



## Research Article

# Evaluation of Enhanced Adherence Counselling among Virally Unsuppressed HIV-Infected Adults on Antiretroviral Therapy in Suburban and Metropolitan parts of Delta State, Nigeria

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## Abstract

**Background:** Virally un-suppressed HIV-Infected persons are known to significantly increase the odds of HIV transmission. Though Enhanced Adherence Counselling (EAC) is recommended for improving viral loads outcomes, it is not a lone predictor for viral suppression. This study evaluated the impact of perceptions, psychosocial, economic and other characteristics of virally un-suppressed HIV-Infected adults on enhanced adherence counselling as a strategy for achieving viral suppression.

**Study design:** A facility-based Cross-sectional study.

**Methods:** This study evaluated 415 virally un-suppressed HIV-Infected adults after 6 months on antiretroviral therapy in comprehensive health facilities in Delta State. Structured questionnaire were administered on randomly sampled HIV-Infected adults at the hospitals on their clinic appointments. Data captured into Epi Info 7.0 were analyzed with SPSS 20.0. Chi square was used to determine relationships considering  $P < 0.05$  statistically significant.

**Results:** Of the 415 virally un-suppressed HIV-infected adults evaluated, 49.1% admitted tiresomeness in taking ARVs; 31.5% of subjects reported on the inefficacy of the ARV drugs, while 19.4% of the subjects said that they had issues with the ARV pills burden. Non-adherence to ARV drugs regimen were observed in 74.1% of the HIV-infected adults studied. More than half (50.9%) of the subjects missed their ARV drugs regimen in the past 3 months. Equally, 28.7% and 17.6% of HIV-infected adults had missed their ARV drugs regimen within 1-5 months and for more than 5 months respectively.

**Conclusions:** This study reveals the association of virally un-suppressed HIV infections with non-adherence to ARV regimen due to forgetfulness, faith-healing belief and taking of herbal medicine.

**Keywords:** Antiretroviral; Enhanced Adherence Counselling (EAC); HIV-infected; Perceptions; Psychosocial; Viral suppression.

## Introduction

HIV infection remain a great catastrophe of public health concern with over 39 million deaths and more than 36 million people currently living with the condition [1,2]. HIV prevention and treatment efforts primarily aim at reducing morbidity and mortality among people living with HIV, and in addition the reduction of the risk of transmission, hence the need to ensure virological suppression to undetectable levels [3]. Therefore, antiretroviral therapy (ART) is initiated for HIV infection to achieve and maintain virologic suppression, thereby preventing disease progression and transmission [4]. Accordingly, viral suppression assesses the success of HIV/AIDS treatment and can avert or reduce transmission of infection [5]. Unsuppressed viral load in patients on antiretroviral (ARV) therapy occurs when treatment fails to suppress a patient's viral load, and is associated with decreased survival and increased HIV transmission [1]. Earlier study highlights sociodemographic and psychological factors, previous treatment failure, long periods on ARV therapy, low baseline CD4, ARV regimen, poor absorption of ARVs, poor adherence to treatment, comorbidities, drug resistance, drug toxicity, substance abuse, weak social support networks, sexually transmitted infections (STIs), and awareness of the benefits of viral suppression to be negatively associated with viral load suppression on ARV therapy [6]. More recent study has equally shown that lower HIV viral suppression are concomitant to a wide range of factors and differ according to settings with the level and cause of the problem differing from country to country [1].

World Health Organization (WHO) clinical staging has long been used to assess the immunological status (CD4 T-cell count) of HIV-infected patients at initiation of antiretroviral therapy and monitoring of routine viral load suppression for treatment outcome [7,1]. Because of the lower positive predictive value and poor sensitivity of both the immunological and clinical methods, regular viral load testing to systematically monitor treatment response after 6 months of ART and at least every 12 months is the gold standard and is therefore preferred as it provides earlier and more accurate signs of treatment failure [1,8,9]. HIV Viral load suppression is defined as HIV RNA <1,000 copies per ml of plasma [10]. Viral suppression among people living with HIV is one of the global indicators for the monitoring of the 2016 UNAIDS 90–90–90 target: which in practical terms translates to: 90% of the population should know their HIV status, 90% of those with known HIV infection status should be on treatment, and 90% of those on treatment should have sustained suppressed viral loads [11]. Nigeria has the second largest HIV epidemic in the world [12]. In 2019, the UNAIDS estimated that around two-thirds of

