

Prevalence and factors associated with treatment adherence among patients on highly active antiretroviral therapy (HAART) in Specialist Hospital, Sokoto, Nigeria

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ABSTRACT

Background: Adherence to treatment has been identified as a major predictor of survival in persons living with HIV/AIDS (PLWHA), and poor medication adherence has been identified as an important factor in treatment failure and development of drug resistance in patients on highly active antiretroviral therapy (HAART). **Aim:** This study was conducted to determine the prevalence and factors associated with treatment adherence among patients on HAART in Specialist Hospital, Sokoto, Nigeria. **Materials and Methods:** A cross-sectional study was conducted among 173 patients (selected by systematic sampling technique) attending the ART clinic of Specialist Hospital, Sokoto, Nigeria. A structured interviewer-administered questionnaire was used to collect data on the research variables. Data were analyzed using IBM SPSS version 23 statistical computer software package. **Results:** Most, 144 (83.2%) of the 173 respondents attained at least 95% adherence to the prescribed HAART regimen. The main reasons cited for missing their ART medication were being away from home (33.3%), being too busy (24.2%) and missing clinic appointments (24.2%). Whereas, adherence to treatment was associated with self-perception of health status as excellent and very good since commencing ART, it was not associated with any of the respondents' socio-demographic variables. **Conclusion:** This study showed optimal adherence by majority of patients on HAART at Specialist Hospital, Sokoto, Nigeria, with adherence being associated with patients' perception of their health status since commencing ART. These findings underscore the need for ART care providers to sustain adherence counseling, make treatment schedules patient-friendly, and consistently assess patients' response to treatment from their own perspectives.

Keywords: Patients on HAART, treatment adherence, prevalence, associated factors

INTRODUCTION

The human immunodeficiency virus (HIV) pandemic remains one of the most important public health crises in the world. In 2007, there were approximately 33 million people living with HIV globally, with two million deaths attributed to the disease and three million new infections occurring annually.¹ It was also estimated that the disease affected 30.8 million adults and 2.5 million children worldwide as at the end of 2009.²

It is well-established that along with improved diagnostic measures such as HIV viral load testing, the advent of highly active antiretroviral therapy (HAART) - combination regimens of different antiretroviral medications have been critical to the ongoing success of controlling the viral replication in each individual patient. However, while HAART has been effective in reducing

morbidity and mortality, these complicated therapies require high levels of adherence by the patient.³ Antiretroviral treatment success depends on sustainable high rates of adherence to HAART regimen, and poor medication adherence has been identified as an important factor in treatment failure and development of drug resistance in patients on HAART; and it is believed that $\geq 95\%$ adherence is required to avoid rapid development of drug resistance and treatment failure.^{4,6}

Adherence to treatment has been identified as a major predictor of survival in persons living with HIV/AIDS (PLWHA).⁴ Although, more potent antiretroviral regimens can allow for effective viral suppression, poor adherence to treatment remains a major obstacle in the fight against HIV/AIDS worldwide.⁷

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Low or incomplete medication adherence has been associated with detectable viral load (>500 viral RNA copies / ml of plasma) and development of cross-resistance to other antiretroviral drugs of the same class; and this can potentially interfere with future therapeutic regimens for HIV-infected patients undergoing treatment, and for those who subsequently become infected with resistant strains of HIV.⁸⁻¹⁰

Medication adherence is a major challenge in chronic medical conditions, as adherence levels change over time. Clinical experience and research indicate that adherence is a “moving target”, the longer a patient stays on treatment; the poorer the adherence is likely to become.¹¹ Generally, adherence rates are higher among patients on medications for acute medical conditions as compared to those with chronic medical conditions.¹²

Wide variations in adherence levels were recorded in studies conducted in other countries including China (81.8%),¹³ Bangkok (57.0%),¹⁴ and Cote d’Ivoire (74.3%).¹⁵ Similar to the situation in other countries, wide variations were also reported in studies conducted across Nigeria including South-Eastern Nigeria (86.1%),¹⁶ Ilorin (73.3%),¹⁷ Keffi (62.8%),¹⁸ and Kano (65.6%).¹⁹

