Predictors of Adherence to Highly Active Antiretroviral Therapy among People Living with HIV/AIDS in Akwa Ibom State, Nigeria

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ABSTRACT

Adherence to Highly Active Antiretroviral Therapy (HAART) remains critical for achieving viral suppression and reducing HIV-related morbidity and mortality, particularly in high-burden settings such as Akwa Ibom State, Nigeria. This study assessed the level of HAART adherence and its associated predictors among People Living with HIV (PLHIV) receiving antiretroviral therapy in Akwa Ibom State.

A descriptive cross-sectional study design was employed among 200 PLHIV accessing HIV care services in selected ART-supported health facilities across Akwa Ibom State. Data were collected using a structured, interviewer-administered questionnaire. HAART adherence was assessed using a four-day recall method. Descriptive statistics were used to summarize respondents' characteristics, while chi-square tests were conducted to determine associations between HAART adherence and selected patient-related, socio-cultural, and health-system factors at a significance level of $p < 0.05$.

The study found that 79.5% of respondents were adherent to HAART, a level below the World Health Organization recommended threshold of ≥95%. HIV status disclosure ($\chi^2 = 9.21$; p = 0.002), family support ($\chi^2 = 6.74$; p = 0.009), and use of medication reminders ($\chi^2 = 18.63$; p < 0.001) were significantly associated with better adherence. Conversely, fear of stigma ($\chi^2 = 11.84$; p = 0.001) and long clinic waiting times ($\chi^2 = 13.02$; p < 0.001) were significantly associated with non-adherence. Forgetfulness, treatment fatigue, and health-system barriers were identified as major challenges to optimal adherence.

In conclusion, HAART adherence among PLHIV in Akwa Ibom State is moderately high but remains suboptimal. Adherence is influenced by an interplay of patient-related, socio-cultural, and health-system factors. Strengthening adherence counselling, promoting safe disclosure, integrating family and digital reminder support, reducing clinic waiting times, and intensifying anti-stigma interventions are essential for improving treatment outcomes and achieving sustained viral suppression in Akwa Ibom State.

Keywords: HAART adherence, HIV, predictors, stigma, Akwa Ibom State, Nigeria

INTRODUCTION

Background of the Study

The Human Immunodeficiency Virus (HIV) affects cells in the immune system as the virus destroys and impairs the function of immune cells, infected individuals gradually become immune deficient. The body becomes increasingly unable to fight infections and disease and vulnerable to opportunistic infections and predisposes the infected individual to multiple opportunistic diseases leading to Acquired Immuno-deficiency Syndrome (AIDS). The virus destroys white blood cells in the immune system called CD4 cells and replicates itself inside these cells. The virus spreads through fluids like blood, semen, and breast milk, but not through casual contact (World Health Organization, 2024).

There were 39.9 million people across the globe with HIV in 2023. Of these, 38.6 million were adults (>15 years old), and 1.4 million were children (<15 years old). In addition, 53% were women and girls (HIV.gov, 2022).

In the African region, there are a total of 25.6 million people living with HIV, with 20.8 million in East and Southern Africa and 4.8 million in West and Central Africa. (World Health Organization, 2018).

In Nigeria, the HIV epidemic ranks as the second highest across the world, with over 1.9 million people currently living with HIV, with current evidence revealing incidence as 8.0 per 10 000 persons across both genders and age groups, and a current prevalence of 1.4% among adults aged 15–49 years (Archibong Edem Bassey & Goshen David Miteu, 2023).

 The states with the highest HIV prevalence rates were primarily located in the South and Southeast regions. The three states with the highest prevalence rates were Akwa Ibom (4.3% [95% UI: 3.7%–4.9%]), Benue (3.6% [95% UI: 3.1%–4.2%]), and Rivers (3.2% [95% UI: 2.8%–3.7%]), all of which are situated in the Southeast region. Conversely, states in the North and Northwest regions exhibited lower HIV prevalence, with most states in the North reporting estimated HIV prevalence rates below 1% (O'BRIEN-CARELLI et al., 2022).

HIV prevalence among adults aged 15-64 years was 1.4%. This was lower among men (1.0%) than women (1.8%) and lower in urban (1.3%) areas than in rural (1.5%) areas. HIV prevalence among adults aged 15-49 years was 1.3%. This was lower among men (0.8%) than women (1.7%) and lower in urban (1.1%) than in rural (1.4%) areas. Among adults aged 15-49 years, Akwa Ibom State had the highest HIV prevalence (4.8%) followed by Benue State (4.3%) and Rivers State (3.6%). Among adults aged 15-49 years, Jigawa and Katsina States had the lowest prevalence at 0.3% (NAIIS, 2018).

Current antiviral treatments can reduce HIV-associated morbidity, prolong survival, and prevent HIV transmission. Highly Active Antiretroviral Therapy (HAART) (Combination antiretroviral therapy (cART)), containing preferably three active drugs from two or more classes is required for durable virologic suppression (Cihlar & Fordyce, 2016).

HAART is recommended for all patients irrespective of their CD4 cell count, WHO staging and clinical status in line with the test and treat strategy. Early initiation and strict adherence to ART are important in the reduction of the progression of the virus through suppression of viral load and increase the level of cluster of differentiation 4 (CD4) cells count. This approach not only enhances patient survival and improves quality of life, but also increases productivity and reduces the risk of opportunistic infections.

Highly Active Antiretroviral Therapy (HAART) is a standard of HIV management to suppress viral load and delay progression to AIDS. The introduction of Highly Active Anti-Retroviral Therapy (HAART) was a major turning point in HIV care. It uses a combination of anti-retroviral medication recommended to aggressively suppress viral replication and halt the progress of HIV to AIDS, hence a subsequent improvement in survival and quality of life (QoL). Significant efforts have been exerted to scale-up HAART uptake in developing countries, particularly in sub–Saharan Africa, where the epidemic has had its most devastating impact. (Desta;, 2020).

