

ORIGINAL RESEARCH

Assessment of ART knowledge and adherence to ARVs among PLWHA accessing care in two Nigerian Military HIV/AIDS Treatment sites

Adje UD*¹, Williams FE², Bezugbe CN³, Dangiwa DA⁴

¹Department of Clinical Pharmacy and Pharmacy Administration, Delta State University, Abraka, Nigeria

²Department of Clinical Pharmacy and Pharmacy Practice, University of Ilorin, Ilorin, Nigeria

³Naval Hospital, Lagos, Nigeria

⁴Department of Clinical Pharmacy and Pharmacy Practice, University of Jos, Jos, Nigeria

*Correspondence: Dr. UD Adje, Department of Clinical Pharmacy,
Faculty of Pharmacy, Delta State University. P.M.B 1 Abraka, Delta State.
Tel: +2348023241125; Email : a_udave77@yahoo.com;
ORCID - <http://orcid.org/0000-0002-4196-2703>

Abstract

Background: Adherence to Highly Active Antiretroviral Therapy (HAART) is critical in achieving treatment goals, avoiding antimicrobial resistance, preventing treatment failure and improving the patient's quality of life.

Objectives: To assess the knowledge of antiretroviral therapy (ART) and adherence to antiretroviral (ARVs) medicines amongst People Living With HIV/AIDS (PLWHA) accessing care in two Nigerian Military HIV/AIDS Treatment sites.

Methods: Four hundred patients on HAART who visited the study sites during the study period were recruited for the study using a systematic random sampling method. A semi-structured, pre-tested, an interviewer-administered questionnaire was used to obtain demographic details. Patients' knowledge of HIV was assessed using an 8-item questionnaire while adherence was measured using the Simplified Medication Adherence Questionnaire (SMAQ).

Results: The predominant age group was 31-40 years (46.4%). There were more females (69%) than males (31%). Only 45.5% answered knowledge questions correctly. The adherence level in this study was 64.0%. The major reasons cited for non-adherence included being away from home (23.6%), forgetfulness (17.1%), busy schedule (14%), need to conceal medication (12.7%) and feeling better (11.6%).

Conclusion: Patients' knowledge of ART and adherence to ARVs medicines were sub-optimal. Appropriate strategies to improve patients' knowledge of ART and adherence to ARVs are recommended.

Key words: Adherence, Antiretroviral medicines, Antiretroviral therapy, HIV, Knowledge, Nigeria.

Introduction

The Human Immunodeficiency Virus (HIV) infection pandemic continues to exert a heavy toll on humanity. Global estimates indicate that in 2016, an estimated 36.7 million people were living with HIV, 1.8 million people became newly infected with HIV while 1 million people died from AIDS-related illnesses.^[1] The gaps in treatment are also serious challenges. As of June 2017, only 20.9 million people were accessing antiretroviral

therapy (ART).^[1] In Nigeria, there were 3.2 million people living HIV in 2016, of whom 220,000 were new infections.^[2] Although Nigeria ranks second in the global epidemic, only 30% of people living with HIV in Nigeria accessed ART in 2016.^[2]

In response to the scourge of HIV in Nigeria, the Nigerian government developed the National Strategic Framework II (NSF II) 2010-2015.^[3] The target of NSF II include the promotion of rational use of drugs, preservation of future therapeutic

options, enhancing adherence to Anti-Retrovirals (ARVs) and promoting treatment success.^[3] Regarding adherence to ART, a high level of sustained adherence is necessary to suppress viral replication, improve immunological and clinical outcomes, decrease the risk of developing ARV drug resistance, and reduce the risk of transmitting HIV.^[4] Adherence rates exceeding 95% are necessary for improved virological, immunological and clinical outcomes.^[5, 6] It is essential to take measures to ensure optimal adherence both at initiation and during therapy.^[5] A low adherence rate to prescribed medications has been observed in different disease conditions. For example, adherence rates of 40.1% for acute coronary syndrome, 36.1% for chronic artery disease, 25.4% for primary prevention and 50% for other chronic diseases.^[7, 8] This trend has also been noted among patients on ART where adherence rates of between 26.7% and 40% have been reported.^[8,9]

Strategies to improve adherence include individual patient counseling, patient and treatment partners education, peer health education, routine assessment and reinforcement of adherence during follow up, directly observed therapy, reminders (e.g. a mobile phone short message service [SMS], diaries, alarm clock), food assistance, evaluation of regimen, solidification of patient- health care provider relation and convenient monthly packs.^[5,11-13] Other strategies are: follow up visit before supplies are exhausted, positive feedback on health improvements, assessment of readiness for adherence before initiation of ART, identification of barriers to adherence, identification and management of substance abuse, treatment of depression and other mental illnesses, encouraging family involvement in therapy, assessment of adherence during follow up visits, adverse events monitoring and resolution; adaptation of therapy to the client's lifestyle; avoiding imposition of out-of-pocket payments at the point of care; support groups and improved social support.^[5,11-13]

