# Adherence challenges: a cross sectional study of patients on antiretroviral therapy in a tertiary hospital in North Central Nigeria.

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## ABSTRACT

**Background:** Adherence to Antiretroviral therapy (ART) is a principal determinant of virologic suppression. ART is recommended for all people living with HIV and AIDS (PLWHIV) to achieve virologic, immunologic, clinical and humanistic outcomes. Non-adherence to treatment may interfere with treatment outcomes.

**Objective:** The main objective of this study was to identify the possible challenges of adherence among people on ART.

**Methods:** This was a cross-sectional survey design which administered structured questionnaires on 1000 adults on ART using simple random sampling technique. The study site was AIDS Prevention Initiative in Nigeria (APIN) clinic of Federal Medical Centre, Makurdi. Simple percentages and correlations were used to analyse data.

**Results:** Cumulatively, patients' factors (98.8%) and socio-cultural factors (98.5%) were found to be the predominant non-adherence factors. Singular non-adherence factors with the strongest impact were strike action, stigma, hunger, fear of side effects and lack of transportation. This study reports no significant relationship between adherence and demographic parameters both in the last 7 days and 3 months.

**Conclusion:** Strike action, stigma, hunger, fear of side effects and lack of transportation were found to be singular factors with highest impact on non-adherence amongst the study participants. Knowledge of HIV among participants was good, though adherence was sub-optimal.

**Keyword:** Adherence challenges, antiretroviral therapy, PLWHIV, APIN, Patient factors

**Défis liés à l'observance : une étude transversale de patients sous traitement antirétroviral dans un hôpital tertiaire du centre-nord du Nigéria.**

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## RÉSUMÉ

**Contexte :** L'observance du traitement antirétroviral (TAR) est un déterminant principal de la suppression virologique. Le TAR est recommandé à toutes les personnes vivant avec le VIH et le SIDA (PVVIH) afin d'obtenir des résultats virologiques, immunologiques, cliniques et humanistes. La non-observance du traitement peut interférer avec les résultats du traitement.

**Objectif :** L'objectif principal de cette étude était d'identifier les défis possibles de l'adhésion au traitement chez les personnes sous TAR.

**Méthode :** Une conception d'enquête transversale qui a administré des questionnaires structurés à 1000 adultes sous TAR en utilisant une technique d'échantillonnage aléatoire simple. Le site d'étude était la clinique APIN du Centre médical fédéral, Makurdi. Des pourcentages simples et des corrélations ont été utilisés pour analyser les données.

**Résultats :** Les facteurs liés aux patients se sont avérés être, cumulativement (98,8 %), les principaux facteurs de non-observance, suivis des facteurs socioculturels (98,5 %). Les facteurs singuliers de non-observance ayant l'impact le plus fort sont la grève, la stigmatisation, la faim, la peur des effets secondaires et le manque de transport. Cette étude ne rapporte aucune relation significative entre l'observance et les paramètres démographiques au cours des 7 derniers jours et des 3 derniers mois.

**Conclusion :** Les grèves, la stigmatisation, la faim, la peur des effets secondaires et le manque de moyens de transport se sont avérés être les facteurs singuliers ayant le plus d'impact sur la non-observance parmi les participants à l'étude. La connaissance du VIH parmi les participants était bonne, mais l'observance était sous-optimale.

**Mots clés :** Défis à l'observance, patients, traitement antirétrovirale

## INTRODUCTION

Human immuno-deficiency virus (HIV) continues to be a major global public health issue, having claimed 36.3 million (27.2 - 47.8 million) lives so far (2021).[1] Antiretroviral therapy (ART) is the treatment of people infected with HIV using anti- HIV drugs, often referred to as, 'Highly Active Antiretroviral Therapy' (HAART).[2] ART is recommended for all PLWHIV regardless of cluster of differentiation 4 (CD4) cell count to consistently suppress viral load, maintain high CD4 cell count, prevents acquired immune deficiency syndrome (AIDS), prolong survival and reduce risks of transmitting HIV to others. Research, however, shows that the success of ART, depends on the extent to which the patient adheres to treatment.[3]

