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**Original Research Article**

# Enhanced adherence counselling and viral load pattern amongst people living with HIV/AIDS in a Nigerian government hospital

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## ABSTRACT

**Background:** Antiretroviral therapy (ART) remains the primary treatment for Human immunodeficiency virus (HIV) infection, aiming to reduce viral replication and mortality, but this requires lifelong adherence. To achieve viral load suppression (VLS) (below 1,000 copies/ml), the World Health Organization (WHO) recommends annual VL measurements and enhanced adherence counselling (EAC). To determine the prevalence of VLS following EAC amongst the virally unsuppressed PLHIV at the Rivers State University Teaching Hospital (RSUTH) and factors influencing their virology outcomes.
**Methods:** A retrospective descriptive review of records of 330 virally unsuppressed PLHIV, aged 18 years and more, from September 2021–March 2023.
Sampling method: Random sampling method of those on comprehensive 3 sessions of monthly EAC. Ethical approval was obtained from the RSUTH ethical committee and an informed consent received from the ART management team. Data was collated and associations analysed with statistical significance set at p-value of<0.05.
**Results:** The prevalence of VLS after EAC3 (three sessions) was 70.9%. Highest preponderances were among females (51.5%), middle aged (73.3%), unemployed (71.1%), those on first line ART regimen (71.3%), CD4 count of <200 cells/mm$^3$ and statistically significant levels (p-value<0.01) in those who had < five years ART (79.5%). There were also significant logistic regression scores (4.119, p=0.042 and 41.173, p=0.000, respectively) for VLS levels after EAC2 and EAC3.
**Conclusions:** Administration of at least three sessions of EAC with VL monitoring is helpful in achieving viral suppression in PLHWA.

**Keywords:** Antiretroviral therapy, Enhanced adherence counselling, Viral load suppression

## INTRODUCTION

HIV was first discovered in 1981 in America and has become a global pandemic over the last 40 years. It has affected over 84 million people with 38.4 million people living with the disease at the end of 2021.[1] The main stay of management for HIV is administering the ART. These medications are taken for life with the aim of reducing viral replication to reduce mortality rates in these individuals. The effectiveness of these antiretroviral medications depends highly on ongoing adherence to the recommended dosage schedule.

To stop the development of drug resistance, viral replication, disease progression and death, an adherence rate of roughly 95% is needed.[2] When there is non-adherence, there is rapid viral replication and decline in the health of the individual. According to reports, factors

that contribute to non-adherence include ART adverse effects, non-disclosure, lack of improvement while receiving treatment, ignorance of HIV, a lack of support, pill burden and amnesia.[3] Higher viral loads cause a greater decline in CD4 cell count, which raises the likelihood of opportunistic infections.[2] Viral suppression in PLWHIV, is achieved when the viral load is less than 1000 copies/ml of blood and is crucial for lowering transmission and mortality. Viral load in PLWHA serves as a direct measure of viral replication and is expressed as the number of HIV RNA copies/ml of blood.

In order to achieve viral load suppression in those with high plasma viral loads (>1000 copies/ml), the World Health Organization (WHO) currently recommends periodic viral load measurement (at least once per year) and enhanced adherence counselling (EAC) in all PLWHA on ART.[4] This is to address the issue of viral load non-suppression because poor ART adherence is the most frequent cause of high viral load.[5] It entails performing an EAC monthly for three months, then repeating the viral load test three months later. ART failure is assumed if the viral load levels remain high and so the patient is moved to a different ART regimen.[6] An approximate 51-70% of patients with high initial viral loads have been shown to experience viral suppression after receiving EAC.[7,8] VL monitoring has been proposed as a tool to reinforce adherence, but outcomes are hardly being systematically assessed.

The aim of this study is to determine the prevalence of viral load suppression following EAC amongst the virally unsuppressed PLWHIV at RSUTH and to determine other factors influencing the virology outcomes of EAC in these patients.

## METHODS

### *Study setting*

The study was conducted in the HIV /ART clinic of RUSTH, Port Harcourt, Rivers state. The hospital serves as a referral centre to primary and secondary health facilities in Rivers State and surrounding states in the Niger Delta region of Nigeria.

The HIV clinic of the RSUTH provides services which includes, free counselling/testing and services for prevention and treatment of HIV. It is operational from Monday to Friday on weekly basis and can accommodate 150 people per clinic day. The different units that make up the HIV clinic includes adherence counselling unit, ART unit, Paediatrics ART unit, HIV/TB co-Infection unit, ARV Pharmacy unit, Monitoring and evaluation (M&E) unit and laboratory unit.

### *Study design*

This study was an institution-based retrospective descriptive review of records of patients with unsuppressed viral loads from September 2021–March 2023.

### *Study place*

The study was conducted in the human immunodeficiency virus (HIV) Program unit located in River state University Teaching Hospital, Nigeria.