new HIV infections in West and Central Africa will occur in Nigeria, agreeably, same year, the National Agency for the Control of AIDS reported that there are 1.9 million people living with HIV in Nigeria [13,14]. The National Guideline on HIV prevention and treatment recommends viral load determination 6 months after initiating cART and then annually if viral suppression was achieved [15]. According to the 2016 national viral load implementation strategy and plan, the reported national viral load suppression rate in adult and children are 44.5% and 34% respectively [16,17]. In cases of viral un-suppression in individuals, adherence counseling support is intensified followed by another viral load testing so as to differentiate poor adherence from treatment failure [17]. Overall, two viral load measurements > 1000 c/ml, 3 months apart after the initial viral load determination indicates treatment failure and such individuals are switched to second-line ART [18].

Poor adherence to ART is considered the most common cause of viral load unsuppression among people living with HIV [19]. Enhanced Adherence Counseling (EAC) is an interventional program that provides targeted adherence counseling for unsuppressed viral load in people living with HIV who are receiving antiretroviral therapy before diagnosing treatment failure [20]. The World Health Organization recommended enhanced adherence counselling (EAC) with the objective to conduct counselling sessions for adult patients with a high viral load, through the identification of barriers to adherence and strategies to overcome them [21]. Enhanced adherence counselling is recommended for virally unsuppressed patients and it has been shown that EAC for virally unsuppressed adults can lead to 70.0% of them achieving viral load suppression [22]. Nonetheless, emerging evidence suggests that receiving adherence counselling alone is not a predictor for viral suppression, especially for children and adolescents [23].

Recent study reported that only 31.2% of virally unsuppressed patients achieved viral load suppression following enhanced adherence counselling [24]. In addition, the 2019 Nigeria HIV/AIDS indicator and impact survey reported HIV viral load suppression rates below 42.3% among persons aged 15 to 49 years [10]. This study seeks to evaluate the impact of psychosocial, economic, other factors and characteristics of virally unsuppressed HIV-Infected adults on enhanced adherence counselling as a strategy for achieving viral suppression in people living with HIV in Delta State, Nigeria.

## Methods

### Study area and population

This study was done in Asaba, the capital city of Delta State in the South-South geo-political zone of Nigeria. Based on the 2006 National population census, Delta State has a population of 4,112,445 (males: 2,069,309; females: 2,043,136). The HIV patients included in this study were drawn from three comprehensive Health Centres namely: St. Joseph Catholic Hospital, Asaba, Okwe

general Hospital, Okwe, and Agbor Central Hospital, Agbor all in Delta state, Nigeria. These health facilities were among the first in July 2006 to start offering HIV/ARV-therapy services for Delta state residents living with HIV/AIDS and since the year 2008 serve as standalone ART clinics with viral load-testing facilities [25]. Asaba and Okwe are located at the northern end of the state, and Agbor is about 60km away from Asaba and is bordered by Benin City to the northeast [26]. The major occupation of the inhabitants of these city and towns are petty trading, farming while some are civil servants [27]. The social amenities within the community include; Government primary school, junior secondary school, private clinics, bore holes for watersource, private nursery and primary schools, churches, mosque and rivers.

### Study Design, Sample-Size and Sampling Technique

This study used a cross-sectional descriptive design and targeted a population comprised of 20539 people living with HIV that are on Anti-retroviral drugs. Out of these, 70% (14377) were virally unsuppressed HIV-positive adults patients who have been on ART after 6 months in the three comprehensive health facilities in Delta State. From the total population of 14377, a representative sample size of 10% of the total number of the patients in the hospitals was found to be adequate for this study. The choice of sample was guided by the expert opinion that suggested sample sizes of between 10-30% [28,29]. Therefore, the sample size for this study was calculated using the formula:  $n = (t^2 \times p(1-p)) / m^2$  Where,  $t$  = confidence level at 95% (standard value of 1.96),  $p$ =estimated prevalence of the variable,  $m$ =margin of error at 5% (standard value of 0.05). Therefore,

$$n = (t^2 \times p(1-p)) / m^2$$

$$n = (1.96^2 \times 0.05(1-0.5)) / 0.05^2$$

$$\text{i.e. } n = 0.9604 / 0.0025 = 384.16 = 384$$

10% of the calculated sample size was added as prevalence error, i.e.,  $384 + 31 = 415$ .

Between the months of July and December 2020, 415 virally unsuppressed adult patients who met the inclusion criteria of being virally unsuppressed after 6 months on antiretroviral therapy selected using simple random sampling were surveyed by the administration of structured questionnaires at the hospital when they came for their clinic appointments.