The World health organization (WHO) defines adherence as the extent to which a person's behaviour (taking medications, following a diet and/or executing lifestyle changes) corresponds with agreed recommendation from the healthcare provider.[4] An adherence of 95% is required as an approximate level to achieve maximal viral suppression and lower the rate of opportunistic infections (OIs). Non- adherence can be linked to the development of ART resistance, progression to AIDS and finally death.[5]

Some challenges of adherence to ARTs include; patient-related factors (such as forgetfulness, tight work schedule, etc.), side effects of ARTs, economic factors (lack of finance, poor feeding), sociocultural factors (stigma, religious beliefs, discrimination), weak heath systems such as drug stock outs, strike action by health workers, and so on. Similar factors have been identified in a previous study done in south-south Nigeria.[6] These challenges might, however, differ in different geographical locations.

Non-adherence is the most common reason for treatment failure with potential risk of developing drug resistance through suboptimal viral suppression (lower than the standard for viral load suppression). Subsequent transmission of first-line ART-resistant HIV strains increases the demand for second line treatment which is often associated with poorer patient health outcomes and increasing health care costs. For these reasons, a thorough understanding of the factors influencing non-adherence to ART is paramount.[7] Identification of these factors would help in carrying out target-specific interventions that will improve adherence.

The primary objective of this study is to identify the possible factors responsible for non-adherence among people on antiretroviral therapy (ART). This study also seeks to evaluate the knowledge and perception of ART among people on antiretroviral therapy and determine the association between non-adherence and the demographic parameters (age, gender, religious beliefs, and educational status).

Studies on ART adherence have shown that predicators and risk factors vary in different regions of the world and the need might arise for context-specific development of non-adherence profiles.[7] This study will aid health care providers to understand the factors affecting ART adherence which would raise their awareness to adherence thus offering tailored care for patients at risk of non-adherence. Furthermore, this study will help in developing adherence - enhancing interventions strategies.[8,9]

## METHODS

### Study setting

This study was conducted at the AIDS Prevention Initiative in Nigeria (APIN) clinic of Federal Medical Centre (FMC), Makurdi, Benue state, Nigeria. FMC Makurdi is a 400-bed hospital. The hospital is currently operating on eight (8) sites namely, Mission ward, National Health Insurance Scheme (NHIS) complex, Dento-Psychiatric Complex-DPC, Permanent site at Apir, Federal Staff Clinic at Federal secretariat, Tongo outstation centre, Efekwo outstation centre, Ikpa Mbatierev outstation centre and Mbamtsar outreach center. The APIN complex /clinic is located within the mission ward and was established in 2013. Many of the patients on ART that attend the clinic come from different parts of the region to fill their prescriptions.

### Study design

A cross-sectional survey design was used. In this case, the researcher enrolled adult patients on antiretroviral therapy who accessed care on adult clinic days within the study period of 6 weeks.

### Study population

The study population comprised of adult HIV patients (aged 18 years and above) accessing ART at the APIN Clinic of the hospital. Pregnant women and children were excluded from the study.

## Sample size determination

The sample size for this study was determined using published tables which provided the sample size for a given set of criteria such as for various levels of precisions, confidence levels and variability. In this case, the size of the population was about 11,000 (gotten from APIN Clinic, Data Unit) and the researchers used a precision of ± 3%. According to the table, the corresponding sample size was 1,000.[10]

**Sample size for ± 3%, ± 5%, ± 7%, and ± 10% Precision Levels, where confidence level is 95% and p=5**

| Size of Population | Sample size (n) for precision (e) of | | | |
|---|---|---|---|---|
| | ± 3% | ± 5%, | ± 7%, | ± 10%, |
| 500 | a | 222 | 145 | 83 |
| 1,000 | a | 286 | 169 | 91 |
| 5,000 | 909 | 370 | 196 | 98 |
| 10,000 | 1,000 | 385 | 200 | 99 |
| 15,000 | 1,034 | 390 | 201 | 99 |
| 25,000 | 1,064 | 394 | 204 | 100 |
| 50,000 | 1,087 | 397 | 204 | 100 |

Glenn D.1 1992 Determining sample size PEOD6

a = Assumption of normal population is poor (Yamane, 1967). The entire population should be sampled.