Adherence to ART is the patient's ability to follow treatment plan by taking the correct dose of medications (≥ 95% of the prescribed doses) at prescribed time, frequencies (schedule) and following dietary instructions (Tigabu Munye Aytenew et al., 2023).

A high level of adherence (>95%) is required for antiretroviral therapy to be effective and to obtain optimal benefits. There are many predictors to adherence. Adherence is a patient's ability to follow a treatment plan, take medications at prescribed times and frequencies, and follow restrictions regarding food and other medications. Suboptimal adherence to ART may ultimately lead to failure of primary regimen (Abadiga et al., 2020) (Banagi Yathiraj et al., 2016).

Adherence is measured by multiplying the number of drug dosage taken by 100 divided by the number of drug dosage prescribed.

The study on predictors of non-adherence to highly active antiretroviral therapy among people living with HIV/AIDS in Akwa Ibom and Katsina States is a crucial research endeavor with significant implications for public health. the proposed PhD research aims to make valuable contributions to efforts aimed at retaining HIV/AIDS positive individuals in care, which will lead to improved viral suppression rates and enhance the longevity of those undergoing HAART treatment in Nigeria.

Statement of the Problem

There were 39.9 million people across the globe with HIV in 2023. Of these, 38.6 million were adults (>15 years old), and 1.4 million were children (<15drwq years old). In addition, 53% were women and girls (HIV.gov, 2022). 39.9 million [36.1 million–44.6 million] people globally were living with HIV in 2023. 1.3 million [1 million–1.7 million] people became newly infected with HIV in 2023. 630 000 [500 000–820 000] people died from AIDS-related illnesses in 2023. 30.7 million people [27–31.9 million] were accessing antiretroviral therapy in 2023. 88.4 million [71.3 million–112.8 million] (UNAIDS, 2023) people have become infected with HIV since the start of the epidemic. 42.3 million [35.7 million–51.1 million] people have died from AIDS-related illnesses since the start of the epidemic. (UNAIDS, 2023) (Tian et al., 2023). In 2023, around 630 000 [500 000–820 000] people died from AIDS-related illnesses worldwide, (UNAIDS, 2023).

Despite the availability of effective antiretroviral therapy and the scale-up of HIV treatment services in Nigeria, optimal adherence to HAART remains difficult to achieve. In Akwa Ibom State, which bears the highest HIV burden in the country, non-adherence to HAART presents a serious public health concern. Poor adherence to antiretroviral therapy leads to inadequate viral suppression, immunological failure, increased risk of opportunistic infections, and the emergence of drug-resistant HIV strains. These outcomes not only threaten the health and survival of people living with HIV but also increase the risk of ongoing HIV transmission within the community.

Several factors have been associated with non-adherence to HAART, including forgetfulness, fear of stigma and discrimination, non-disclosure of HIV status, treatment fatigue, adverse drug effects, and structural barriers within the health system such as long waiting times and negative attitudes of healthcare providers. In high-prevalence settings like Akwa Ibom State, these challenges are often compounded by socio-economic vulnerabilities and persistent HIV-related stigma.

Although previous studies have examined HAART adherence in different parts of Nigeria, there remains a need for state-specific evidence that reflects the unique epidemiological and socio-cultural context of Akwa Ibom State. Without such evidence, interventions may fail to address the most relevant barriers to adherence. This study therefore seeks to investigate the predictors of adherence and non-adherence to HAART among People Living with HIV in Akwa Ibom State, with the aim of generating evidence to inform targeted interventions and policy decisions.

Research Questions

1. What is the prevalence of adherence to Highly Active Antiretroviral Therapy among People Living with HIV/AIDS in Akwa Ibom State?

2. What patient-related, treatment-related, and health-system factors predict adherence to HAART among People Living with HIV/AIDS in Akwa Ibom State?

3. What are the perceived barriers to optimal HAART adherence among People Living with HIV/AIDS in Akwa Ibom State?

Objectives of the Study

General Objective

To determine the predictors of adherence to Highly Active Antiretroviral Therapy (HAART) among People Living with HIV/AIDS in Akwa Ibom State, Nigeria.

Specific Objectives

1. To determine the prevalence of HAART adherence among People Living with HIV/AIDS in Akwa Ibom State.

2. To identify the predictors of adherence to HAART among People Living with HIV/AIDS in Akwa Ibom State.

3. To examine perceived barriers to HAART adherence among People Living with HIVAIDS in Akwa Ibom State.

Significance of the Study

The findings of this study will contribute to improved understanding of the factors influencing adherence to HAART among People Living with HIV in Akwa Ibom State. The results will be valuable to the Akwa Ibom State Ministry of Health, HIV programme implementers, non-governmental organizations, and healthcare providers involved in HIV care and treatment. Evidence generated from this study can inform the design of targeted adherence-support interventions, strengthen HIV treatment programmes, and support policy development aimed at improving viral suppression and reducing HIV-related morbidity and mortality in the state.

Scope of the Study

This study was conducted exclusively in Akwa Ibom State, Nigeria, and focused on adult People Living with HIV aged 18 years and above who were receiving Highly Active Antiretroviral Therapy in selected ART-supported health facilities. The study examined socio-demographic, patient-related, treatment-related, and health-system factors influencing adherence to HAART. Children, adolescents, and People Living with HIV outside Akwa Ibom State were excluded from the study.

Operational Definition of Terms

- **Adherence:** The extent to which a patient consistently takes antiretroviral medication according to the prescribed dose, timing, and frequency.

- **Non-adherence:** Failure to take antiretroviral medication as prescribed, including missed doses, incorrect dosing, or treatment interruption.