### Data and Statistical Analysis

Data were recorded into Microsoft Excel and were analyzed using the SPSS 24.0 statistical package (SPSS Inc., Chicago, U.S.A.). Means, percentages, and frequencies were used to present data as descriptive statistics for demographic, clinical, and ARV treatment-related characteristics of participants. The Chi-square test and independent t-test were employed to assess

differences in variables and statistically significant associations with unsuppressed viral load at a  $p$  value  $< 0.05$ .

### Ethics approval

Ethical approval for this study was obtained from Delta State Ministry of Health, Asaba, Delta State. The participants were informed about the research and their consent duly obtained. All the information collected from participants were treated with utmost confidentiality.

### Results

#### Sociodemographic Characteristic of virally unsuppressed adult patients

Of the 415 participants included in this study, more than half 242(58.3%) were females, while 173 (41.7%) were males. Participants age ranges were as follows: 21-30 years (31.5%), 31 and 40 year (38%), 41-50 years (13.8%) and the least among them were those within the age range of 51 years and above (16.7%). Among the virally unsuppressed adult patients, 107 (25.9%) had primary education, 39(9.3%) had secondary education and 269(64.8%) had tertiary education. Occupationally, 127(30.6%) of respondents were civil servants; 119 (28.7%) were business people; 81(19.4%) were farmers and 88 (21.3%) were doing other unspecified jobs. Two Hundred and ninety-two (70.4%) of the participants were practicing Christianity; 104 (25.0%) of the participants practiced Islam and the religious affiliation of only 19 (4.6%) of the participants were undefined. One hundred and twenty-seven (30.6%) of the participant tested positive to HIV in 2015; 104 (25.0%) tested HIV-positive in 2016 and 61 (14.8%) of tested HIV-positive in 2017; 69 (16.7%) tested HIV-positive in 2018, while only 54 (12.9%) of the virally unsuppressed adult patients tested HIV-positive in 2019 (Table 1).

Characteristic	Frequency	Percentage (%)
<b>Gender</b>		
Male	173	41.7
Female	242	58.3
<b>Age</b>		
21-30	131	31.5
31-40	158	38
41-50	57	13.8
51 and above	69	16.7
<b>Education Level</b>		
Primary Education	107	25.9
Secondary Education	39	9.3

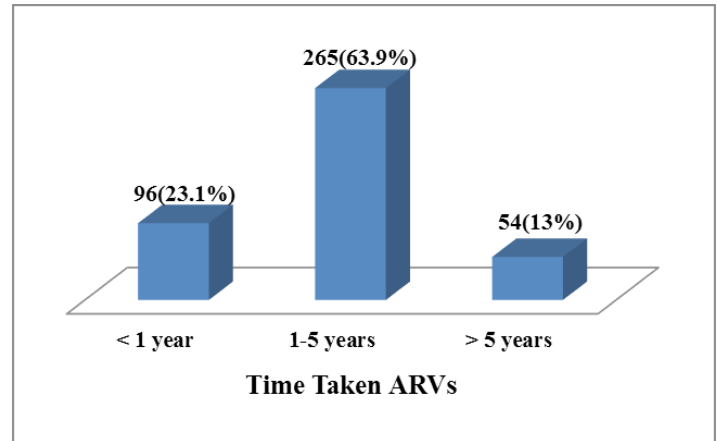
Tertiary Education	269	64.8
<b>Occupation</b>		
Civil servant	127	30.6
Business	119	28.7
Farming	81	19.4
Others	88	21.3
<b>Religion</b>		
Christianity	292	70.4
Islam	104	25
Unbeliever	19	4.6
<b>Year Diagnosed with HIV</b>		
2015	127	30.6
2016	104	25
2017	61	14.8
2018	69	16.7
2019	54	12.9
<b>N= 415 100%</b>		

**Table 1:** Distribution of Characteristics of the virally unsuppressed adult patients.

Of the 415 HIV-infected adults evaluated, 204(49.1%) admitted that they were tired of taking ARVs; 130(31.5%) of subjects reported on the inefficacy of the ARV drugs, while 81(19.4%) of the subjects said that they had issues with the ARV pills burden. (Table 2). Analysis of participants duration on ARV regimen by virally unsuppressed adult patients showed that 265(63.9%) had been taking ARVs between 1 and 5 years; 96 (23.1%) of participants had been taking ARVs for less than a year, whereas only 54 (13%) of the adult patients had been taking ARVs over 5 years Figure 1.