The patients' knowledge about HIV and ARVs enhances patient adherence to medical advice and medication use.^[14] Therefore strengthening patients' knowledge about ARVs and HIV can

promote adherence, prevent development of resistance strains and enhance successful treatment outcome. This study assessed the knowledge of ART and adherence to ARVs among people living with HIV/AIDS (PLWHA) receiving care in two Nigerian Military HIV/AIDS sites. It also identified reasons for non-adherence and examined the impact of patient's knowledge of ART on their adherence to ARVs.

Methods

Study Design

This was a cross-sectional study assessing the knowledge and adherence of PLWHA receiving care in two military hospitals using pre-tested structured questionnaire and interview.

Study Area

The Emergency Plan Implementation Committee (EPIC) is the arm of the Ministry of Defense (MOD) which represents the Nigerian government in the collaborative HIV/AIDS program with the United States Department of Defense (USDOD). EPIC presently has 23 comprehensive sites and 23 satellite sites located across military hospitals in Nigeria. The comprehensive sites offer services which include HIV Counseling and Testing (HCT), Prevention of Mother to Child Transmission (PMTCT), antiretroviral therapy (ART), Basic Care and Support (BCS), Laboratory investigations, and TB/HIV Prevention services. The satellite sites, which are basically PMTCT-only sites, offer services which include HCT, PMTCT, BCS and laboratory investigations. The two sites that were used for the study offered comprehensive services and were selected based on the researcher's personal experience and high patient enrollment. The two sites used for the study were the Nigerian Navy Hospital (NNH), Warri and the Military Hospital, Port Harcourt (MHPH). Both hospitals offer comprehensive services and were selected based on high patient enrollment. The Nigerian Navy Hospital (NNH), Warri had a patient population of 1,100 on ART while MHPH had 1,200 patients on ART. The total population of the sites used for this study was 2300.

Study Population

At the time of the study, there were 2300 HIV-positive patients (military and civilians) enrolled in NNH Warri and MPPH who had commenced ART for more than six months. Out of this population, study participants were recruited by systematic random sampling using a sample fraction of five over the study period.

Sample size determination and sampling technique

Yamane formula^[15] was used to calculate the sample size using the formula:

$n = N / (1 + N(e^2)^{[11]})$ where:

n = the sample size, N = Total number of population, e = the level of precision or margin of error (0.05), Therefore, $n = [2300] / (1 + (2300 \times 0.05^2))$;
 $n = 340$

However, in order to accommodate incomplete responses, the minimum sample size was increased to the nearest hundred. Therefore, the sample size used for the study was 400.

The 400 sample size was proportionally allocated to the two sites based on the population of registered HIV patients on ART per site and the total population of registered HIV on ART for the two sites. Eligible participants were systematically sampled at each HIV clinic day using a sampling interval of one-fifth.

Inclusion/Exclusion Criteria

The inclusion criteria included: age of 18 years and above, ART for more than six months, and voluntary informed consent to participate in the study. HIV/AIDS patients who were severely ill or who were terminally ill were excluded from the study.

Study Instruments

The study instrument was a 44-item pre-tested questionnaire comprising four sections. Section A obtained data on basic demographic characteristics; knowledge on HIV and ARVs was assessed in Section B which consisted of eight questions. Section C measured adherence using the simplified medication adherence questionnaire (SMAQ). SMAQ was a validated structured questionnaire consisting of six questions with a dichotomous response stem. It has been widely

used in adherence studies among HIV patients.^[16]

The last section addressed reasons for non-adherence. The pre-testing of the research tool was conducted at the Naval Hospital, Lagos.

Data Collection

The patients were recruited following a written informed consent process. A pre-tested, standardized, semi-structured questionnaire was used for the study. The questionnaire was prepared in English, the official language in Nigeria. The questionnaire was interviewer-administered following a face-to-face interaction with the patient in a counseling room with audio-visual privacy to ensure confidentiality.

Ethical Considerations

Approval to conduct the survey was obtained from the Nigerian Navy Hospital Warri Management Committee and Emergency Plan Implementation Ethical Committee. Informed consent (written or thumb printed) was obtained from each study participant after full explanation of the purpose of the study and details of their involvement.

