

Effects of sociodemographic status, HIV disclosure, and self-reported adherence on treatment outcome among HIV/AIDS patients in south-western Nigeria

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Background. HIV/AIDS is still a leading cause of death and a health threat to millions worldwide.

Objectives. To assess the effects of sociodemographic status, HIV disclosure, and self-reported adherence on treatment outcome among patients living with HIV in south-western Nigeria.

Methods. Four hundred and forty participants were recruited from six secondary health facilities offering antiretroviral therapy (ART) services in Osun State. A multistage sampling technique was used to select eligible participants. The level of significance was set at $p < 0.05$.

Results. Of the participants, less than half (42.0%) had good knowledge on HIV and ART services, while 73.0% had good treatment adherence, about one-quarter (20.7%) had been stigmatised or discriminated against, and 58.4% had disclosed their status to their sexual partner; 75.5% of the partners were supportive afterwards. Treatment outcome was favourable for 86.4% of the participants, and there was a significant relationship between marital status and viral load suppression ($p = 0.003$) and between adherence and viral load suppression ($p = 0.001$). Participants with good adherence were 2.6 times more likely to have a favourable treatment outcome than those with poor adherence.

Conclusion. Adherence and marital status were found to be significantly associated with suppressed viral loads among people living with HIV.

Keywords. Sociodemographic status, self-reported adherence, HIV/AIDS, treatment outcome

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HIV/AIDS is a significant global health concern, with millions affected worldwide.^[1] In 2024, an estimated 40.8 million people across the globe were living with HIV.^[2] HIV/AIDS was the eighth leading cause of death in Nigeria in 2021.^[3] In Nigeria alone, there were 1.9 million HIV-positive individuals in 2021.^[4] Antiretroviral therapy (ART) is the primary treatment for HIV infection, but its effectiveness depends on strict adherence to medication.^[5] Ensuring that people living with HIV (PLWH) receive and adhere to their highly active ART can pose a challenge in terms of treatment efficacy.^[6]

The main determinant of biological outcome measures in HIV has been shown to be adherence to ART, and adherence also predicts clinical outcome measures such as mortality, AIDS progression, and hospitalisation.^[7] Adherence rates >95% greatly improve viral suppression, while lower adherence rates are associated with decreased effectiveness and increase the risk of drug-resistant HIV strains.^[8] Factors such as fear of disclosure, stigma and social support influence adherence. Poor adherence not only harms individual health but also contributes to HIV transmission.^[9] Poor social support and non-disclosure to sexual partners significantly contribute to poor medication adherence, because there is no one to remind the patient.^[10] Social stigma, as well as actual or perceived discrimination against PLWH, is a major driver of the spread of HIV infection in sub-Saharan Africa.^[11] According to 2021 figures, 85% of PLWH knew their status, 75% were receiving treatment, and 68% were virally suppressed.^[12]

The present study, conducted in south-western Nigeria, sought to explore the impact of sociodemographic factors, HIV disclosure and self-reported adherence on treatment outcome, specifically viral load. A favourable treatment outcome is defined as a viral load $\leq 1\,000$ copies/mL, while an unfavourable treatment outcome is defined as a viral load $> 1\,000$ copies/mL.^[13] Understanding these factors can improve HIV/AIDS management strategies and biological and clinical outcomes of ART among PLWH.

Methods

A descriptive cross-sectional study was conducted from January to February 2020 among PLWH currently on ART. The participants were PLWH aged ≥ 18 years receiving treatment at six secondary health facilities in Osun State, four public, one faith-based and one private, who attended clinics for ART refills between January and February 2020 and had had at least one viral load test done during the course of their ART. Clients who did not attend clinics for their ARV refills during the study period and those aged < 18 years were excluded from the study.