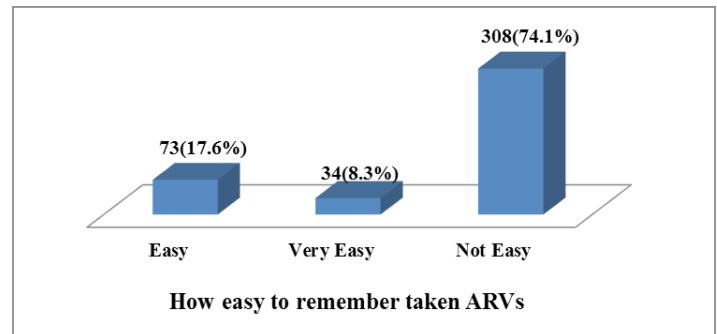
Why do you feel like stopping ARVs	Frequency	Percentage (%)
I am tired	204	49.1
The ARV pills burden	81	19.4
The medicine is not working	130	31.5
<b>Total</b>	<b>415</b>	<b>100</b>

**Table 2:** Distribution of reasons for stopping ARVs by virally unsuppressed adult patients.



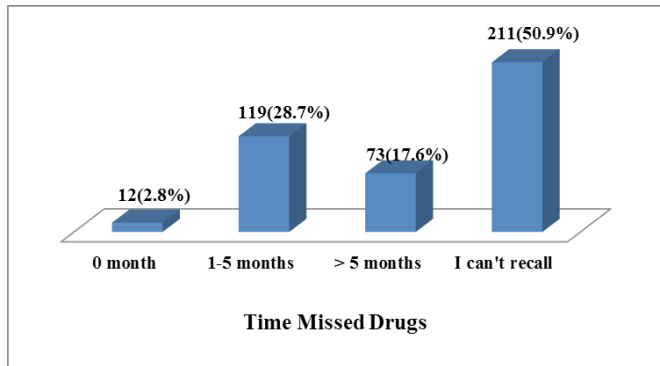
**Figure 1:** Duration on ARV regimen by virally unsuppressed adult patients.

Noncompliance to ARV drugs regimen due to inability (not easy) to remember to take ARVs were observed in 308 (74.1%) of the participants, 73 (17.6%) found it easy and only 34 (8.3%) of the virally unsuppressed adult patients studied found it very easy to take ARVs drug Figure 2.



**Figure 2:** AVR regimen compliance rate of virally unsuppressed adult patients.

Difficulty to take ARVs each day were reportedly due to forgetfulness, faith-healing belief and taking of herbal medicines. On the average, 211(50.9%) of the virally unsuppressed HIV-infected adults could not recall the last time they had taken their drugs in the past 3 months. Equally, 119(28.7%) of the virally unsuppressed adult patients had missed their ARV drugs regimen within 1-5 months and 73(17.6%) had missed their ARV drugs regimen for more than 5 months (Figure 3).



**Figure 3:** Time log of missed ARV regimen by virally unsuppressed adult patients.

The profiling of the indicators of enhanced adherence counselling and viral load suppression among adult is shown in Table 3. Most of the participants 373(89.8%) reported that they have fixed time for taking their ARVs each day, while 42 (10.2%) stated that they had no fixed time for taking their ARVs. More than two-third, 296(71.3%) of the virally unsuppressed adult patients disagreed with the myth that taking ARV in combination with herbal remedies makes it more effective in viral suppression. On the average, 215(51.9%) of the virally unsuppressed adult patients in this study said they never felt like discontinuing the ARV drugs. A reasonable proportion of the virally unsuppressed adult patients 200(48.1%) in this study indicated that they felt like discontinuing with ARV therapy. Many of the patients 342(82.4%) identified skipped doses of ARV drugs as a risk factor for developing resistance

