 95% adherence to their medication.

For patients taking their medication once daily, 95% adherence means missing not more than one dose a month. For those taking their treatments twice daily, 95% adherence means missing not more than three doses a month and for those taking their medication three times a day, 95% adherence means missing not more than four doses a month. Greater than 95% adherence includes those who have never missed a dose and those that missed a dose but have greater than or equal to 95% level of adherence. On the reasons for missing HAART, a good number of the patients reported side effects as one of the major reasons for missing their medications. So, side effects was found to be strongly associated with lower adherence in our study. This is in line with other studies that reported side effects to be associated with irregular medication intake or even quiting medication (Reda and Biadgilign, 2012). Other reasons like fasting, living too far away from home and simply forgot were among the factors mentioned that brings about non-adherence. Also, ran out of pills, and difficulty in fitting drug schedules with daily activities were also mostly reported. The observation that 31.11% attributed their missing therapy to fasting is very instructive especially in our environment where religious beliefs among christians and even muslims play important role in determining health behaviour.

A good number of the respondents (94.03%) indicated that they experienced adverse effects with HAART with most of them experiencing nausea, rash, diarrhoea, vommitting, dry mouth and headache. Our findings further proved that side effects are major cause of non adherence among the respondents as 74.27% stated that these adverse effects influence adherence to their medi-cations. The findings also agree with the study conducted at the centre for AIDS prevention studies at University of California, San Francisco (UCSF) in 1998 which found that side effects was one of the major factors hindering people from starting HAART (Coates et al., 1998).

Side effect can therefore play a large role in discouraging

adherence to therapy which in turn impacts the development of drug resistance.

Conclusion

The study revealed poor availability of HAART and poor adherence to medication by HIV/AIDS patients at the study site. The patients experience adverse effects to their medications and the adverse effects together with the other mentioned factors had great impacts on adherence to HAART.

Conflict of interest

There is no conflict of interest.

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