Data Analysis

The data were analysed using SPSS for windows version 21.^[17] Categorical variables were expressed as frequencies and proportion, while the means and standard deviation were computed for continuous variables. Chi-Square Test was used to explore the significance of the association between categorical variables while the Logistic Regression analysis was used to identify the predictors of non-adherence to HAART in the study population. The level of significance (p) was set at less than 0.05. Knowledge scores were computed by noting the proportion of respondents that answered knowledge questions correctly and a total summary score was thereafter calculated by summing up the proportions and dividing by the number of questions. The SMAQ was considered 'positive' when a non-adherent patient was detected, that is, when there was a positive response to any of the qualitative questions. In other words, negative answers to all the qualitative questions, not missing more than two doses over the past one week or not missing more than two

days medication over the past three months translated to adherence level of 95% and above.^[16]

Results

Out of the 400 questionnaires administered, 395 had complete data, giving a response rate of 98.7%. More than half (56.0%) of the respondents were married. The predominant age groups were the 31-40 years group (46.4%) and the 41-50 years group (24.3%). Most of the respondents were educated up to the secondary school level (45.3%). The details of the socio-demographic characteristics of the study participants are shown in Table I.

More than three quarters (76.3%) had no idea how they acquired the HIV infection. Even though the level of social support was appreciable (44.7%), over half of the participants reported they tried to remember to take their medications on their own (68.5%). Only a small proportion of respondents (6.1%) combined herbs with their ARVs as shown in Table II

Regarding the participants' knowledge about HIV, more than half (54.8%) believed that HIV is curable and mosquito can spread the virus (55%). Over two-third believed that HIV, is contagious. Less than half (40%) of the participants knew and could specify the names of their medications. More than a quarter, (27.7%) did not know their dosage frequency and more than half (59.8%) were unaware that poor adherence could lead to drug resistance. The overall knowledge score was 45.5% (Table III).

The overall adherence level was 64%. There was no significant association between demographic characteristics and the level of adherence. The details of patients' knowledge about ARV medications and level of adherence are shown in Table IV.

Travelling away from home and forgetfulness were the most common reasons why respondents were non-adherent - 23.6% and 12.7% respectively. The fear of stigmatization also featured prominently (12.7%) among the reasons for non-adherence.

Table V presents the other reasons for non-adherence to drug therapy.

Discussion

The level of ART knowledge of the participants in this study was low. For example, only 40% of the participants had adequate knowledge of their medications. This finding is in contrast with those of studies conducted in Kenya and Togo, which reported 48% of the study participants displaying adequate knowledge of ART^[18] and 55.6% of them knew the names of their ARVs^[19] respectively. The finding in the present study is also in contrast with the findings of a study conducted in Nigeria, in which all the study participants were knowledgeable about the route of administration of dispensed medicines, 99.9% were knowledgeable about the quantity of medicines to be administered for 99.9% of the dispensed medicines while 99.2% of the study participants were knowledgeable about the frequency of administration of 99.6% of dispensed medicines.^[20] The standard level of adherence required for maximum suppression of HIV multiplication and subsequent increase in CD4+ cell counts is 95%, whereas only 63.8% of the participants in the present study attained a satisfactory level of adherence. The adherence level in the present study is slightly higher than earlier reports of 54.5% and 59.9% from Kano (Northern Nigeria)^[21] and Calabar (South-south Nigeria)^[22] respectively.

Adherence in the present study is lower than that reported from Ilorin (North-Central Nigeria)^[23] and in Kenya^[18] where adherence levels of 73.3% and 85% respectively were reported.

The major reasons cited by participants for missing doses of ARVs include: being away from home, simply forgetting medications and operating a busy schedule. These reasons are similar to those advanced by respondents in other studies.^[24-27] Other reasons given by the respondents for skipping or missing doses of the medications included falling asleep, feeling of wellness and not wanting others to notice them take the medications. Only 21.3% of the participants used devices such as