to HIV drugs whereas 73 (17.6%) of the virally unsuppressed adult patients do not consider ARV dose skipping a risk for the development of HIV drugs resistance. Virally unsuppressed adult patients that indicated not having experienced any negative attitude from family or co-workers in the course of taking AVR drugs were 273 (65.7%) patients. General attitude towards HIV/AIDS influences their adherence to ARV drugs in 300 (72.2%) of the virally unsuppressed adult patients. The believe that HIV treatment will help patient live long were expressed by 350 (84.3%) of the virally unsuppressed adult patients studied. More than half 238 (57.4%) of the virally unsuppressed adult patients felt comfortable coming to pick- up their drugs in the facility any moment, but, 177(42.6%) of them felt uncomfortable. A total of 407 (98.1%) of the virally unsuppressed adult patients disagreed that ARV could cure HIV/AIDS, while only an insignificant 8 (1.9%) think ARV can cure HIV/AIDS. Missed clinic appointments were reported by 254(61.1%) of the virally unsuppressed adult patients. Regarding availability of the ARV drugs, 319 (76.9%) patients affirmed that ARV drugs were available in the facility where they access the drugs, none the less, 96 (23.1%) were of contrary opinion. Money and the use of same was not considered as a factor by 315 (75.9%) of the virally unsuppressed adult patients to access the drugs. On the contrary, 100 (24.1%) of the virally unsuppressed adult patients affirmed that they needed money to access the drugs. Analysis showed that there is a significant relationship between Enhanced Adherence Counselling (EAC) and achievement of viral load suppression among adult patients with previously unsuppressed viral loads.

Indicators	Yes	%	No	%
Do you have a fixed time for taking your ARVs each day?	373	89.8	42	10.2
Combining herbal medication and ARVs makes it work effectively?	119	28.7	296	71.3
Do you feel sometimes like discontinuing your ARV drugs?	200	48.1	215	51.9
Do you think that skipping a dose of your ARV can cause HIV to become resistant?	342	82.4	73	17.6
Have you ever experienced a negative attitude from your family, friends or co-workers because you take ARVs?	142	34.3	273	65.7
Does the general attitude towards HIV/AIDS in your area influence your adherence to ARV drugs?	300	72.2	115	27.8
Do you believe that treatment will help you live long?	350	84.3	65	15.7
Do you feel comfortable coming to pick-up your drugs in your facility any moment?	238	57.4	177	42.6
Do you agree that ARV can cure HIV/AIDS?	8	1.9	407	98.1
Have you ever missed your clinic appointment?	254	61.1	161	38.9
Are ARV drugs readily available in the facility where you access your drugs?	319	76.9	96	23.1
Do you need money to access the drugs?	100	24.1	315	75.9

N = 415      100%

**Table 3:** Enhanced Adherence Counselling and Viral Load Suppression Among Adult Patients.

## Discussion

Antiretroviral Therapy (ART) is invaluable in improving the health status of HIV-positive persons. ART help curtail the morbidity, mortality and other public health challenge due to HIV infection. Antiretroviral Therapy (ART) is purposely instituted to achieve and maintain virologic suppression, thereby preventing disease progression and transmission [4]. Notwithstanding the apparent benefits of ART, the necessity for strict adherence to treatment with ARV regimens is often not easily achieved by HIV-positive adult patients. To help address the menace of poor ART adherence, the World Health Organization recommended the Enhanced Adherence Counseling (EAC), a continual and repeated process involving structured assessment of the current level of adherence, exploring specific barriers patient must overcome, assisting patients to identify solutions, and address barriers as well as developing an individualized adherence interventional plan which improve viral load suppression and reduces subsequent treatment failure [30]. Although renowned for improving viral loads outcomes, the Enhanced Adherence Counselling (EAC) evidently is not a lone predictor for viral suppression.

In this study, the sociodemographic and other characteristics of virally unsuppressed HIV-Infected adults in Delta state Nigeria on enhanced adherence counselling showed that more females (58.3%) than males and predominantly of youthful age were virally unsuppressed HIV-Infected adults. Our gender and age descriptives of virally unsuppressed HIV-Infected adults are similar to the recent reporting of more females and of youthful age among virally unsuppressed adult patients in public hospitals in Northeast Ethiopia [20]. Interestingly, the sociodemographic characters of the virally unsuppressed adult patients included in this study further indicate that they were very literate, with 64.8% having had tertiary education, and mostly business people and persons professing Christian religious affiliation. The educational and employment profile of the subjects in our study is in consonance with analysis from a retrospective study in Ghana which reported that more than half of the virally suppressed HIV patients had attained basic education and were mostly informally employed [31]. Invariably, sociodemographics such as sex, age, gender, economic and other characters including clinical characteristics taken together were significant predictors of viral load suppression in adult patients.

According to the HIV Status disclosure, the virally unsuppressed HIV-Infected adults in this study comprised of those who tested positive between 2015 to 2019, most of whom have been on ARVs for a duration ranging between 1 and 5 years.