Also, several factors including behavioral, socio-demographic and provider-related characteristics have been found to influence adherence to HAART. These factors are normally grouped into patient-related factors, treatment regimen, and patient-provider relationship, and it is believed that they are interrelated.²⁰⁻²² Patient-related factors, particularly, patients’ behavior are believed to be the most important factors influencing adherence as they constitute a critical link between the prescribed medication and treatment outcomes, and as such, paying attention to them therefore constitutes a necessary and important step in improving adherence.²² Socio-demographic factors that have been found to influence adherence to treatment include older age, male sex, white ethnicity, higher education, and higher income.^{21,23-25}

The psychological factors that have been found to influence adherence to treatment among patients on HAART include depression, substance abuse (including alcohol and intravenous drugs), social support, self-efficacy, body image and weight concerns.^{22,24,26} Complexities of ART regimens constitute fundamental challenge to treatment adherence; some regimens require several doses of medication per day together with various requirements or restrictions on food intake or

other activities. These complexities, in addition to the problems of toxicity and side effects can greatly influence individuals’ willingness and ability to adhere to therapy.^{27,28} While dosing schedules and food restrictions appear to have more influence on adherence than pill burden, drug side effects have been consistently associated with decreased adherence, and patients who experience more than two adverse reactions are less likely to continue with their treatment.^{22,29,30}

A meaningful and supportive relationship between patients and healthcare providers can help overcome significant barriers to adherence. The factors that have been found to strengthen patient-healthcare provider relationship include perception of provider competence, quality and clarity of communication, compassion shown by the provider, involving the patient as an active participant in treatment decisions, and convenience of the regimen. Patients become frustrated with healthcare providers when misunderstandings occur, treatment becomes complex, side effects go unmanaged, and the patient is blamed for being a “bad patient”.^{22,30,31} In addition, access to reliable primary health care services and some aspects of the clinical setting including transportation, waiting time, convenience of scheduling appointments, integrated services and confidentiality have been found to influence adherence to treatment.²⁰

Considering the fact that HIV/AIDS is a lifelong condition which requires continuous use of antiretroviral drugs with the likelihood of reduction in adherence to treatment over time, and the attendant consequences, it is important to continuously monitor adherence to medications among patients on HAARTS. Also, understanding the factors that influence drug adherence is crucial to designing appropriate strategies for promoting adherence to treatment among patients. This study was conducted to determine the prevalence and factors associated with treatment adherence among patients on highly active antiretroviral therapy (HAART) in Specialist Hospital, Sokoto, Nigeria.

MATERIALS AND METHODS

Study Design, Population and Area

A cross-sectional study was conducted among HIV positive patients attending the antiretroviral therapy (ART) clinic of Specialist Hospital Sokoto, Nigeria, in May and June 2017. The hospital is a tertiary healthcare facility with a bed capacity of 540, and it is one of the centers designated for treating patients with HIV/AIDS in Sokoto State, Nigeria. Comprehensive HIV care services including ART for HIV-infected patients are offered at the hospital’s ART clinic at no cost to the

patients. The ART clinic sessions are held on daily basis, adults are seen on Mondays to Thursdays, while paediatric cases are seen on Fridays, with a total of 7,600 HIV-infected patients on ART care. All consenting HIV-positive patients of at least 18 years of age and had been on HAART for at least 6 months were considered eligible for enrolment into the study. Terminally ill patients, pregnant women, and those with chronic comorbidities such as diabetes mellitus, hypertension and chronic kidney disease (not related to HIV) were excluded.

Sample Size Estimation, Sampling Technique, Data Collection and Analysis

The sample size was statistically estimated at 173 and the eligible participants were selected by systematic sampling technique using the list of clients attending the clinic during the period of the study to constitute the sampling frame. A structured interviewer-administered questionnaire was used to obtain information on the respondents’ socio-demographic characteristics, HIV/AIDS history and treatment adherence. The questions for assessing adherence were adapted from “The Brief Medication Questionnaire: a tool for screening patient adherence and barriers to adherence”.³² Six resident doctors assisted in data collection after pre-training on the conduct of survey research, the objectives of the study, selection of study participants and use of the survey instrument. The questionnaire was pretested on 17 patients attending the ART clinic of Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria. The necessary corrections were made based on the observations made during the pretesting.