## Sampling

For the purpose of this study, simple random sampling technique was used to select the 1,000 participants from the general adult patient population on antiretroviral therapy in the study location.

## Data collection Instrument/procedure

A structured questionnaire which comprised of the categories evaluating the knowledge of HIV drugs, treatment adherence and distribution of the factors or challenges affecting adherence was deployed among the respondents. The questionnaires were administered on those who chose a yes from the sampling pool and those who could not read and write were assisted to provide the required data. Their responses were used for subsequent data analysis and result presentation. Data collection was done over a period of 6 weeks.

## Data analysis

The researcher employed the use of descriptive and inferential statistics for data analysis. Computer analyses with statistic software called Statistical Package for Social Sciences (SPSS), version 20 was used to analyze and present result for this study. Data were analyzed using simple percentages. Relationship between variables were analyzed using Pearson correlation.

Non-adherence factors were grouped as follows:

**Patient factors:** Forgetfulness, tightness of work schedule, travelled out of town, drugs got finished, too ill to take drugs, no longer feeling sick, suspicious of treatment.

**Economic factors:** Lack of transportation and no food to eat (Hunger)

**Socio-cultural factors:** Spiritual Healing, stigma, sharing of drugs, taking native medicines, religious beliefs.

**Health system factors:** Strike in the hospital, poor attitude of workers.

**Drug related factors:** Fear of side effects, too many pills (Pill burden).

## Ethical consideration

Ethical approval was obtained from the hospital ethical

research committee (HREC) prior to the conduct of the study. Participants were duly informed about the study and their consent obtained being assured that their refusal of consent would have no negative influence on the quality of care they would be given. They were also assured of the confidentiality of their information.

**RESULTS**
Of the 1000 participants enrolled, 691(68.1%) were females and 295 (29.5%) males. The largest number of participants were within the ages of 31-40 years. Christians were more in number (62.5%) followed by Muslims (24.3%). Majority, 519 (51.9%) of the participants were married with the highest number having secondary school education (346 representing 34.6%). Majority, 657 (65.7%) of the participant had one form of job or the other: trading/business, civil service, self-employment and others. Unemployed participants were also high 301 (30.1%) while 42 (4.2%) were students (see Table 1).

Table 2 shows the results of the assessment of the knowledge of HIV among study participants. Majority, 723 (72.3%) knew ARV drugs do not cure HIV, 615 (61.5%) knew that they couldn't stop ARV drugs once commenced, 355 (35.5%) knew that ARV drugs reduce the viral load, 258 (25.8%) knew that if they didn't adhere to their ART, they will fall sick again. Despite a good knowledge of HIV among the participants, 17% representing 170 participants believe that HIV can be cured.

Majority of the participants, 775(77.5%) did not miss their doses in the last 7 days and 788(78.8%) had not missed taking their drugs in the last 3 months. Adherence

was 77.5% and 78.8% in the last 7 days and in the last 3 months respectively (Table 3). The calculation for this adherence should be specified in the method with relevant reference.

Table 4 shows the different factors responsible for non-adherence among participants. These ranged from factors relating to the patient, economy, society and culture, health system to the drugs themselves. Patients' factors were found to be, cumulatively (98.8%), the predominant non-adherence factors followed by socio-cultural factors (98.5%). Drug related factors were cumulatively found to have the least effect on none-adherence in these patients. Strike action: 546 (54.6%), stigma: 544(54.4%), hunger: 475 (47.5%), fear of side effects: 458 (45.8%) and lack of transportation: 424 (42.4%) were found to be singular factors with highest impact on non-adherence amongst the study participants. Factors with minimal effects were: suspicious of treatment: 13 (1.3%), drug got finished: 27 (2.7%), too ill to take drugs: 52 (5.2%), religious beliefs: 54 (5.4%) and, no longer feeling sick and taking native medicines: 55 (5.5%) each.