A structured closed-ended questionnaire, developed through a review of previous literature and pre-tested to align with the study objectives, was used for data collection.^[14,15] Data obtained included sociodemographic characteristics, knowledge of HIV/AIDS and ART, self-reported medication adherence, disclosure and partner characteristics, HIV-related stigma, and treatment outcome based on viral load. The World Health Organization advocates using a multi-method approach to measure adherence levels.^[16] In this study, we used self-reporting adherence questions, a method consistently linked to clinical outcomes and widely adopted owing to its low cost and ease of implementation.^[15,17,18] Participants

were asked if they had missed any ART doses during the past week, the reasons for missing them, and their perception of their health status after taking them. The questionnaire comprised six questions, categorising participants as having good adherence if they answered 'no' to all questions and as moderately or poorly adherent if they answered 'yes' to any of the questions.^[19]

The questionnaire was administered by 'expert clients' recruited by the national HIV/AIDS programme as volunteer case managers at the six ART sites. It was administered after clients had picked up their prescriptions at the pharmacy department on clinic day(s) at each health facility. While treatment outcomes (viral load) were obtained immediately after the interview from the participants' records, the data analysis did not include any information about their identities.

Data collected were cross-checked for errors and omissions, then imported into and analysed using the Statistical Package for the Social Sciences (SPSS), version 25 (IBM, USA). Variables were used to generate frequency distribution tables, charts and graphs, as well as cross-tabulation and test statistics where applicable. The χ^2 test was used to compare rates, ratios and proportions. The level of significance was set at $p < 0.05$.

Measurement of outcome variables

The possible responses to the knowledge questions were 'yes', 'no' and 'don't know'. Each 'yes' response was assigned a score of 1, while 'no' and 'don't know' responses were assigned a score of 0. The responses were then graded, and both the total and average scores were calculated. The same was done for medication adherence, and self-reported stigma/discrimination.

Participants with records indicating a viral load $> 1\,000$ copies/mL were classified as having an unsuppressed viral load, an unfavourable outcome. In contrast, those with a viral load $\leq 1\,000$ copies/mL were considered to have a suppressed viral load, a favourable outcome.

Ethical considerations

Ethical approval for the study was obtained from the Osun State Ministry of Health (ref. no. OSHREC/PRS/569T/1273), and permission to take part in the study was obtained verbally from the participants. The participants were told that participation was voluntary, and that they would not suffer any consequences if they chose not to participate. All information gathered was kept confidential, and participants were identified using serial numbers.

Results

Table 1 shows the sociodemographic characteristics of the study participants. Of the 440 participants, 76.1% were male, 37.3% fell within the age range 38 - 47 years, and 60.9% were married and living with their partners. The highest educational level for 37.5% of the participants was secondary school. In terms of employment, 38.9% were working full-time but not as employees. Approximately two-thirds (60.5%) identified as Christian, and the dominant ethnic group was Yoruba, comprising 95.9% of the participants.

Table 2 summarises participants' knowledge on HIV/AIDS. Most of them gave correct responses to questions on understanding HIV/

Table 1. Sociodemographic characteristics of the study participants (N=440)

Variable	n (%)
Sex	
Male	105 (23.9)
Female	335 (76.1)
Age group (years)	
18 - 27	30 (6.8)
28 - 37	116 (26.4)
38 - 47	164 (37.3)
48 - 57	89 (20.2)
≥58	41 (9.3)
Marital status	
Single	31 (7.0)
Married, living together	268 (60.9)
Married, not living together	40 (9.1)
In a relationship, not living together	32 (7.3)
Divorced or separated	22 (5.0)
Widow or widower	47 (10.7)
Level of education	
No formal education	54 (12.3)
Primary school	147 (33.4)
Secondary school	165 (37.5)
Technical college or tertiary	74 (16.8)
Employment status	
In full employment (as an employee)	77 (17.5)
In part-time employment (as an employee)	22 (5.0)
Working full time but not as an employee	171 (38.9)
Casual or part-time work (self-employed)	100 (22.7)
Unemployed and not working at all	70 (15.9)
Religion	
Christian	266 (60.5)
Muslim	170 (38.6)
Traditional	4 (0.9)
Ethnicity	
Yoruba	422 (95.9)
Hausa	6 (1.4)
Igbo	11 (2.5)
Others	1 (0.2)

AIDS, but two-thirds did not know who is at risk of HIV/AIDS, and 68.6% had no knowledge about the management of HIV/AIDS with ART. Overall, more than half of the participants had poor knowledge about HIV and ART services.

