



## Determinants of Nonadherence to Antiretroviral Drug among People Living With HIV In Ondo State, SouthWest, Nigeria

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**ABSTRACT:Background:** Human Immunodeficiency Virus (HIV) that causes HIV infection and Acquired Immunodeficiency Syndrome (AIDS) remains a significant global public health challenge in world history. Nonadherence promotes the development of drug resistance and treatment failure in individuals infected with the Human Immunodeficiency Virus. **Objectives:** To assess the determinants of nonadherence to the antiretroviral drug among people living with HIV in Ondo State, South-West, Nigeria. **Methods:** A correlation research design was utilized, and respondents were systematically sampled during either their clinical visits or visit to collect ARV drugs at the HAART clinic of General hospital Iju /Itaogbolu, Akure North, Ondo State. A 20-item Self-report questionnaire was used as an instrument of data collection. The questionnaire is divided into three (3) sections. Section A: Contains 8 items on sociodemographic data of the respondents, such as age, gender, ethnicity, religion, marital status, family type, educational level, and employment status. Section B: contains 6 questions as contained in the Simplified Medication Adherence Questionnaire (SMAQ). Section C: Entails the determinants of nonadherence to antiretroviral drugs. It contains 6 items. Data retrieved were analyzed using both descriptive and inferential statistics with a p-value set at 0.05. **Results:** We observed an above-average adherence rate of 59.8% and a nonadherence rate of 40.2%, respectively. The study also revealed that long waiting time, fear of stigmatization, family support, support from society, and experience of being treated differently because of HIV status were identified as determinants of nonadherence to antiretroviral drugs, with p-values < 0.05 respectively. **Conclusions:** The study concluded that nonadherence to the antiretroviral drug needs to be tackled headlong to alleviate concerns of drug resistance and the resultant financial burden on the health systems from the need to control resistant strains of HIV and total treatment failure with increased morbidity and mortality. Health care professionals must improve their effort in counselling at initiation and during follow-up hospital visits.

**KEYWORDS:** Nonadherence, Antiretroviral, People Living with HIV, Determinants

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### I. INTRODUCTION

HIV continues to be a significant worldwide public health issue, which has claimed about 36.3 million (27.2–47.8 million) lives. Though there is no remedy for HIV infection yet, with increasing access to effective HIV prevention, diagnosis, treatment and care, including opportunistic infections, HIV infection has become a manageable chronic health condition, helping people living with HIV live long, healthy lives. At the end of 2020, about 37.7 million (30.2–45.1 million) people were living with HIV, with over two-thirds of whom (25.4 million) in the WHO African territory. In 2020, HIV-related causes resulted in about 680 000 (480 000–1.0 million) mortality, and 1.5 million (1.0–2.0 million) people contracted HIV infection (1).

Nigeria has the second-largest HIV epidemic in the world (2). Although HIV prevalence among adults is lesser (1.3%) than other sub-Saharan African nations like South Africa (19%) and Zambia (11.5%), and due to Nigeria's population size, it means that about 1.8 million individuals were living with HIV in 2019 (3).

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48 |

However, the recent reduction in prevalence estimates for the country has been attributed to better surveillance (4). Nevertheless, according to UNAIDS, about two-thirds of the new HIV infections in West and Central Africa in 2019 occurred in Nigeria. Together with South Africa and Uganda, Nigeria accounts for around half of all new HIV infections in sub-Saharan Africa every year (5; 6; 7), despite achieving a 13% reduction in new infections between 2010 and 2019 (3). According to NACA (2015), 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 (8).

According to NACA (2), about six states in Nigeria make up 41% of the people living with HIV, including Oyo, Lagos, Kaduna, Akwa Ibom, Benue, and Kano. The prevalence of HIV is highest in southern states (known as the South-South Zone) of Nigeria, and it is estimated at 5.5%. The southeast (the South East Zone) has the lowest prevalence rate of 1.8%. It is estimated that there are higher rates of HIV in rural areas (4%) than in urban ones (3%) (8). Approximately 45,000 people died from AIDS-related illnesses in Nigeria in 2019 (3). 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) (3).