Table I: Socio-demographic characteristics of 395 respondents

| Characteristics | Frequencies | Percentages |
|------------------------------|-------------|-------------|
| Sex | | |
| Male | 124 | 31.4 |
| Female | 271 | 68.6 |
| Age Range (Years) | | |
| 18-30 | 76 | 19.2 |
| 31-40 | 196 | 49.6 |
| 41-50 | 90 | 22.8 |
| 51-60 | 26 | 6.6 |
| 61-70 | 7 | 1.8 |
| Marital Status | | |
| Single | 116 | 29.4 |
| Married | 220 | 55.7 |
| Divorced | 9 | 2.3 |
| Separated | 14 | 3.5 |
| Widowed | 35 | 8.9 |
| Cohabiting | 1 | 0.2 |
| Tribes | | |
| Hausa | 16 | 4.1 |
| Yoruba | 16 | 4.1 |
| Ibo | 90 | 22.8 |
| Urhobo | 107 | 27.1 |
| Ijaw | 26 | 6.6 |
| Itsekiri | 19 | 4.8 |
| Edo | 20 | 5.0 |
| Esan | 9 | 2.3 |
| Isoko | 31 | 7.8 |
| Others | 61 | 15.4 |
| Religion | | |
| Christianity | 384 | 97.2 |
| Islam | 10 | 2.5 |
| Traditional | 1 | 0.3 |
| Educational Status | | |
| No formal education | 11 | 2.8 |
| Primary | 66 | 16.7 |
| Secondary | 178 | 45.1 |
| Tertiary | 136 | 34.4 |
| Postgraduate | 4 | 1.0 |
| Occupation | | |
| Yes (employed/self-employed) | 276 | 69.9 |
| No (unemployed) | 119 | 30.1 |

alarm clocks as reminders to take their medication. This is, perhaps, the reason why forgetfulness and sleeping through the dose time were significant factors in participants' non-adherence to ART. Therefore, it is imperative that patients should be strongly encouraged to use alarm devices to enhance their ability to remember to take their medications regularly and this should be reinforced during follow-up visits.

Socio-demographic characteristics such as sex, religion and educational attainment did not significantly affect adherence levels in the study

population. This corroborates the findings of Talaam *et al.* [28] but contrasts those of Kleeberger *et al.* and Uzochukwu *et al.* [29, 30]. In this study, self-reported improved health status was a risk factor for non-adherence. About 11.6% of the respondents were observed to abandon their drugs because they felt good or healthy. This finding agrees with the reports of other workers who found that most patients tended to abandon treatment once there was an improvement in their health. [31] One study, however, reported that patient-perceived improved health status was significantly

Table II: Participants' knowledge of sources of HIV infection and management activities

| <i>Parameters</i> | <i>Frequencies</i> | <i>Percentages</i> |
|--|--------------------|--------------------|
| How respondents acquired HIV | | |
| I don't know | 305 | 77.2 |
| Through sex | 64 | 16.2 |
| Contaminated needles | 5 | 1.2 |
| Blood transfusion | 9 | 2.3 |
| Barbing salon | 2 | 0.5 |
| Manicure/ pedicure | 3 | 0.8 |
| Surgical procedure | 4 | 1.0 |
| Others | 3 | 0.8 |
| Extent to which family members and friends encourage clients to take ARVs | | |
| Not at all | 98 | 24.8 |
| A little | 27 | 6.8 |
| Slightly | 30 | 7.6 |
| A lot | 174 | 44.1 |
| Not applicable | 66 | 16.7 |
| Reminders of specific time to take ARVs | | |
| Alarm | 80 | 20.3 |
| Reminded by Parents | 3 | 0.8 |
| Reminded by Spouse | 19 | 4.8 |
| Children | 12 | 3.0 |
| Remembers on my own | 274 | 69.3 |
| Reminded by relations | 4 | 1.0 |
| No response | 3 | 0.8 |
| Combining Herbs with ARVs | | |
| No | 371 | 93.9 |
| Yes | 24 | 6.1 |

associated with better adherence amongst their study population.^[22]

There was an association between ART knowledge and ART adherence level. A positive correlation between the ART knowledge level and the level of adherence has also been established by a previous study.^[18] Therefore, encouraging patients to remember the names, strength, and dosage frequency of their medications and to take ownership of the treatment process would be an appropriate strategy to address the observed low level of adherence. The use of self-report to assess medication adherence was a limitation in this study since there could have been recall bias resulting in over- or under-estimation of adherence. In addition, due to financial and logistical constraints, it was not possible to corroborate patient self-report of adherence with viral loads and CD4+ counts of the participants.

Conclusion

The HIV knowledge scores were low among patients accessing care at two Military HIV/ AIDS Treatment sites as only 45.5% answered knowledge questions correctly. Adherence to ART was low with only 63.8% of the patients achieving optimum adherence to ART. There was a strong association between ART knowledge and adherence to ART. The leading reasons for non-adherence included being away from home, busy with other things, forgetfulness, sleeping through the dose time, felt good and the need to conceal drug ingestion from others. This suggests that adherence level of patients could be significantly improved by deliberate effort to expand participants ART knowledge. Drug adherence counselors should make a deliberate effort to expand patients ART knowledge level about their regimen. This can be achieved through encouraging patients to