Table 5 shows the results for tests for any statistically significant association between adherence and demographics. No statistically significant relationship was shown between age and adherence (last 7 days: p=.735 and last 3 months: p=603). The same was applicable to the other demographic parameters: Sex (last 7 days: p=.151 and last 3 months: p=.073), Religion (last 7 days: p =.684 and last 3 months: p =.658) and Educational qualification (last 7 days: p =.778 and last 3 months: p =.571).

Table 1: Socio-demographic characteristics of participants (N=1000)

| Variables | Frequency | Percentage |
|---|---|---|
| **AGE (YRS)** | | |
| Less or = 20 | 109 | 10.9 |
| 21-30 | 242 | 24.2 |
| 31-40 | 279 | 27.9 |
| 41-50 | 160 | 16.0 |
| 51-60 | 67 | 6.7 |
| Above 60 | 143 | 14.3 |
| **GENDER** | | |
| Male | 295 | 29.5 |
| Female | 691 | 69.1 |
| Invalid | 14 | 14 |
| **RELIGION** | | |
| Christianity | 625 | 62.5 |
| Islam | 244 | 24.4 |
| Traditional | 131 | 13.1 |
| **MARITAL STATUS** | | |
| Single | 252 | 25.2 |
| Married | 519 | 51.9 |
| Divorced/Separated | 110 | 11.0 |
| Widowed | 119 | 11.9 |
| **EDUCATIONAL QUALIFICATION** | | |
| No formal education | 170 | 17.0 |
| Primary | 164 | 16.4 |
| Secondary | 346 | 34.6 |
| Tertiary | 320 | 32.0 |
| **OCCUPATION** | | |
| Trading/Business | 121 | 12.1 |
| Civil Servant | 188 | 18.8 |
| Self employed | 277 | 27.7s |
| Unemployed | 301 | 301 |
| Students | 42 | 4.2 |
| Others | 71 | 7.2 |

**Table 2. Knowledge and perception of participants about HIV**

| Variable | Frequency | Percentage |
|---|---|---|
| 7.   Does HIV have cure? | | |
| Yes | 170 | 17.0 |
| No | 723 | 72.3 |
| I Don't Know | 78 | 7.8 |
| No response | 29 | 2.8 |
| Total | **1000** | **100** |
| 8.   Can you stop HIV drugs once you start? | | |
| Yes | 211 | 21.1 |
| No | 615 | 61.5 |
| I Don't know | 95 | 9.50 |
| No response | 79 | 7.90 |
| Total | **1000** | **100** |
| 9.   What does HIV drugs do to the body? | | |
| Reduce viral load | 355 | 35.5 |
| Make you grow fat | 92 | 9.20 |
| Reduce risk of transmission | 174 | 17.4 |
| Make you stop feeling sick | 256 | 25.6 |
| Can be used to treat other illnesses in the | 71 | 7.10 |
| body | 52 | 5.20 |
| I Don't know | **1000** | **100** |
| Total | | |
| 10.   What are the implications of non-adherence? | | |
| My Doctor may be angry | 39 | 3.90 |
| The drug may no longer work | 212 | 21.2 |
| I will become sick again | 258 | 25.8 |
| I may not be cured | 27 | 2.70 |
| The viruses will become resistant | 211 | 21.1 |
| My viral load will increase | 145 | 14.5 |
| I might die from the diseases | 65 | 6.50 |
| I will lose weight | 43 | 4.30 |
| Total | **1000** | **100** |

## Table 3: Participants adherence to ART

| Variable | Frequency | Percentage |
|---|---|---|
| 11. Did you miss taking your drug in the last 7 days? | | |
| Yes | 225 | 22.5 |
| No | 775 | 77.5 |
| Total | **1000** | **100** |
| 12. Have you ever missed taking your drug in the last 3months | | |
| Yes | 212 | 21.2 |
| No | 788 | 77.8 |
| Total | **1000** | **100** |