Data were analyzed using IBM Statistical Package for the Social Sciences (SPSS) version 23.0 software. Adherence was defined as taking at least 95% of the prescribed medications in the 7 days preceding the survey. Quantitative variables were summarized using mean and standard deviations, while qualitative variables were summarized using frequencies and percentages. The chi-square test was used to compare differences between proportions. All levels of significance were set at $p < 0.05$.

Ethical Consideration

Institutional ethical clearance was obtained from the Ethical Committee of Sokoto State Ministry of Health, Sokoto, Nigeria. Permission to conduct the study was obtained from the Management of the hospital, and informed consent was obtained from the participants before commencing questionnaire administration.

RESULTS

Socio-demographic profile of respondents

All the 173 questionnaires administered were adequately completed and found suitable for analysis, giving a response rate of 100%. The mean age of the respondents was 33.4 ± 9.3 years, and almost half 77 (44.5%) of the 173 respondents were aged 25-34 years. Majority of respondents were females (64.2%), reported Islam as their religion (78.0%), and were Hausa by tribe (61.7%). Close to half of respondents (46.2%) were married and a larger proportion of them (35.3%) had only Qur’anic education. Close to half 62 (44.6%) of the 139 respondents that specified their occupation were unemployed; and most, 158 (91.3%) of the 173 respondents earn an average monthly income of $\leq \text{₦}18000.00$ (Table 1).

Table 1: Socio-demographic profile of respondents

Variables	Frequency (%) n = 173
Age group (years)	
< 25	25 (14.5)
25-34	77 (44.5)
35-44	50 (28.9)
45-54	16 (9.2)
≥ 50	5 (2.9)
Sex	
Female	111 (64.2)
Male	62 (35.8)
Religion	
Islam	135 (78.0)
Christianity	38 (22.0)
Marital status	
Single	50 (28.9)
Married	80 (46.2)
Separated	3 (1.7)
Divorced	18 (10.4)
Widowed	22 (12.7)
Tribe	
Hausa	107 (61.8)
Fulani	22 (12.7)
Yoruba	16 (9.2)
Igbo	19 (11.0)
Others (e.g., Lanta and Dakarkari)	9 (5.2)
Educational status	
None	5 (2.9)
Qur’anic	61 (35.3)
Primary	21 (12.1)
Secondary	45 (26.0)
Tertiary	41 (23.7)
Occupation (n = 139)	
Unemployed	62 (44.6)
Housewife	42 (30.2)
Farmer	17 (12.2)
Civil servant	18 (12.9)
Average monthly income (Naira)	
$\leq 18,000$	158 (91.3)
$> 18,000$	15 (8.7)

Respondents' treatment profile

The mean duration of treatment on HAART was 47.8 ± 40.4 months and majority 107 (61.8%) of the 173 respondents have been on HAART for more than 24 months. Since the commencement of HAART close to two-thirds of respondents (59.0%) had experienced drug side effects, and about a third (27.7%) reported use of herbal medications alongside their ART medications. Less than half of respondents (45.1%) belong to a social support group, and a larger proportion of them (42.8%) disclosed their HIV status to their parents. Majority of respondents (74.0%) perceived their health to be excellent or very good since they were commenced on ART (Table 2).

Table 2: Respondents' treatment profile

Variables	Frequency (%) n = 173
Duration on ART (months)	
< 12	16 (9.2)
12-24	50 (28.9)
> 24	107 (61.8)
Experienced drug side effects	
Yes	102 (59.0)
No	71 (41.0)
Use of herbal medication	
Yes	48 (27.7)
No	125 (72.3)
Use of alcohol	
Yes	14 (8.1)
No	159 (91.9)
Belong to a social support group	
Yes	78 (45.1)
No	95 (54.9)
Number of pills taken per day	
One	109 (63.0)
Two	64 (37.0)
Made payments for ART services	
Yes	16 (9.2)
No	157 (90.8)
Disclosure of HIV status made to:	
Spouse	46 (26.6)
Parents	74 (42.8)
Friends	11 (6.4)
Relatives	29 (16.8)
Others (e.g., none)	13 (7.5)
Perception of health after commencing ART	
Excellent	50 (28.9)
Very good	78 (45.1)
Good	40 (23.1)
Fair	5 (2.9)

Prevalence of adherence to HAART among respondents

Most, 144 (83.2%) of the 173 respondents attained at least 95% adherence to the prescribed HAART regimen. The main reasons cited by the respondents for missing their ART medication were being away from home (33.3%), being too busy (24.2%) and missing clinic appointments (18.2%) as shown in Table 3.