- **Highly Active Antiretroviral Therapy (HAART):** A combination of antiretroviral drugs used for the treatment and management of HIV infection.

- **People Living with HIV (PLHIV):** Individuals who have been diagnosed with Human Immunodeficiency Virus infection.

LITERATURE REVIEW

Introduction

This chapter reviews relevant literature on adherence to Highly Active Antiretroviral Therapy (HAART) among People Living with HIV/AIDS, with specific emphasis on issues applicable to Akwa Ibom State,

Nigeria. The review is organized into conceptual, theoretical, and empirical components, focusing on the nature of HAART adherence, determinants of adherence and non-adherence, and contextual factors influencing treatment outcomes in high HIV-burden settings. The chapter also presents a conceptual framework that guides the study.

Conceptual Review

Concept of HIV and AIDS

Human Immunodeficiency Virus (HIV) is a retrovirus that attacks the immune system, particularly CD4 lymphocytes, leading to immune suppression and increased susceptibility to opportunistic infections. Acquired Immunodeficiency Syndrome (AIDS) represents the advanced stage of HIV infection, characterized by severe immunodeficiency and the presence of opportunistic infections or malignancies. Without effective treatment, HIV infection inevitably progresses to AIDS and death. However, the advent of antiretroviral therapy has dramatically altered the course of the disease.

Highly Active Antiretroviral Therapy (HAART)

Highly Active Antiretroviral Therapy (HAART) refers to the use of a combination of antiretroviral drugs from at least two different classes to suppress HIV replication. HAART works by inhibiting various stages of the HIV life cycle, thereby reducing viral load, improving immune function, and prolonging survival. In Nigeria, including Akwa Ibom State, HAART is provided free of charge through government-led and donor-supported HIV programmes.

Concept of Adherence to HAART

Adherence to HAART refers to the extent to which a patient's medication-taking behaviour corresponds with agreed recommendations from a healthcare provider. This includes taking the correct dose, at the correct time, and in the correct manner. Optimal adherence is critical for achieving viral suppression, preventing drug resistance, and improving quality of life among PLHIV. The World Health Organization recommends a minimum adherence level of 95% for sustained viral suppression.

Measurement of HAART Adherence

HAART adherence can be measured using various methods, including self-report questionnaires, pill counts, pharmacy refill records, electronic monitoring devices, and viral load monitoring. In resource-limited settings such as Akwa Ibom State, self-report measures like the Adult AIDS Clinical Trials Group (AACTG) 4-day recall tool are commonly used due to their simplicity and feasibility. Although self-report methods may be subject to recall and social desirability bias, they remain valuable for programmatic assessment of adherence.

Theoretical Review

World Health Organization Multidimensional Adherence Model

The World Health Organization's multidimensional adherence model conceptualizes adherence as a dynamic process influenced by multiple interacting factors. These include patient-related factors, therapy-related factors, condition-related factors, health-system factors, and socio-economic factors. This model recognizes that non-adherence is not solely the responsibility of the patient but is shaped by broader systemic and contextual influences. The model is particularly relevant to Akwa Ibom State, where social support systems, health-system constraints, and socio-cultural dynamics play critical roles in adherence behaviour.

Health Belief Model

The Health Belief Model (HBM) explains health-related behaviour based on individuals' perceptions of susceptibility to illness, severity of the condition, benefits of action, and barriers to action. In the context of HAART adherence, PLHIV are more likely to adhere to treatment if they perceive HIV as a serious condition,

believe that HAART is effective, and perceive minimal barriers to consistent medication use. Factors such as stigma, fear of disclosure, and treatment fatigue may reduce perceived benefits and increase perceived barriers among PLHIV in Akwa Ibom State.

Empirical Review

Global Epidemiology of HIV Infection

Acquired immunodeficiency syndrome (AIDS) of humans is caused by two lentiviruses, human immunodeficiency viruses types 1 and 2 (HIV-1 and HIV-2). Here, we describe the origins and evolution of these viruses, and the circumstances that led to the AIDS pandemic. Both HIVs are the result of multiple cross-species transmissions of simian immunodeficiency viruses (SIVs) naturally infecting African primates. Most of these transfers resulted in viruses that spread in humans to only a limited extent. However, one transmission event, involving SIVcpz from chimpanzees in southeastern Cameroon, gave rise to HIV-1 group M—the principal cause of the AIDS pandemic (Sharp & Hahn, 2011). The closest relatives of HIV-1 are simian immunodeficiency viruses (SIVs) infecting wild-living chimpanzees (*Pan troglodytes troglodytes*) and gorillas (*Gorilla gorilla gorilla*) in west central Africa. Phylogenetic analyses have revealed the origins of HIV-1: chimpanzees were the original hosts of this clade of viruses; four lineages of HIV-1 have arisen by independent cross-species transmissions to humans and one or two of those transmissions may have been via gorillas. (Sharp & Hahn, 2010). Acquired Immune Deficiency Syndrome (AIDS) was first recognized as a new disease in 1981 when increasing numbers of young homosexual men succumbed to unusual opportunistic infections and rare malignancies (Centers for Disease Control (CDC), 1981).

Global Statistics of HIV/AIDS

There were 39.9 million people across the globe with HIV in 2023. Of these, 38.6 million were adults (>15 years old), and 1.4 million were children (<15 years old). In addition, 53% were women and girls (HIV.gov, 2022).