**Table 4. Showing Non adherence factors**

| | Variable | Freq. | Percent. | CNADF% (Percentage Cumulative Non Adherence Factor) |
|---|---|---|---|---|
| 13. | Patient Factors affecting adherence to treatment | | | |
| a. | Forgetfulness | 293 | 29.3 | |
| b. | Tightness of work schedule | 276 | 27.6 | |
| c. | Travelled out of town | 282 | 28.2 | |
| d. | Drugs got finished | 27 | 2.70 | |
| e. | Too ill to take drugs | 52 | 5.20 | 99.8 |
| f. | No longer feeling sick | 55 | 5.50 | |
| g. | Suspicious of treatment | 13 | 1.30 | |
| h. | None of the above | 2 | 0.20 | |
| | Total | **1000** | **100** | |
| 14. | Economic factors affecting adherence to treatment | | | |
| a. | Lack of transportation | 424 | 42.4 | |
| b. | No food to eat (Hunger) | 475 | 47.5 | |
| c. | None of the above | 101 | 10.1 | 89.9 |
| | Total | **1000** | **100** | |
| 15. | Socio-cultural factors affecting adherence to treatment | | | |
| a. | Spiritual healing | 123 | 12.3 | |
| b. | Stigma | 544 | 54.4 | |
| c. | Sharing of drugs | 209 | 20.9 | |
| d. | Taking native medicines | 55 | 5.50 | 98.5 |
| e. | Religious beliefs | 54 | 5.40 | |
| f. | None of the above | 15 | 1.50 | |
| | Total | **1000** | **100** | |
| 16. | Health system factors affecting adherence to treatment | | | |
| a. | Strike in the hospital | 546 | 54.6 | |
| b. | Poor attitude of workers | 264 | 26.4 | 81.0 |
| c. | None of the above | 190 | 19.0 | |
| | Total | **1000** | **100** | |
| 17. | Drug related factors affecting adherence to treatment | | | |
| a. | Fear of side effects | 458 | 45.8 | |
| b. | Too many pills ( Pill burden) | 239 | 23.9 | 69.7 |
| c. | None of the above | 303 | 30.3 | |
| | Total | **1000** | **100** | |

*CNADF% : Percentage Cumulative Non-Adherence Factors*

**Table 5. Pearson correlation showing relationship between demographic parameters and adherence**

| | ever missed taking your drugs in the last 7 days | ever missed taking your drugs in the last 3 months |
|---|---|---|
| **AGE** | | |
| Pearson correlation | .735** | .603** |
| Sig. (2-tailed) | .000 | .000 |
| **SEX** | | |
| Pearson correlation | .151** | .073* |
| Sig. (2-tailed) | .000 | .021 |
| **RELIGION** | | |
| Pearson correlation | .684** | .658** |
| Sig. (2-tailed) | .000 | .000 |
| **EDUCATION** | | |
| Pearson correlation | .778** | .571* |
| Sig. (2-tailed) | .000 | .002 |

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).                    of =95%[5]

## DISCUSSION
This study was carried out to identify adherence challenges to ART and to evaluate the knowledge and perception of ART amongst people on anti-retroviral therapy. The researchers reported an adherence of 77.5% and 77.8% in the last seven (7) days and three (3) months respectively, which is below the optimal adherence rate of =95%[5] expected of persons on ART. A study conducted in a tertiary hospital in Ilorin, Kwara state, North Central Nigeria, reported a higher adherence rate of 92.6%, although it was still below the optimal rate.[11] Several studies conducted across the globe have reported sub-optimal adherence to ART: Kahema *et al*, 2018, Basavaprabhu *et al* 2013.[12-13] HIV is a chronic disease that can be managed effectively using ART. It is, however, critical that treatment be adhered to for optimal therapeutic outcomes. Suboptimal adherence has been shown to increase healthcare utilization, creating a burden on the system and healthcare workers.[14] It is also associated with high rate of drug resistance and mortality among HIV patients.[15] This research has given more insight to the fact that more needs to be done to improve adherence among HIV patients on ART. Proper adherence

counselling and dissemination of health information should be conducted.