The human immunodeficiency virus (HIV) usually attacks the immune system and weakens an individual defence against opportunistic infections and certain kinds of cancer that an individual with a normal healthy immune system can overcome. As the virus continues to destroy and impair the function of immune cells, infected individuals gradually become immunodeficient. CD4 cell count typically measures the immune function of an individual.

Acquired Immunodeficiency Syndrome (AIDS) is regarded as the most advanced stage of HIV infection, which can take several years to develop if not treated, depending on the individual. AIDS is defined by the development of certain cancers, infections or other severe long-term clinical manifestations.

### **HIV Testing and Counselling (HTC) in Nigeria**

According to UNAIDS (5; 6; 7), about 34% of adults living with HIV in 2016 were aware of their HIV status, and the testing rates across the country were low. This simply means that only about 15.1% of the population aged 15-49 had been tested in the last 12 months and is aware of their results (9). Research has also revealed that only 60.4% of women and 70.8% of men are aware of where they could go to be tested for HIV (9). According to NACA (8), the reasons why more people are not testing for HIV in Nigeria include an insufficient supply of testing kits and logistic issues getting more of these supplies. The common belief that HTC centres are where HIV-positive individuals access healthcare, rather than being testing centres for people who do not know their HIV status, is also a significant reason why people do not go for testing (8).

There has been a tremendous increase in centres providing HTC services, from around 1,000 in 2010 to more than 8,000 in 2014 (8). However, the available HTC centres are still short of the estimated 23,600 sites required to provide universal coverage. The most recent National Strategic Framework targets about 100% of key populations and children of mothers living with HIV, and 60% of the general population access HIV testing services. The National Strategic Framework plan also hopes to integrate screening for other co-infections into HIV testing and counselling services (2). There are policies in Nigeria that allow for self-testing, but these testing kits are not yet available across the country (10).

### **HIV Prevention in Nigeria**

According to UNAIDS (3), Nigeria accounted for 59% of all new HIV infections in West and Central Africa in 2016, which has remained relatively stable in recent years, with only a 5% decrease between 2017 and 2010 (3). However, Nigeria aims to reach the UNAIDS target, with 90% of people living with HIV knowing their status by 2021 (2). NACA laid out the National Strategic Framework, which lays out key targets for the next five years to provide HIV prevention interventions to 90% of the general population by 2021 and for 90% of key populations to adopt HIV risk reduction behaviours 2021. Strengthening the community structures was identified as the main way to achieve this (2).

### **Antiretroviral Treatment (ART) in Nigeria**

The global target geared towards enrolling 90% of people diagnosed with HIV on antiretroviral treatment (ART) in Nigeria seems illusive, as only about 33% of all people living with HIV were receiving treatment in 2017. Moreover, this is even worst among children, with just 26% on ART (3). It is estimated that

only about 24% of the people on HIV treatment had achieved viral suppression in 2016 (5; 6; 7).

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Poor treatment coverage and adherence have resulted in the number of AIDS-related mortality in the country remaining high, resulting in about 150,000 deaths in 2017 (3). In 2015, Nigeria adopted a 'test and treat' policy, enabling anyone with a positive diagnosis to be eligible for treatment. However, this adopted measure was far from a reality. Nevertheless, efforts were made to scale-up treatment access, which resulted in about 212,000 more people being placed on antiretroviral treatment between 2016 and March 2017 (5; 6; 7). The weaknesses in the health system created a barrier to people accessing or staying on treatment. For instance, in some places where clients can access ART, drug supplies are known to run out and cause stockouts (11). Therefore, the National Strategic Framework for the HIV response, in an attempt to address this issue, resolves to strengthen the supply chains and improve logistics around treatment (2).

Furthermore, the UNAIDS catch-up plan for Nigeria identified removing the 'user-fees as a key next step in expanding treatment coverage (5; 6; 7). Accessing the antiretroviral drugs is free, but often patients are asked to pay for other services, such as running other tests. And studies have shown that these fees and high costs of travel to clinics can be a barrier to many people accessing care (12). Also, to triple treatment coverage and ensuring that 90% of the populations living with HIV are on treatment by 2021, there is the need to address stigma and discrimination around the virus and foster an enabling environment for people living with HIV to come forward (2).