Table 3 displays self-reported adherence to ART. All 440 participants were on ART, with the majority (78.6%) not forgetting to take their medication. Most (90.2%) did not stop taking their medication when feeling better, and did not report missing any doses in the past 2 weeks (91.6%). Additionally, 91.6% did not discontinue their medication when feeling unwell. Overall, adherence to ART was good (73.0% of participants).

[Supplementary Table 1](#) shows HIV disclosure among participants. The duration of confirmation of status was >1 year for almost all the participants (95.2%). More than half had disclosed their status to their sexual partner (58.4%), and the main means of disclosure

Table 2. Knowledge on HIV/AIDS (N=440)

Variable	n (%)
Understanding about HIV/AIDS	
Yes	391 (88.9)
No	34 (7.7)
Don't know	15 (3.4)
Knowledge about who is at risk of HIV/AIDS	
Yes	132 (30)
No	292 (66.4)
Don't know	16 (3.6)
Knowledge about management with ART	
Yes	138 (31.4)
No	302 (68.6)
Grading of knowledge about HIV and ART services	
Good knowledge	185 (42.0)
Poor knowledge	255 (58.0)

ART = antiretroviral therapy.

Table 3. Self-reported adherence to ART (N=440)

Variable	n (%)
Placed on ART	
Yes	440 (100)
Sometimes forget to take medicine	
Yes	94 (21.4)
No	346 (78.6)
Sometimes stop medicine when feeling better	
Yes	43 (9.8)
No	397 (90.2)
Recall missing any doses in the past 2 weeks	
Yes	37 (8.4)
No	403 (91.6)
Stop medicine sometimes when feeling unwell	
Yes	37 (8.4)
No	403 (91.6)
Grading of adherence to ART	
Good	321 (73.0)
Poor	119 (27.0)

ART = antiretroviral therapy.

was self. The reaction of partners after disclosure was supportive in 75.5% of cases. The majority (74.1%) did not disclose their status to anyone other than their sexual partner. Only a few (7.9%) disclosed to a friend.

HIV-related stigma experienced by participants is shown in [Supplementary Tables 2a and 2b](#). The vast majority of participants (95.9%) were not mistreated by hospital workers because of their HIV status, 87.0% felt that people did not look at them differently because of their status, 96.6% said that healthcare workers did not avoid touching them because they had HIV, and almost all (96.1%) had not been told that they were not to share food or utensils with their family because of their HIV status. The majority of the participants had not been denied medical care because of their HIV status (99.3%) or been forced to move out of their home by family members because of their HIV status (98.9%), 98.9%

said that healthcare workers did not make their HIV status known in public, 99.3% had not been threatened with physical harm by someone because of their HIV status, and almost all (97.5%) had not been refused housing because people suspected them of having HIV/AIDS. Overall, the majority (79.3%) had not been stigmatised or discriminated against.

Outcomes were favourable (viral load $\leq 1\ 000$ copies/mL) among 86.4% of the participants.

[Supplementary Table 3](#) shows the association between sociodemographic characteristics, summarised knowledge, adherence, disclosure, stigma and treatment outcome among participants. Significant associations exist between marital status and treatment outcome ($p=0.003$) and adherence and treatment outcome ($p=0.001$).

[Supplementary Table 4](#) shows the predictors of suppressed viral load among participants. Those with good adherence were 2.6 times more likely to have a suppressed viral load than those with poor adherence.