Table 3: Prevalence of adherence to HAART among respondents

Variables	Frequency (%) n = 173
Adherence level	
< 95	29 (16.8)
≥ 95	144 (83.2)
Main reasons for missing ART medication (n = 33)	
Forgot	2 (6.1)
Away from home	11 (33.3)
Too busy	8 (24.2)
Missed appointment	6 (18.2)
Lack of transport fare	1 (3.0)
Religious fasting	6 (6.1)
Marital problem	1 (3.0)
Medical fatigue	2 (6.1)

Factors associated with adherence to HAART among respondents

The proportion of respondents that attained ≥ 95% adherence to HAART was significantly higher among those that perceived their health as excellent (90.0%) and very good (89.7%) since commencing ART as compared to those that perceived it as good (65.0%) and fair (60.0%) ($\chi^2 = 15.475$, $p = 0.001$). The proportion of respondents that attained ≥ 95% adherence to HAART was also higher among those that were less than 34 years of age, males, and those that were Yoruba by tribe, as compared to the other groups, but the differences were not significant ($p > 0.05$). Similarly, the proportion of respondents that attained ≥ 95% adherence to HAART was higher among those that had tertiary education, were civil servants, and earn more than ₦18,000 per month as compared to the other groups, but the differences were also not significant ($p > 0.05$) as shown in Table 4.

DISCUSSION

This study assessed treatment adherence among patients on HAART in Specialist Hospital, Sokoto, Nigeria. A larger proportion of the respondents in this study (44.5%) were aged 25-34 years; this is similar to the findings in studies conducted in other cities in Nigeria, including Nasarawa, Nigeria,¹⁸ and Calabar, Nigeria,³³ which also reported that a larger proportion of their respondents were aged 25-34 years. The preponderance of respondents that were aged 25-34 years in these studies could be due to the fact that it is a sexually active age group, strong and energetic, and are more likely to engage in unsafe sexual practices; and it underscores the need to target this group for HIV/AIDS prevention education intervention.

Majority of the respondents in this study (64.2%) were females, this is in consonance with the findings in studies by Bello *et al.* (64.8%),¹⁷ and Oku (80.9%)³³; and it could be

Table 4: Factors associated with adherence to HAART among respondents

Variables	Adherence status		Test of significance
	< 95% Frequency (%)	≥ 95% Frequency (%)	
Age group (years)			
< 34	15 (15.6)	81 (84.4)	$\chi^2 = 0.200$, p = 0.655
≥34	14 (18.2)	63 (81.8)	
Sex			
Male	9 (14.5)	53 (85.5)	$\chi^2 = 0.350$, p = 0.554
Female	20 (18.0)	91 (82.0)	
Tribe			
Hausa	19 (17.8)	88 (82.2)	$\chi^2 = 3.281$, p = 0.512
Fulani	3 (13.6)	19 (86.4)	
Yoruba	1 (6.3)	15 (93.8)	
Igbo	3 (15.8)	16 (84.2)	
Others	3 (33.3)	6 (66.7)	
Educational status			
None	1 (20.0)	4 (80.0)	$\chi^2 = 3.366$, p = 0.498
Qur'anic school only	14 (23.0)	47 (77.0)	
Primary	3 (14.3)	18 (85.7)	
Secondary	7 (15.6)	38 (84.4)	
Tertiary	4 (9.8)	37 (90.2)	
Occupation			
Unemployed	11 (17.7)	51 (82.3)	$\chi^2 = 3.495$, p = 0.479
Housewife	10 (23.8)	32 (76.2)	
Farmer	3 (17.6)	14 (82.4)	
Civil servant	2 (11.1)	16 (88.9)	
Perception of health after commencing ART			
Excellent	5 (10.0)	45 (90.0)*	$\chi^2 = 15.475$, p = 0.001
Very good	8 (10.3)	70 (89.7)	
Good	14 (35.0)	26 (65.0)	
Fair	2 (40.0)	3 (60.0)	
Average monthly income (Naira)			
≤18,000	27 (17.1)	131 (82.9)	$\chi^2 = 0.138$, p = 0.710
>18,000	2 (13.3)	13 (86.7)	

related to differences in the health seeking behavior of males and females, as females have a higher tendency to present to the hospital for treatment, and also, being of reproductive age, a lot of them were probably diagnosed of HIV infection (and referred to the ART clinic) during their antenatal clinic visits.