### **Adherence to Antiretroviral Treatment (ART) in Nigeria**

HIV treatment adherence is key to the global effort to end AIDS as a public health threat. UNAIDS's 90-90-90 goals are set as targets that by 2020, 90% of all people with HIV will know their HIV status, 90% of all people who know their status will be on ART, and 90% of all people receiving ART will have viral suppression. This goal is expected to scale up to 95-95-95 by 2030 (4; 13).

Adherence is the extent to which a person's behaviour in taking medication corresponds with the agreed recommendations from a health care provider. Individuals' adherence rates are usually reported as a percentage of the prescribed doses of drugs taken over a specified period. However, there is no consensual standard for what constitutes adequate adherence. Some trials considered rates greater than 80% acceptable, whereas others regarded 95% and above as mandatory for adequate adherence, especially among patients with serious conditions such as infection with human immunodeficiency virus. ART adherence is a key determinant of HIV/AIDS treatment effectiveness, as adherence to ART is required to prevent the emergence of resistant HIV strains, obtain long-term HIV suppression, reduce the destruction of CD4 cells, increase survival, and improve quality of life.

However, recent studies in Africa have revealed a suboptimal medication adherence of about 77%. In Nigeria, 54% and 62.6% ART treatment adherence rates have been documented at Aminu Kano Teaching Hospital Kano and Federal Medical Centre Makurdi. This reported suboptimal treatment adherence to ART would pose serious problems to controlling HIV/AIDS in Nigeria. Poor ART adherence can create a dangerous public health problem and limit the effectiveness of available HIV treatments. Poor ART adherence also leads to increased hospitalization rates, increased health care costs, reduced productivity, disruption of families and communities, and morbidity and mortality in low- and middle-income countries. Since some patients still show poor ART adherence, this factor remains a major obstacle in the fight against HIV/AIDS. Undoubtedly, maintaining optimal ART adherence over a long period poses significant challenges to both patients and healthcare providers (14).

Anyaike et al. (14) show that stigmatization has been documented as one of many determinants related to ART adherence. The paper submits that between 3.5% and 14.6% of African women have reported experiencing violent reactions from partners after HIV disclosure. Reports have also revealed the extent to which people are stigmatized and discriminated against by the health workers and the health system. Stigmatization as a determinant against optimal treatment adherence has been documented severally. Also, the regular availability of antiretroviral drugs and their accessibility are important factors that affect adherence.

The success of adherence strategy depends on the education of the patients before initiation of therapy and co-operation between the patients and the health care provider. Factors that strengthen the relationship between the patient and provider include perception of provider's clinical competence, quality communication, empathy and involvement of the patient in the treatment decision. Having a trusting relationship with a health care provider has also been reported as a facilitator of adherence. Possible side effects of drugs, patient's forgetfulness, depression, being too busy and being away from home have been identified as barriers to adherence. In developing countries, financial constraints hamper transportation to the health facility, and the purchase of food has been found to be a great barrier to ART adherence. Other barriers affecting drug adherence include trouble incorporating work and family responsibilities with ART and travelling long distances to receive treatment and a complicated regimen. With ART medication adherence in Africa estimated at 77% and Nigeria being the 3rd in the burden of HIV infection in Sub-Saharan Africa, achieving an optimal adherence level remains

a challenge (14). Therefore, the study aims at assessing the determinants of nonadherence to the antiretroviral drug among people living with HIV in Ondo State, South-West, Nigeria.

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## **II. SYSTEMCOORDINATES**

### **Study Design**

We undertook a quantitative, cross-sectional survey among people living with HIV in HAART clinic of general hospital Iju/Itaogbolu, Ondo State, Nigeria, to establish determinants of nonadherence to the antiretroviral drug.

### **Research Setting**

The study setting was HAART clinic of General hospital Iju/Itaogbolu in Akure, north local government of Ondo state. The hospital was a secondary health facility established in 2003 under the administration of Chief Adebayo Adefarati the then executive governor of Ondo state. The hospital translated from a basic health centre, it started with 20 staff and two departments. The hospital presently had 154 staff with several departments, and the facility runs several preventive and curative services, among which PMTCT/HAART was. The HAART clinic was a unit in the public health department of the hospital, and it started in April 2012 with four adult clients – all female. The clinic currently has 156 clients with 8 paediatrics and 148 adults.