Table III: Participants knowledge on HIV infection and management

| <i>Knowledge questions</i> | <i>Correct responses Frequencies</i> | <i>Percentages</i> |
|---|--|--------------------|
| HIV is curable | 178 | 45.1 |
| Mosquito can spread HIV | 175 | 44.3 |
| Drug Treatment is started as soon as a person is diagnosed with HIV | 179 | 45.1 |
| HIV is contagious (Can be acquired through touch or staying close to the infected) | 137 | 34.7 |
| Kindly mention the names of the medicines you are taking | 160 | 40.5 |
| What kind of medicine treatment regimen are you on | 165 | 41.8 |
| If you do not take this medication exactly as instructed, the HIV will become resistant to the drug | 159 | 40.3 |
| How many tablets do you take per day and how many times? | 286 | 72.3 |
| Total knowledge score | | 45.5 |

Table IV: Adherence Scores stratified by patient demographics

| <i>Characteristics</i> | <i>Non-adherent</i> | <i>Adherent</i> | <i>Df</i> | <i>P-value</i> |
|--------------------------------------|---------------------|-----------------|-----------|----------------|
| | Frequency (%) | Frequency (%) | | |
| Gender | N=140 | N=255 | | |
| Male | 46 (32.9) | 78(30.6) | 1 | 0.813 |
| Female | 95 (67.1) | 177(69.4) | | |
| Total adherence score * | 36.3%+ | 63.8%+ | | |
| Religion | N=138 | N=255 | | |
| Christianity | 138(97.9) | 245(96.1) | | |
| Islam | 2(1.4) | 10(3.9) | 2 | 0.155 |
| Traditional | 1(0.7) | 0(0.0) | | |
| Total adherence score * | 35.8% + | 64.2%+ | | |
| Educational Status | N=143 | N=252 | | |
| None | 6(4.2) | 5(2.0) | | |
| Primary | 23(16.0) | 43(17.1) | | |
| Secondary | 64(44.8) | 114(45.2) | 4 | 0.378 |
| Tertiary | 50(35.0) | 86(34.1) | | |
| Postgraduate | 0(0.0) | 4(1.6) | | |
| Total adherence Score * | 35.9%+ | 64.1%+ | | |
| Knowledge about names of ARVs | N=145 | N=255 | | |
| No | 106(73.1) | 134(52.5) | | |
| Yes | 39(26.9) | 121(47.5) | 1 | 0.000 |
| Total adherence Score | 36.3%+ | 63.8%+ | | |
| Overall mean total score | | 64.0% | | |

* Positive response to any of the qualitative questions on SMAQ =Adherence

+ Proportion of respondents classified as Adherent/Non-adherent

Table V: Reasons for non-adherence to ART by PLWHA who ever missed therapy

| Reasons | Frequencies (n = 395) | Percentages |
|--|-----------------------|-------------|
| Away from home | 91 | 23.0 |
| Busy with other things | 54 | 13.7 |
| Simply forgot | 66 | 16.7 |
| Wanted to avoid side effects | 25 | 6.3 |
| Did not want others to notice drug ingestion | 49 | 12.4 |
| Change of daily routine | 31 | 7.8 |
| Felt drugs were harmful | 4 | 1.0 |
| Felt sick | 19 | 4.8 |
| Felt depressed | 14 | 3.5 |
| Fell asleep | 58 | 14.7 |
| Felt good | 45 | 11.4 |
| Had too many pills | 16 | 4.1 |
| Big size of pills | 12 | 3.0 |
| Offensive smell of pills | 14 | 3.5 |
| Cannot take pills on empty stomach | 17 | 4.3 |
| Ran out of pills | 15 | 3.8 |
| Drugs not in stock | 7 | 1.8 |
| Unfriendly health workers | 10 | 2.1 |
| Long waiting time in the hospital | 32 | 8.3 |
| Due to fasting and prayer | 3 | 0.8 |

* Totals do not add up to 100% because of multiple responses.

remember the names of their drugs, the strength of their medications as well as take ownership of the treatment process. In addition, ART caregivers should reinforce the need for drug adherence at every follow-up visit to the clinic. The patients should be encouraged to use alarm to enhance their ability to remember to take their drugs regularly and at specified times.

Authors' Contributions: AUD conceived and designed the study. WFE did the literature search, data analysis and interpretation while BCN and DDA participated in data acquisition, analysis and interpretation. WFE, BCN and DDA drafted the manuscript while all the authors approved the final version of the manuscript.

Conflict of interests: None.

Funding: Self-funded.

Publication History: Submitted 10-December 2017; Revised 24-February 2018; Accepted 23-March 2018

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