In 2023, there were 39.9 million [36.1 million–44.6 million] people living with HIV. 38.6 million [34.9 million–43.1 million] adults (15 years or older). 1.4 million [1.1 million–1.7 million] children (0–14 years). 53% of all people living with HIV were women and girls. 86% [69–>98%] of all people living with HIV knew their HIV status in 2023. About 5.4 million people did not know that they were living with HIV in 2023. At the end of December 2023, 30.7 million [27–31.9 million] people were accessing antiretroviral therapy, up from 7.7 million [6.7–8 million] in 2010, but still short of the 34 million target for 2025. In 2023, 77% [61–89%] of all people living with HIV were accessing treatment. 77% [62–90%] of adults aged 15 years and older living with HIV had access to treatment, as did 57% [41–75%] of children aged 0–14 years. 83% [66–96%] of women aged 15 years and older had access to treatment; however, just 72% [56–84%] of men aged 15 years and older had access. 84% [72–>98%] of pregnant women living with HIV had access to antiretroviral medicines to prevent transmission of HIV to their child in 2023. New HIV infections have been reduced by 60% since the peak in 1995. In 2023, 1.3 million [1 million–1.7 million] people were newly infected with HIV, compared to 3.3 million [2.6 million–4.2 million] people in 1995. Women and girls accounted for 44% of all new infections in 2023. Since 2010, new HIV infections have declined by 39%, from 2.1 million [1.7 million–2.7 million] to 1.3 million [1 million–1.7 million] in 2023. However, this falls far short of the target of getting below 370 000 by 2025. AIDS-related deaths have been reduced by 69% since the peak in 2004 and by 51% since 2010. In 2023, around 630 000 [500 000–820 000] people died from AIDS-related illnesses worldwide, compared to 2.1 million [1.6 million–2.7 million] people in 2004 and 1.3 million [1 million–1.7 million] people in 2010. AIDS-related mortality has declined by 56% among women and girls and by 47% among men and boys since 2010. In 2023, someone died of HIV every minute. People most affected by HIV - Median HIV prevalence among the adult population (ages 15–49) was 0.8% globally. However, because of marginalization, discrimination and in some cases criminalization, median prevalence was higher among certain groups of people. 2.3% higher among young women and girls aged between 15 and 24 in eastern and southern Africa. 7.7% higher among gay men and other men who have sex with men. 3% higher among sex workers. 5% higher among people who inject drugs. 9.2% higher among transgender people. 1.3% higher among people in prisons (UNAIDS, 2024).

Epidemiology of HIV/AIDS in Africa and Nigeria

There are 25.6 million people living with HIV in the African region. East and Southern Africa – 20.8 million and West and Central Africa – 4.8 million (World Health Organization, 2018).

Nigeria has the second-largest HIV epidemic in the world. Although HIV prevalence among adults (1.3%) is much less than other sub-Saharan African countries such as South Africa (19%) and Zambia (11.5%), the size of Nigeria's population means 1.8 million people were living with HIV in 2019. Approximately 45,000 people died from AIDS-related illnesses in Nigeria in 2019. Since 2010, AIDS-related deaths have decreased by 35% to 2019, and 89% of those with a positive diagnosis in Nigeria are accessing antiretroviral treatment (ART) (*HIV/AID-Protection and Early Detection, Promise of Health*, 2021).

HIV prevalence rate in Nigeria's states according to NACA, 2020, Akwa Ibom 5.6%, Benue 4.9%, Rivers 3.8%, Taraba 2.7%, Anambra 2.4%, Enugu 2.1%, Abia 2.1%, Delta 1.9%, Nasarawa 1.9%, Edo 1.8%, Bayelsa 1.8%, Cross River 1.7%, Imo 1.6%, Plateau, 1.5%, FCT 1.5%, Lagos 1.3%, Borno 1.3%, Adamawa 1.3%, Ogun 1.2%, Gombe 1.2%, Kaduna 1.0%, Kogi 1.0%, Kwara 1.0%, Ondo 0.9%, Osun 0.9%, Oyo 0.9%, Ebonyi 0.8%, Niger 0.7%, Ekiti 0.7%, Kebbi 0.6%, Kano 0.5%, Zamfara 0.5%, Yobe 0.4%, Bauchi 0.4%, Sokoto 0.4%, Jigawa 0.3% and Katsina 0.3%. Among adults aged 15-64 years, HIV prevalence varied by zone across Nigeria, with the highest prevalence in South South Zone (3.1%) and the lowest prevalence in Northwest Zone (0.6%), North Central 2.1, North East 1.1, North West 0.6, South East 1.9. South-South 3.1, Southwest 1.2. National Prevalence Rate stands at 1.4% (NAIIS, 2018).

Evidence-based data from developing countries, including Nigeria, regarding anti-retroviral therapy adherence rates is limited (Onwunata *et al.*, 2019). It is important to establish ways of continuously monitoring treatment adherence, to identify and stem the incidence of non-adherence as early as possible. In Nigeria, 1.9 million people live with HIV, with an adult (15-49 years) HIV prevalence of 1.5%, 130,000 new HIV infections, 53,000 AIDS-related deaths, 55% adults on antiretroviral treatment. (UNAIDS Data, 2019). National prevalence of HIV is at 1.4% with Akwa Ibom state having the highest prevalence rate of 3.8% (NAIIS, 2018). Of all adults aged 15 years and over living with HIV, 55% were on treatment, while only 35% of children aged 0 - 14 years living with HIV were on treatment in the country. In 2018 in low access to antiretroviral treatment remains an issue for people living with HIV, meaning that there are still many AIDS-related deaths in Nigeria. Several factors contribute to viral suppression and may vary in different settings and age groups, hence the need to study the associated factors. Suboptimal adherence to the Highly Active Antiretroviral Therapy (HAART) regimen leads to inadequate inhibition of viral replication, immunological failure, the emergence of drug-resistant strains, and transmission of resistant strains, leading to primary regimen failure (Onwunata, *et al.*, 2019).