Most of the respondents in this study (83.2%) attained ≥ 95% adherence to medications, this is similar to the finding in a study conducted in Kano, Nigeria,³⁴ which reported that 80% of respondents achieved ≥ 95% adherence, and another study conducted in South-Eastern Nigeria,¹⁶ which reported that 86.1% of respondents had optimum adherence. In contrast to the uniformly high adherence levels in this study and the other studies conducted in Nigeria, studies conducted in other countries showed wide variations in adherence levels; while studies conducted in Bangkok,¹⁴ Vietnam,²⁵ and Cote d'Ivoire¹⁵ reported relatively lower adherence levels of 57, 74.1 and 74.3% as compared to the 83.2% adherence level obtained in this study, another study conducted in China¹³ reported a similarly high adherence level of 81.8%. The relatively high

levels of adherence reported in this study and the other studies conducted in Nigeria could be due to the fact that ART services are virtually free across the country. In addition, clients are consistently offered adherence counseling before commencing treatment and during treatment, and a patient-friendly once daily dosing schedule of antiretroviral drugs is often used.

In this study the commonest reasons for missing ART medication by the respondents were being away from home (33.3%), being too busy (24.2%), and missing clinic appointments (18.2%). This is similar to the findings in studies conducted in Ilorin, Nigeria,¹⁷ and South-South Nigeria³³ in which the most common reasons cited for missing medications were being away from home, and being too busy. These findings highlight the importance of patient-friendly treatment schedules in facilitating treatment adherence, and they underscore the need for ART care providers to consider individual patient's daily routine in planning his or her treatment schedule. Although, only a few respondents in this study (6.1%) attributed missing their

ART medication to forgetfulness, it is one of the main reasons cited in the study conducted in South-South Nigeria³³ and in another study conducted in China¹³; and it is believed that use of effective treatment reminders, treatment partners, and memory aids (especially for patients who operate busy schedules, travel frequently and forget to carry their medications) may be of immense help in improving their adherence to medications.

The absence of association between adherence to HAART and the respondents' socio-demographic characteristics (including age, sex, occupation, marital status, and educational status), monthly income, duration of treatment, use of herbal medications and use of alcohol in this study is in consonance with the findings in studies conducted in South-South Nigeria³³ and South-Eastern Nigeria¹⁶ which also found no association between these factors and adherence to HAART.

A significantly ($p < 0.05$) higher proportion of those that perceived their health as excellent (90.0%) and good (89.7%) since commencing ART attained $\geq 95\%$ adherence to HAART as compared to those that perceived it as good (65.0%) and fair (60.0%) in this study; this is not surprising, as it is in agreement with the Health Belief Model (HBM) which posits that in health decision-making, individuals are expected to navigate choices involving weighing risk for consequences with benefits of action³⁵; this implies that those that perceived their health to have improved substantially since commencing ART are more likely to have and maintain high adherence levels.

Similar to the finding in this study, a study conducted in South-South Nigeria³³ also found that respondents who rated their health status as improved were three times more likely to have optimal medication adherence as compared to those who perceived their health status as not improved since they commenced treatment. These findings highlight the need for ART care providers to consistently assess patients' response to treatment from their own perspectives, particularly regarding how they perceive their health since commencing HAART while monitoring them for treatment adherence, as it would help in identifying and addressing the barriers to adherence.

CONCLUSION

This study showed optimal adherence by majority of patients on HAART at Specialist Hospital, Sokoto, Nigeria, with adherence being associated with perception of health since commencing ART, and the main reasons for missing medications were being away from home, being too busy, and missing clinic appointments. These findings underscore the need for ART care providers to

sustain adherence counseling, make treatment schedules patient-friendly, and consistently assess patients' response to treatment from their own perspectives.

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Conflict of interest

None declared.

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