Many factors have been responsible for the poor adherence of patients to therapy. This study reports that, cumulatively, patient related factors were the most predominant non adherence factors. The most reason given by participants for non-adherence under this category was forgetfulness. Similar results have been reported by different researchers who established patient related factors as the major reason for non-adherence with forgetfulness as the primary reason.[6,16,17] Another study which was carried out in a tertiary hospital in Ilorin, Nigeria indicated lack of money for transportation as the greatest reason for non-adherence to ART, which is an economic factor.[11] Both in Nigeria and globally, forgetfulness has been seen as a serious barrier to adherence to ART. Although Seth *et al.*, (2016) opined that use of medication reminders and medication organizational strategies did not result in optimal adherence,[18] healthcare providers must put in efforts to ensure that this problem is tackled: proper counselling and advocacy for use of family and social support

strategies, and special gadgets for reminders eg. phones, alarms, calendars, diaries, text messaging devices, should be done.

The second highest cumulative non-adherence factors given by participants in this study was socio-cultural factors which included; spiritual healing, stigma, sharing of drugs, taking native medicines and religious beliefs. Stigma was reported as the highest non adherence factor in this group. Other studies also reported poor adherence associated with stigma.[19-20,13] This indicates that despite the high level anti-stigmatization campaigns against people living with HIV, social stigma is still a serious challenge of adherence to ART. There is need for continuous public sensitization to reduce stigma. According to Chirambo et al., (2019) defaulting from antiretroviral treatment found in privately owned health facilities in Malawi was as a result of fear of disclosing an HIV status to avoid potential stigmatization and discrimination.[21] In the implementation of ART services, there is need to adopt strategies that will promote the patients' right to privacy and confidentiality of their health and related information. Strike action, stigma, hunger, fear of side effects and lack of transportation were found to be singular factors with highest impact on non-adherence amongst the study participants.

The Sexually Transmitted Infections (STI) clinic operates even during strike action yet strike actions was considered a serious challenge of adherence. Information gap between healthcare providers and patients may be implicated. Patients enrolment on ART programmes in facilities with good proximity to their homes will help address transportation challenges. This will, however, be achieved if the problem of stigmatization is adequately tackled.

Majority of the participants in this study believed that ARV drugs do not cure HIV. Most of them knew they couldn't stop ARV drugs upon commencement and were aware that the drugs reduce viral load. The participants knew that non-adherence to ART would increase morbidity. The overall knowledge and perception of ART among participants in this study was good. An earlier study carried out in the South-South region of Nigeria indicates majority of the participants were aware that ARV drugs do not cure HIV and that ARV drugs can't be stopped once started.[5] On the contrary, Strother et al., (2022) reported the exhibition of poor knowledge of HIV among HIV patients on ART.[19] The result of the current study implies that lack of knowledge was not a predictor

of non-adherence as the participants clearly understood HIV and its treatment as well as the implications of non-adherence.

This study reports no significant relationship between age and adherence for both the last 7 days and the last 3 months respectively. This was also shown in the other demographic parameters: sex, religion, and educational qualification, thus implying that adherence to ART does not depend on age, sex, religion or level of education of the patients on ART. A previous study by Anyaike et al., (2019) reported a significant relationship with the level of education and adherence among the patients; those with tertiary education adhered more than those with no formal education.[11] Another study also shows no significant relationship between sex and adherence, which is in consonance with the present study, but shows significant relationship between education and adherence.[6] An earlier study reported a significant correlation with increasing age and adherence, and also noted adherence to be higher in males than in females.[22] Tessa et al., (2016) on the contrary identified the male gender as one of the determinants of non-adherence.[7] The variations in the results of these studies relating adherence to demographic parameters might be as a result of setting specific characteristics. There is, therefore, need for setting specific interventions or a comprehensive adherence improvement strategy that will accommodate different settings specificities.

## CONCLUSION
The level of adherence to ART was seen to be sub-optimal. While the study revealed patient factors as the major cumulative factors responsible for non-adherence to ART followed by sociocultural factors, strike action, stigma, hunger, fear of side effects and lack of transportation were found to be singular factors with highest impact on non-adherence amongst the study participants. The overall knowledge and perception of HIV among participants in this study was good. Patients' demographics have no significant influence on adherence.

## ACKNOWLEDGEMENT

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