Nevertheless, UNAIDS estimates that around two-thirds of new HIV infections in West and Central Africa in 2019 occurred in Nigeria. Together with South Africa and Uganda, the country accounts for around half of all new HIV infections in sub-Saharan Africa every year. This is despite achieving a 13% reduction in new infections between 2010 and 2019. Unprotected heterosexual sex accounts for 80% of new HIV infections in Nigeria, with most remaining HIV infections occurring in key affected populations such as sex workers (UNAIDS, 2019).

The most recent Nigeria HIV/AIDS Indicator and Impact Survey (NAIIS) conducted in 2018 reported a prevalence rate of 1.4%. This result was a great reduction from the previous 3.4% estimates reported in 2012. Across the country's six (6) geopolitical zones, HIV prevalence in the South-South zone was highest at 3.1 %, while the North-West zone recorded the lowest HIV prevalence at 0.6 %. Across states, there were variations ranging from 0.3% in Katsina State to 5.5% in Akwa Ibom. Among the various age groups, the prevalence rate of HIV was noticeably highest among females 35 to 39 (3.3%), and males 50 – 54 (2.3%). Great disparity was also noted among the age group 20 – 24 years, with females having almost four times the prevalence of males in the same age group. (NAIIS, 2018).

HAART Adherence in Akwa Ibom State

Akwa Ibom State has received considerable attention in HIV research due to its high prevalence rate. Empirical studies conducted in the state have reported moderate levels of HAART adherence, often below the WHO-recommended threshold. Evidence suggests that strong family support, disclosure of HIV status, and NGO-supported case management programmes positively influence adherence among PLHIV in Akwa Ibom State.

However, challenges such as stigma, fear of discrimination, long waiting times at health facilities, and treatment fatigue continue to undermine adherence. Socio-economic vulnerabilities, including poverty and unemployment, further exacerbate these challenges, highlighting the need for context-specific interventions.

Patient-Related Factors Influencing HAART Adherence

Patient-related factors play a significant role in HAART adherence. Forgetfulness, depression, alcohol use, and lack of motivation have been identified as major contributors to non-adherence. In Akwa Ibom State, fear of stigma and non-disclosure of HIV status often lead to missed doses, particularly in social settings where taking medication may expose an individual's HIV status.

Treatment-Related Factors Influencing HAART Adherence

Treatment-related factors such as pill burden, drug side effects, and the lifelong nature of HAART can negatively affect adherence. Although newer antiretroviral regimens are associated with fewer side effects and simpler dosing schedules, treatment fatigue remains a concern among long-term HAART users in Akwa Ibom State.

Health-System Factors Influencing HAART Adherence

Health-system factors, including distance to health facilities, long waiting times, drug stock-outs, and healthcare provider attitudes, significantly influence adherence behaviour. In Akwa Ibom State, studies have shown that supportive provider-patient relationships and efficient clinic services enhance adherence, while negative experiences at health facilities discourage consistent treatment attendance.

Socio-Cultural Factors Influencing HAART Adherence

Socio-cultural factors such as stigma, discrimination, religious beliefs, and social norms play an important role in shaping adherence behaviour. In Akwa Ibom State, HIV-related stigma remains a significant barrier to adherence, particularly in rural communities. Conversely, strong family support and community-based support groups have been shown to improve adherence and retention in care.

Conceptual Framework of the Study

The conceptual framework for this study illustrates the relationship between independent variables patient-related factors, treatment-related factors, health-system factors, and socio-cultural factors and the dependent variable, HAART adherence among People Living with HIV in Akwa Ibom State. These factors interact to influence adherence behaviour and treatment outcomes such as viral suppression and improved quality of life.
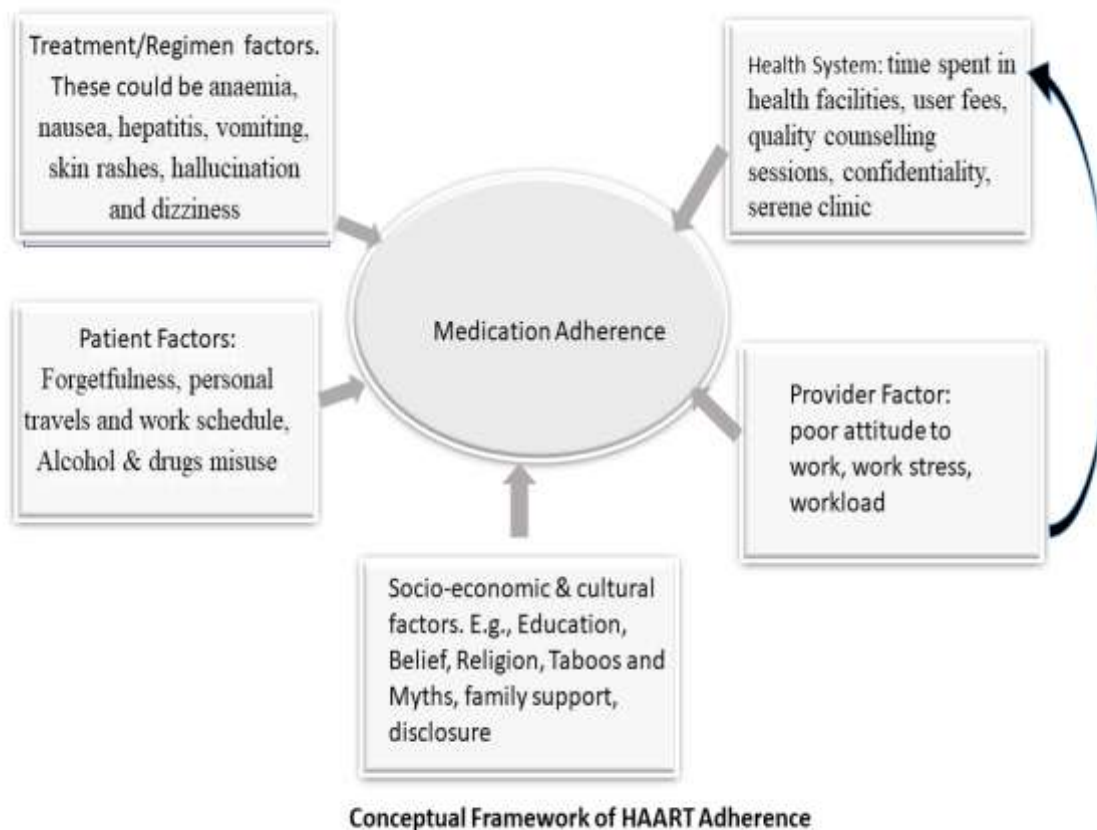
Conceptual Framework of HAART Adherence