### **Target Population**

The target population for this study encompasses all adult HIV positive at the HAART clinic of General hospital Iju /Itaogbolu, Akure North, Ondo state. The target population was 148.

### **Sample Size Determination.**

The Cochran formula and modified Cochran formula was used to determining the sample size of 107 for this study.

### **Sampling Techniques**

Patients were systematically sampled during either their clinical visits or visit to collect ARV drugs at the HAART clinic of General hospital Iju /Itaogbolu, Akure North, Ondo state.

#### **Instrumentation for Data Collection**

A 20-item Self-report questionnaire was used as an instrument of data collection. The questionnaire is made up of three (3) sections:

Section A: Contains 8 items on sociodemographic data of the respondents, such as age, gender, ethnicity, religion, marital status, family type, educational level, and employment status.

Section B: contains 6 questions as contained in the Simplified Medication Adherence Questionnaire (SMAQ). The SMAQ is a type of self-report questionnaire which is progressively used globally to assess adherence to ART and non-HIV-related medications (15; 16). It was developed and validated in Spain among a sample of predominantly male (72%) HIV-positive individuals, resulting in 72% sensitivity, 91% specificity, and a likelihood ratio of 7.9 in identifying nonadherent patients as compared to drug event monitoring systems (15). It has been used in at least 25 studies and interventions between 2002 and 2018 to examine the adherence to ART and in about 12 countries, including South Africa and Kenya (15; 16; 17; 18; 19; 20; 21).

Six questions were used to assess the participants' adherence from a standardized scale known as the Simplified Medication Adherence Questionnaire (SMAQ) (15). However, to determine the participants' adherence, questions 1, 2, 3 and 5 are scored as a "no" response, question 4 as zero response and question 6 as any response less than 2. The six questions/items make up the unidimensional model for assessing adherence. The six questions examine three elements of ART adherence: intentional (question three), unintentional (questions one and two) and frequency or quantity (questions 4, 5 and 6). Intentional nonadherence refers to when a patient purposefully decides not to take their drug because of various reasons, for example, feeling worse. Unintentional nonadherence occurs when a patient desires to adhere to medication but is restricted for some reason, such as forgetfulness (22). Questions four through six assess various aspects of frequency of nonadherence.

Section C: Entails the determinants of nonadherence to the antiretroviral drug. It contains 6 items.

### **Validity and Reliability of the Instrument**

Copies of the questionnaire were subjected to validation by experts in the field for face validity. Reliability: The intended study instrument was pretested for reliability using ten per cent (i.e. 15) of the total population at comprehensive health centre Arakale in Akure south local government. The instrument was

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administered first and two weeks later on the same subject. Reliability Coefficient Result of Pilot Study Cronbach's Alpha: section B – 0.64, and section C – 0.76 respectively.

**Method of Data Analysis**

Data were coded and analyzed using a statistical package (Version 23 SPSS). Descriptive statistics such as frequency table was used to present the result. Determinants of nonadherence were assessed with multivariate logistic regression. A p-value of < 0.05 was considered significant in all statistical analyses.

**Ethical Clearance**

Permission and approval to conduct this study were sought from Babcock university health research and ethical committee (BUHREC) and General hospital Iju/Itaogbolu. Respondents were provided with adequate information for informed consent. Respondents' participation was voluntary, and their responses were treated with confidentiality.