Whereas majority of the subjects in the current study reportedly tested positive in 2015, only 13% of such adult patients had been taking ARVs over 5 years. Observed durations on ARV virally unsuppressed HIV-Infected adults in this study significantly differed from a recent report among Adult Antiretroviral Therapy Users in Southwestern Ethiopia [1]. Non-adherence to Antiretroviral Therapy (ART) is the most important factor for therapeutic failure and the development of resistance [32]. Reasons adduced by patients in this study for failing to adhere to ARV regimen by virally unsuppressed adult are varied. The most widely held complaint for lack of adherence by 74.1% virally unsuppressed adult studied was that it had not been easy to remember to take ARVs, only 8.3% found it very easy to take ARVs drug. Apart from those for whom it had not been easy to remember to take ARVs, many others that found it difficult to take ARVs each day reportedly said it may be due to reaction of the drug in the body. Overall, reasons given for the lack of adherence in this study particularly not been easy to remember likened to the reported “forgetting the doses” in 35-52% of patients are consistent with the documented clinical viewpoints that dubbed adherence a difficult but essential task for a successful HIV treatment [33].

In the current study, ARV virally unsuppressed HIV-Infected adults admittedly had various reasons for which they felt like stopping ARVs regimen. Some of the patients studied insists that the ARVs were ineffective and the reason adduced by a number of them were associated with ARV pills burden. It is quite concerning that a substantial proportion (49.1%) of the virally unsuppressed HIV-Infected adults in this study conceded that they were tired of taking ARVs. This finding is helpful because in order to develop effective adherence interventions, it is important to identify the common reasons people report for not taking their ART [34]. Our result is therefore worrisome in view of the fact that viral suppression is affected not only by adherence to therapy, but by the appropriateness and effectiveness of patients’ ARV regimens [35].

The time log of missed ARV regimen by virally unsuppressed adult patients spanning over a period of five months in our study were quite varied. Whereas only 2.8% of the virally unsuppressed adult patient reportedly had not missed their ARV drugs at all, many admitted they had missed their ARV regimen within 1-5 months. An earlier multi-Country study in Tanzania, Uganda, and Zambia found that about one third of participants (29%) reported ever missing ART [34]. On the contrary, our results indicate that an average (50.9%), of the adult HIV patients could not recall the last time they had taken their drugs in the past 3 months. The result of the current study underscores the value of Enhanced

Adherence Counselling (EAC) among virally unsuppressed HIV-Infected missing ART for at least 48 consecutive hours considered incomplete adherence, which is related to virological failure. In addition, we found that most of the patients (82.4%) identified skipped dose of ARV drugs as a risk factor for developing resistance to HIV drugs which agreeably is a leading cause of treatment interruptions and an important predictor of viral load failure and resistance [36].

Enhanced Adherence Counseling (EAC) is a prescribed protocol by the World Health Organization that provides targeted adherence counseling for virally unsuppressed HIV-Infected adults on antiretroviral therapy before diagnosing treatment failure. Although in this study, our analysis revealed that a significant relationship exists between Enhanced Adherence Counselling (EAC) and achievement of viral load suppression among adult patients with previously unsuppressed viral loads, only but 2.8% of the HIV-Infected adults achieved viral load suppression following enhanced adherence counselling after a previous unsuppressed viral load result. The proportion of HIV-Infected adults that achieved viral load suppression following enhanced adherence counselling in our study is by far lower compared to previously reported 47.1% amongst people living with HIV/AIDS in a rural setting in South-South Nigeria [36]; 54% from Swaziland [37]; 25% from five hospitals in Haiti [38]; and very recently, the reported 51% of the patients from Ibadan [39], in South western Nigeria who underwent EAC that were virally suppressed afterwards.

By and large, given the impact of psychological variables and independent effect of self-efficacy on adherence, we therefore consider that attitudes towards adherence are likely to improve if the individual feels that he or she is freely choosing to participate in drug therapy at his or her own volition, and because it is important to him or her than otherwise.

## Conclusion

This study found that a high level of Viral Load (VL) suppression can be achieved among adults receiving ART, but the attitudes of adult patients receiving ART towards achieving the VL suppression is terribly poor as a whopping 50.9% of adult patients receiving ART do not recall the last time they took their drugs. Therefore, we suggest the introduction of observed antiretroviral therapy adherence in people living with HIV to monitor the compliance level of adult patients, as Enhanced Adherence Counselling (EAC) alone does not seem to achieve Viral Load (VL) suppression.

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## Conflict of interest

No conflicts of interest in to declare.

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