Figure 2:1 Conceptual framework of Predictors of HAART Adherence

METHODOLOGY

Study Area

The study was conducted in Akwa Ibom State, located in the South–South geopolitical zone of Nigeria. Akwa Ibom State lies between latitudes 4°32′N and 5°33′N and longitudes 7°25′E and 8°25′E. The state is bordered by Cross River State to the east, Rivers State to the southwest, Abia State to the northwest, and the Atlantic Ocean to the south. Akwa Ibom State has a predominantly rural–urban mix and is characterized by diverse socio-cultural practices. Wikipedia (2021).

Akwa Ibom State has the highest HIV prevalence in Nigeria and hosts several government-owned, private, and faith-based health facilities providing antiretroviral therapy services through the support of the State Ministry of Health, State AIDS Control Agency, and implementing partners. These characteristics make the state an appropriate setting for examining predictors of HAART adherence.

Study Design

A cross-sectional interventional study design employing quantitative methods was adopted. This design was considered appropriate for assessing HAART adherence levels and identifying associated predictors among PLHIV at a specific point in time.

Study Population

The study population comprised adult People Living with HIV aged 18 years and above who were receiving Highly Active Antiretroviral Therapy in selected ART-supported health facilities in Akwa Ibom State.

Inclusion and Exclusion Criteria

Inclusion Criteria - Adults aged 18 years and above - Confirmed HIV-positive status - On HAART for at least three months - Receiving care in selected ART facilities in Akwa Ibom State - Provided informed consent to participate in the study

Exclusion Criteria - PLHIV below 18 years of age - Individuals newly initiated on HAART for less than three months - Severely ill patients unable to respond to the questionnaire - PLHIV receiving care outside Akwa Ibom State

Sample Size Determination

The sample size for the study was determined using an appropriate statistical formula for cross-sectional studies. Assumptions included a 95% confidence level, an acceptable margin of error, and an estimated prevalence of HAART adherence based on previous studies. The calculated sample size was adjusted to account for non-response.

Sampling Technique

A multistage sampling technique was employed. First, selected ART-supported health facilities across Akwa Ibom State were purposively chosen based on patient load and geographical spread. In the second stage, eligible PLHIV attending clinic visits at the selected facilities were recruited using systematic sampling until the required sample size was achieved.

Instruments for Data Collection

Data were collected using the following instruments:

1. **Structured Questionnaire:** Designed to obtain information on socio-demographic characteristics, patient-related factors, treatment-related factors, health-system factors, and socio-cultural influences on HAART adherence.

2. **AACTG 4-Day Adherence Recall Tool:** Used to assess self-reported adherence to HAART.

Validity and Reliability of Instruments

Content and face validity of the questionnaire were ensured through expert review by HIV programme specialists and public health researchers. Reliability of the instrument was assessed through a pre-test conducted among PLHIV in a similar setting outside the study facilities. Necessary modifications were made based on feedback obtained.

Data Collection Procedure

Data collection was carried out by trained research assistants under the supervision of the researcher. Eligible participants were informed about the purpose of the study, and written informed consent was obtained prior to participation. Questionnaires were administered in a private setting to ensure confidentiality. Data collection was conducted during routine clinic days to maximize participation.

Method of Data Analysis

Using an observational cross-sectional study design, HIV positive patients receiving antiretroviral therapy for at least 3 months will be interviewed using a semi structured questionnaire. The collected data will be analyzed using Statistical Product and Service Solutions (SPSS) version 11.5. Chi-square test will be done. A P value of < 0.05 will be considered statistically significant.

Measurement of adherence: Adherence will be assessed retrospectively based on a 4-day recall as used in Adult AIDS Clinical Trials Group (AACTG) follow up questionnaire.

Adherence index will be calculated by the formula:

= (Number of doses taken)/(number of doses prescribed) X 100

Conduct HIV Testing Intervention

Ethical Considerations

Ethical approval for the study was obtained from relevant ethical review committees. Permission was also secured from the Akwa Ibom State Ministry of Health and the management of participating health facilities. Participation was voluntary, and respondents were informed of their right to withdraw from the study at any time without consequences. Confidentiality and anonymity of participants were strictly maintained throughout the study.

Limitations of the Methodology

The use of self-reported measures of adherence may be subject to recall and social desirability bias. However, the use of standardized tools and assurances of confidentiality helped to minimize these limitations.

RESULTS

4. 1 Socio-Demographic Characteristics of Respondents (n = 200)

Table 4.1: Socio-Demographic Characteristics of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–29	38	19.0
	30–39	74	37.0
	40–49	56	28.0
	≥50	32	16.0
Sex	Male	78	39.0
	Female	122	61.0
Marital Status	Single	52	26.0
	Married	104	52.0
	Widowed/Separated	44	22.0
Educational Level	No formal education	24	12.0
	Primary	48	24.0
	Secondary	76	38.0
	Tertiary	52	26.0

Residence	Urban	118	59.0
	Rural	82	41.0

The majority of respondents were female (61%) and within the economically productive age group of 30–49 years (65%). More than half were married (52%), and a substantial proportion had at least secondary education (64%).