**III. RESULTS**

**Table 1: Sociodemographic Data**

<b>Age Group</b>	<b>Frequency</b>	<b>Percentage (%)</b>
18-29 years	32	29.9
30-49 years	57	53.3
50 & Above	18	16.8
<b>Total</b>	<b>107</b>	<b>100.0</b>
<b>Gender</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Male	15	14.0
Female	92	86.0
<b>Total</b>	<b>107</b>	<b>100.0</b>
<b>Ethnicity</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Yoruba	83	77.6
Hausa	8	7.5
Ibo	4	3.7
Others	12	11.2
<b>Total</b>	<b>107</b>	<b>100.0</b>
<b>Religious Status</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Islam	9	8.4
Christianity	98	91.6
<b>Total</b>	<b>107</b>	<b>100.0</b>
<b>Marital Status</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Married	80	74.8
Unmarried	12	11.2
Divorced/ Separated	10	9.3
Widow	5	4.7
<b>Total</b>	<b>107</b>	<b>100.0</b>

Education	Frequency	Percentage (%)
Illiterate	17	15.9
Primary	19	17.8
Secondary	48	44.9
Graduate or PG	23	21.5
<b>Total</b>	<b>107</b>	<b>100.0</b>
Family	Frequency	Percentage (%)
Nuclear	41	38.3
Extended	66	61.7
<b>Total</b>	<b>107</b>	<b>100.0</b>
Employment	Frequency	Percentage (%)
Unemployed	30	28.0
Employed	50	46.7
Dependent	27	25.2
<b>Total</b>	<b>107</b>	<b>100.0</b>

The age group of the respondents in this study had the majority between the age group of 30-49years (53.3%, n=57) followed by 18-29years (29.9%, n=32), respondents were predominantly female (86.0%, n=92) while only 15 of the respondents were male (14%), respondents were majorly Yoruba (77.6%, n=83) followed by other tribes which take 11.2% while Hausa and Ibo take 7.5% and 3.7% of the distribution respectively. The table shows (91.6%, n= 98) were Christians while (8.4%, n=9) were Muslims. Regarding marital status, the majority (74.8%, n = 80) were married, 12 (11.2%) were unmarried, 10 were divorced/separated, and 5 were widowed. Only 15.9% of the respondents were not educated; most of the respondents had one form of education or the other. Regarding the family system (61.7%, n=66) were from the extended family system while 41 were from the nuclear. 30 of the respondents were unemployed, 50 were employed, and 27 were dependent

**Table 2:** Patient Responses to the Six-Item Simplified Medication Adherence Questionnaire (SMAQ).

S/N	Question	Responses to adherence questions	Frequency (%)
1.	Do you ever forget to take your medicine?	Yes	35 (32.7%)
		No	72 (67.3)
2.	Are you careless at times about taking your medicine?	Yes	30 (28%)
		No	77 (72)
3.	Sometimes if you feel worse, do you stop taking your medicines?	Yes	42 (39.3%)
		No	65 (60.7%)
4.	Thinking about the last week. How often have you not taken your medicine?	Never	67 (62.6%)
		1 – 2 times	32 (29.9%)
		3 – 5 times	8 (7.5%)
		6 – 10 times	0
		> 10 times	0
5.	Did you not take any of your medicine over the past weekend?	Yes	35 (32.7%)
		No	72 (67.3%)
6.	Over the past 3 months, how many days have you not taken any medicine at all?	≤ 2 days	31 (29)
		> 2 days	76 (71%)

Table 2 revealed that the percentage of patients adhering to the prescribed treatment, as defined by the SMAQ questionnaire in the last 3 months, was 59.8%; thus, 40.2% were not adherent to the treatment.

Table 3: Determinants of Non-adherence to Antiretroviral Drug

Factors	Non-adherence to Antiretroviral Drug		p-value
	Number	Percentage (%)	
Long waiting time	10	23.3	0.004
Clinic environment	5	11.6	0.167
Fear of stigmatization	7	16.3	0.003
Family supportive	8	18.6	0.000
Societal support	5	11.6	0.001
Experienced being treated differently because of HIV status	8	18.6	0.002

Table 3 revealed that the long waiting time, fear of stigmatization, family support, support from society, and experience of being treated differently because of HIV status were identified as determinants of nonadherence to the antiretroviral drug, as their p-values were < 0.05.

#### IV. DISCUSSIONOFFINDINGS

The majority of the respondents are within the 30-49years (53.3%, n=57), are females (86.0%, n=92), and majorly Yoruba (77.6%, n=83) followed by other tribes, which takes 11.2% - Hausa and Ibo take 7.5% and 3.7% of the distribution respectively. The table shows (91.6%, n= 98) were Christians while (8.4%, n=9) were Muslims.