Discussion

Despite the availability of medications that can control HIV and reduce viral transmission, HIV/AIDS continues to be a leading cause of death and a significant health risk for millions worldwide. This study aimed to examine the effects of sociodemographic status, HIV disclosure, and self-reported adherence on treatment outcome among PLWH in south-western Nigeria.

Most of the participants were male, with a significant proportion aged between 38 and 47 years. Nearly two-thirds were married and living with their partners. More than one-third had completed secondary school education, and 38.7% were working full-time but not as employees. Almost all participants were Yoruba, and nearly two-thirds identified as Christian.

The study found that less than half of the participants (42.0%) had good knowledge of HIV and ART services, which aligns with the findings of Banagi Yathiraj *et al.*,^[20] who reported that 46.2% of their participants demonstrated good knowledge. Our figure suggests that only two out of every five PLWH were well informed about HIV and ART. In contrast, another study reported that 0% of participants had good knowledge and only 20% had average knowledge.^[21] The difference in knowledge levels could be attributed to variations in study location and sample size. Nevertheless, the present study underscores the importance of educating PLWH and the public about the infection. While many participants had a good understanding of HIV/AIDS infection, transmission modes and prevention methods, there was a notable gap with regard to knowledge about who is at risk of infection and available ART services.

Most participants reported consistently taking their antiretroviral medication without interruption, regardless of whether they felt better or worse. This adherence rate was notably higher than that in a study in Kenya, where only 43.2% of participants adhered to the prescribed drug schedule.^[22] More than half of our participants had disclosed their HIV status to their sexual partner, comparable to a study at Mekelle Hospital in Ethiopia, where the disclosure rate was 57.4%.^[23]

Partners' reactions following disclosure in the present study were mainly supportive, and most participants did not experience stigma from their families, healthcare providers or the community. This finding is significant, as social support has been linked to increased access and improved adherence to treatment.^[24] A study among Malawian couples living with HIV found that supportive and fulfilling relationships could mitigate the negative impact of stigma on ART adherence.^[25] Non-disclosure of HIV status to individuals other than a sexual partner, as reported by many participants in this study (74.1%), may be a strategy to avoid the stigma, discrimination and psychological violence associated with disclosure, which can lead to negative treatment outcomes.^[26,27]

Additionally, most participants had a suppressed viral load, which was associated with marital status and adherence status. The study found that participants who adhered to the prescribed regimen were 2.6 times more likely to achieve a favourable outcome compared with their counterparts who did not. This aligns with the findings of a study in Ghana, where ART adherence significantly influenced viral load suppression.^[28] To reduce the global HIV/AIDS burden, it is crucial to promote medication adherence among PLWH.

Study limitations

This cross-sectional study faced challenges in establishing a cause-effect relationship, as self-reported adherence relied on the clients' recall ability. Nevertheless, clients were assured of privacy and confidentiality regarding the information provided for the study.

Conclusion

Most participants reported good adherence to ART services and favourable treatment outcomes. Despite low levels of knowledge and potential stigmatisation, the majority of participants disclosed their HIV status to their sexual partners, with the majority receiving supportive reactions. Only marital status and adherence to ART services were found to be associated with favourable outcomes. Participants who adhered well to ART services had nearly three times better treatment outcomes compared with their counterparts whose adherence was poor.

Declaration. The research for this study was done in partial fulfilment of the requirements for OIO's MPH degree at Ladoké Akintola University of Technology (LAUTECH), Ogbomoso, Nigeria.

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Author contributions. The study was conceived by SOO, and the protocol for ethical approval was developed by CAA. SBB-O, OKI, ENA, GMI, OAF, SCA, EMO, OOK, TMJ, EMF and EOE reviewed and provided input. Participants were recruited and data collected by OIO and EMO. Analysis of quantitative data collected after the field activities was done by EMO and OIO. EOE and NAE generated the report in the form of the manuscript.

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Data availability statement. The data generated and analysed during the present study are available from the corresponding author (NAE) upon reasonable request.

Conflicts of interest: None.

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