Level of HAART Adherence among Respondents

Table 4.2: HAART Adherence Level (AACTG 4-Day Recall)

Adherence Status	Frequency (n)	Percentage (%)
Adherent (≥95%)	159	79.5
Non-adherent (<95%)	41	20.5
Total	**200**	**100.0**

A total of 159 respondents (79.5%) were adherent to HAART, while 20.5% were non-adherent, indicating adherence below the WHO-recommended ≥95% level.

Disclosure of HIV Status

Table 4.3: HIV Status Disclosure

Disclosure Status	Frequency (n)	Percentage (%)
Disclosed	188	94.0
Not disclosed	12	6.0
Total	**200**	**100.0**

An overwhelming majority (94%) of respondents had disclosed their HIV status to at least one trusted person.

Level of Family Support

Table 4.4: Perceived Family Support

Level of Support	Frequency (n)	Percentage (%)
Very satisfied	160	80.0
Fairly satisfied	28	14.0
Not satisfied	12	6.0
Total	**200**	**100.0**

Most respondents (80%) reported being very satisfied with family support, which positively influenced adherence.

Use of Adherence Support Mechanisms

Table 4.5: Use of Medication Reminders

Use of Reminder	Frequency (n)	Percentage (%)
Yes	150	75.0
No	50	25.0
Total	**200**	**100.0**

Three-quarters of respondents used reminders such as phone alarms to support adherence.

Patient-Related Factors Influencing Non-Adherence

Table 4.6: Patient-Related Predictors of Non-Adherence (Multiple Responses)

Factor	Frequency (n)	Percentage (%)
Forgetfulness	112	56.0
Treatment fatigue	74	37.0
Fear of stigma	68	34.0
Travel away from home	60	30.0

Treatment-Related Factors Influencing Non-Adherence

Table 4.7: Treatment-Related Factors

Factor	Frequency (n)	Percentage (%)
Drug side effects	66	33.0
Pill burden	52	26.0
Long duration of treatment	78	39.0

Health-System Factors Influencing Non-Adherence

Table 4.8: Health-System Predictors of Non-Adherence

Factor	Frequency (n)	Percentage (%)
Long waiting time	84	42.0
Distance to clinic	58	29.0
Negative provider attitude	46	23.0

Inferential Analysis: Association Between HAART Adherence and Predictors

Chi-square (χ^2) tests were performed to determine the association between HAART adherence and selected patient-related, socio-cultural, and health-system predictors among PLHIV in Akwa Ibom State. Statistical significance was set at **p < 0.05**.

Table 4.9: Association Between HAART Adherence and HIV Status Disclosure

Disclosure Status	Adherent n (%)	Non-Adherent n (%)	χ^2	p-value
Disclosed (n=188)	156 (83.0)	32 (17.0)	9.21	0.002*
Not disclosed (n=12)	4 (33.3)	8 (66.7)		

Statistically significant

HIV status disclosure was significantly associated with HAART adherence. Respondents who disclosed their status were more likely to adhere to treatment.

Table 4.10: Association Between HAART Adherence and Family Support

Family Support	Adherent n (%)	Non-Adherent n (%)	χ^2	p-value
Satisfied (n=188)	154 (81.9)	34 (18.1)	6.74	0.009*
Not satisfied (n=12)	6 (50.0)	6 (50.0)		

Statistically significant

Adequate family support showed a statistically significant association with better HAART adherence.

Table 4.11: Association Between HAART Adherence and Use of Medication Reminders

Reminder Use	Adherent n (%)	Non-Adherent n (%)	χ^2	p-value
Yes (n=150)	132 (88.0)	18 (12.0)	18.63	<0.001*
No (n=50)	28 (56.0)	22 (44.0)		

Statistically significant

Use of medication reminders was strongly associated with higher adherence to HAART.

Table 4.12: Association Between HAART Adherence and Perceived Stigma

Fear of Stigma	Adherent n (%)	Non-Adherent n (%)	χ^2	p-value
Yes (n=68)	42 (61.8)	26 (38.2)	11.84	0.001*
No (n=132)	118 (89.4)	14 (10.6)		

Statistically significant

Table 4.13: Association Between HAART Adherence and Clinic Waiting Time

Waiting Time	Adherent n (%)	Non-Adherent n (%)	χ^2	p-value
Long (n=84)	54 (64.3)	30 (35.7)	13.02	<0.001*
Short (n=116)	106 (91.4)	10 (8.6)		

Statistically significant

Summary of Chapter Four Findings

Chi-square analysis revealed that HAART adherence among PLHIV in Akwa Ibom State was significantly associated with HIV status disclosure, level of family support, use of medication reminders, perceived stigma, and clinic waiting time ($p < 0.05$). The strongest predictors of adherence were use of reminders and shorter clinic waiting time. These findings demonstrate that adherence is influenced by an interaction of patient-related, socio-cultural, and health-system factors.

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

Discussion of Findings

Level of HAART Adherence Among HIV/AIDS in Akwa Ibom State

The overall self-reported adherence to HAART observed in this study was 79.5%. This finding is consistent with earlier studies indicating that ART adherence in Nigeria varies by region and is shaped by socio-economic, cultural, and health-system factors (Ugwu & Eneh, 2013). The adherence level reported in this study is comparable to rates documented among PLHIVs in Akwa Ibom State (79.2%) (Edet, 2024), 71.2% among PLHIVs in Port Harcourt (Kanu et al., 2017), 70% at the national level in Nigeria (Richard, 2018), and the average adherence rate of 72.9% for sub-Saharan Africa reported in a systematic review by Heestermans et al. (2016). It remains below the World Health Organization (WHO) recommended adherence threshold of ≥95% required for optimal viral suppression and prevention of drug resistance. This finding suggests that despite improved access to antiretroviral therapy and sustained programme interventions in Akwa Ibom State, adherence challenges persist.