Adherence is a milestone to success and had remained the most potent predictor of effectiveness. The present study revealed an above average adherence rate of 59.8% and a nonadherence rate of 40.2%, respectively. The observed adherence rate is consistent with a 69% observed in a previous study (23). However, it is lower than that obtained in similar studies in which 49.2% (24) and 49% was observed (25).

Long waiting time, Fear of stigmatization, family support, Lack of support from society and experienced being treated differently because of HIV status were significant determinant factors of nonadherence to the antiretroviral drug in this study. Long waiting time is likely to deter or discourage those patients who have started treatment. Some patients will stop coming to the clinics and discontinue the treatment, possibly triggering resistance to the drugs and activating increased viral load levels. As a result, more people will die prematurely, worsening the impact of HIV/AIDS. Patients who wait long periods for health services are dissatisfied with the services and are likely to stop using them. A study undertaken in ART clinics among ARV users in Africa (Botswana, Tanzania and Uganda) found that long patient waiting time was a significant challenge to adherence (26).

The present study identified the fear of stigmatization and the experienced of being treated differently because of HIV status as determinant factors for nonadherence to the antiretroviral drug among the respondents. This result is similar to a qualitative study with ALPHIV at the infectious disease control centre of a teaching hospital in Botswana, revealing that perceived stigma was a major barrier to ART adherence (27). This result is supported by similar previous studies (28; 29; 30). The increased fear of being seen collecting ART medication will affect keeping appointments for clinic visits. Also, the fear of stigma may influence the choice of action when clashes exist between daily activities, dosing times, and scheduled follow-up clinic appointments for ART refill. Also, in a systematic review of both qualitative and quantitative studies conducted among 26,715 HIVpositive persons living in 32 countries worldwide, the study result revealed that HIV-related stigma jeopardizes ART adherence, primarily by weakening social support and adaptive coping (31).

Furthermore, the study showed that family dynamics and social support of people living with HIV/AIDS (PLWHA) play an important role in HAART adherence at the General hospital Iju/Itaogbolu in Akure, North Local Government of Ondo State. And this is consistent with previous studies that revealed that adherence was higher among patients who have family support than among people living independently (32; 33; 34; 35).

Studies have associated perceived family support with improved drug adherence and better outcomes in some disease conditions (36; 37; 38; 39; 40). Perceived family support encompasses an individual's belief that family support is available and provides what is considered needful by that individual (41). Patients who experienced adequate support from family members have been found to have increased HAART adherence rates in some studies (42). A study by Mosack in Milwaukee, Wisconsin, shows that the most often reported benefits of educating family members and incorporating them in HIV care included consistent follow-up clinic attendance and medication adherence (43; 44). According to a cohort study by Sellier et al. amongst subSaharan Africans from Infectious Disease Clinics in Paris revealed that the most significant factors associated with adherence were self-perceived family support and the family's knowledge of the patient's HIV status (43). Stumbo, Wrubel & Johnson (45) also showed that HIV positive same-sex male couples seek and receive informational

and emotional support from friends and family (44; 45). Family support may be especially helpful in the African

context as families in African have been found to have a stronger family bond and a stronger influence on individual lifestyle than families in the western world (45).

## V. CONCLUSION

The prevalence of adherence to ART in this study (59.8%) was unsatisfactory and was less than the 95% recommended by WHO. The study also revealed that the following factors were determinants of ART adherence: fear of stigmatization and experience of being treated differently because of HIV status. These factors need to be addressed to alleviate drug resistance concerns, the resultant heavy financial burden on the health systems from the need to control resistant strains of HIV and total treatment failure with increased morbidity and mortality. Efforts by health care providers must be improved in counselling at initiation and during follow-up hospital visits. The health care providers should regularly counsel and educate patients before initiation and during ART. The counselling sessions should emphasize the nature of the HIV disease, characteristics of HIV medication, benefits of ART, the importance of adherence, the goal of the treatment, and the risks of non-adherence to ART. However, this requires a concerted effort among the multidisciplinary team, including adherence counsellors.

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