The observed adherence level is comparable to findings from similar high HIV-burden settings in Nigeria, where adherence rates often fall short of the optimal standard. Given that Akwa Ibom State has the highest HIV prevalence in Nigeria, even modest gaps in adherence have significant implications for viral suppression, treatment outcomes, and HIV transmission dynamics within the state.

Influence of HIV Status Disclosure on HAART Adherence

HIV status disclosure was found to be significantly associated with HAART adherence in this study ($\chi^2 = 9.21$; $p = 0.002$). Respondents who disclosed their HIV status were substantially more likely to adhere to their treatment regimen than those who had not disclosed. Disclosure enables emotional, practical, and sometimes financial support from family members or trusted individuals, which reinforces medication-taking behaviour.

In the socio-cultural context, disclosure appears to play a protective role against non-adherence by reducing secrecy, fear, and isolation. However, the small proportion of respondents who had not disclosed their status demonstrated markedly poorer adherence, underscoring the continued influence of stigma and fear of discrimination in the state.

Role of Family Support in HAART Adherence

Family support was another significant predictor of adherence in Akwa Ibom State ($\chi^2 = 6.74$; $p = 0.009$).

Respondents who reported being satisfied with family support were more likely to adhere to HAART compared to those who were not satisfied. Strong family support provides encouragement, reminders to take medication, and assistance with clinic attendance, all of which contribute to sustained adherence.

Given the strong family and communal structures in Akwa Ibom State, integrating family-based adherence support into HIV care programmes represents a culturally appropriate and effective strategy for improving treatment outcomes.

Effect of Medication Reminders on HAART Adherence

The use of medication reminders emerged as the **strongest predictor of adherence** in this study (χ^2 = 18.63; p < 0.001). Respondents who used reminders, such as mobile phone alarms, demonstrated significantly higher adherence levels than those who did not.

This finding highlights the effectiveness of simple, low-cost interventions in addressing forgetfulness, which was identified as the most common patient-related barrier to adherence in Akwa Ibom State. The widespread availability of mobile phones presents an opportunity to scale up digital adherence support interventions across ART programmes in the state.

Influence of Stigma on HAART Adherence

Fear of stigma was significantly associated with non-adherence to HAART (χ^2 = 11.84; p = 0.001). Respondents who reported fear of stigma were more likely to miss doses, often to avoid inadvertent disclosure in social, religious, or occupational settings.

Despite ongoing HIV sensitization efforts in Akwa Ibom State, stigma remains a critical barrier to optimal adherence. This finding underscores the need for sustained community-level anti-stigma interventions and supportive environments that enable PLHIV to adhere to treatment without fear of discrimination.

Health-System Factors and HAART Adherence

Clinic waiting time was significantly associated with HAART adherence (χ^2 = 13.02; p < 0.001). Respondents who experienced long waiting times at ART clinics were less likely to adhere to treatment compared to those who reported shorter waiting times.

Long waiting times may discourage regular clinic attendance, contribute to treatment fatigue, and increase the likelihood of missed medication refills. In a high-burden setting such as Akwa Ibom State, improving clinic efficiency and client flow is essential for sustaining adherence and retention in care.

Conclusion

This study demonstrated that adherence to Highly Active Antiretroviral Therapy among People Living with HIV in Akwa Ibom State is moderately high but remains below the optimal level required for sustained viral suppression. HAART adherence in the state is influenced by a combination of patient-related, socio-cultural, and health-system factors.

Key factors that enhanced adherence included HIV status disclosure, strong family support, and the use of medication reminders, while major barriers included fear of stigma and long clinic waiting times. Addressing these factors is critical for improving treatment outcomes, reducing HIV transmission, and achieving national and global HIV control targets in Akwa Ibom State.

RECOMMENDATIONS

Recommendations to Government

- **Reduce Clinic Waiting Time:** Government should support health facilities to adopt efficient appointment scheduling systems, task-shifting strategies, and differentiated service delivery models in ART clinics to minimize waiting time and improve patient retention.

- **Scale Up Digital Reminder Interventions:** State and national HIV programmes should formally integrate mobile phone–based reminder systems into routine HIV care and provide the necessary policy backing and funding for digital adherence technologies.

Recommendations to Non-Governmental Organizations (NGOs)

- **Strengthen Adherence Counselling:** NGOs implementing HIV programmes should intensify continuous and targeted adherence counselling, with particular emphasis on addressing forgetfulness, treatment fatigue, and stigma-related barriers to adherence.

- **Promote Safe Disclosure and Family Involvement:** NGOs should design and implement psychosocial support interventions that facilitate safe disclosure and encourage the involvement of trusted family members as treatment supporters.

Recommendations to the Community

- **Strengthen Anti-Stigma Interventions:** Community-based sensitization and advocacy campaigns should be intensified, with active involvement of religious, traditional, and community leaders to reduce HIV-related stigma and discrimination.

Recommendations to Health Workers

- **Support Adherence and Disclosure Processes:** Health workers should provide patient-centered counselling that supports safe disclosure, reinforces adherence behaviors, and encourages appropriate family involvement in treatment support.

- **Optimize Service Delivery:** Health workers should implement differentiated service delivery approaches and adhere to appointment systems to reduce congestion and waiting time at ART clinics.

Limitations of the Study

The study relied on self-reported measures of adherence, which may be affected by recall and social desirability bias. In addition, the cross-sectional design limits the ability to establish causal relationships between predictors and HAART adherence.

Suggestions for Further Research

Future studies in Akwa Ibom State should adopt longitudinal research designs to assess adherence patterns over time and examine the relationship between HAART adherence and viral load suppression. Further research is also recommended to evaluate the effectiveness of digital adherence technologies and family-centered support models in improving long-term treatment adherence.

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