### *Sample size and study participants*

With the WHO accepted figure for prevalence (p) for EAC of 70% among virally unsuppressed HIV clients1 the sample size was calculated for this study using the standard formula and an approximated sample size of 330 was derived.

### *Sampling method*

A random sampling method (table of random numbers and selecting the assigned ones till the sample size was achieved) was employed.

### *Selection criteria*

All virally unsuppressed adult HIV patients aged 18 years and above who underwent EAC within the stipulated period were included and studied for a period of three months. Those with a viral load (VL) of <1,000 copies/ml as well as pregnant women and persons below 18years were excluded.

### *Sampling technique*

At the RSUTH, newly diagnosed HIV positive clients, following confirmation of retroviral disease (RVD) are usually enrolled into ART management same day or latest same week of diagnosis for commencement of HAART of first line regimen (TDL) and adherence counselling section. At the end of six months, their VL levels are re-assessed. Those who are virally unsuppressed (clients with high VL>1000 copies/ml) are enrolled for enhanced adherence counselling (EAC).

They were placed on first line regimen and had three sessions of EAC which were conducted monthly using adherence forms after which viral load estimations were done on the 4th month to assess the patient's suppressed state as well as ascertain if the adherence plan worked out during the EAC sessions. Those who later become suppressed were given three-monthly drug refill and verbal counselling on drug adherence, while those who were still unsuppressed were placed on repeat monthly EAC session for three sessions with a viral load estimation on the fourth month.

The suppressed clients were placed on three-monthly refill and received verbal counselling on drug adherence. Those who were still unsuppressed after the third session of EAC were regarded as treatment failure and were

switched to second line medication treatment (TLD/3TC/ATV/LPV/r) as authorized by the drug switch committee of the ART unit of RSUTH. Data was collected from the medical records of clients with high viral load who had up to three complete sessions of EAC at the Rivers State University Teaching Hospital (RSUTH) from 2021-2023. Two trained officers working at the Monitoring and Evaluating (M&E) department of the ART clinic helped to collect the data. Dependent variables were the viral load levels before and following EAC.

Independent variables assessed included age, gender, number of EAC sessions done, occupation, duration on ART, type of ART regimen and last CD4 count. We described the viral loads (VL) outcomes of patients with VLs>1 000 copies/ml after at least 6 months on ART and a comprehensive 3-monthly EAC support programme. Patients with two VL measurements after the EAC sessions were eligible for analysis. Data was extracted from patients' ART follow-up records, EAC register and high viral load follow up charts.

### *Data analysis*

The data collected was analyzed based on the objectives of the study using the statistical package for social sciences (SPSS) version 22. Frequency distribution tables, percentages, charts, were used to analyze data. Chi square test was used to test for associations and the level of significance was set at $p<0.05$.

### *Ethical consideration*

Ethical approval for this study was obtained from the ethical committee of the RSUTH, Port Harcourt. An informed consent was received from the ART management team and confidentiality maintained.

## RESULTS

The prevalence of viral load suppression among respondents in this study, following three sessions of EAC (EAC3) was 70.9%.

### *Socio-demographic characteristics of respondents*

In this study, there was a female preponderance of 71.8%, compared to males (28.2%). Higher proportions were also recorded for ages 45-65 years, the employed and those that had been on ART for less than five years (Table 1).

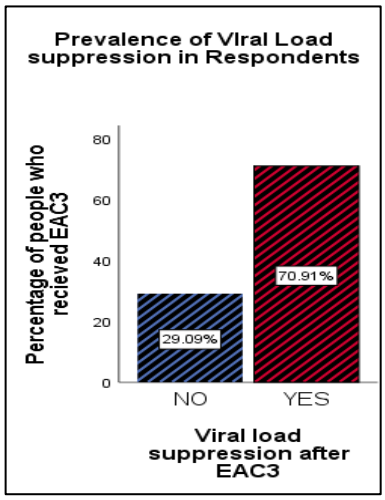


**Figure 1: Prevalence of VL suppression.**

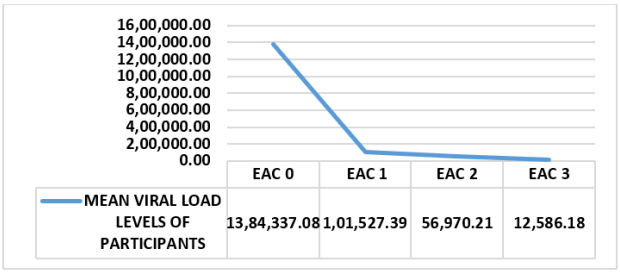


**Figure 2: Mean viral load levels of participants vs. number of EAC.**

### *Viral load suppression and associated factors in respondents*

In this study, 234 participants were virally suppressed, with highest suppression levels among the female gender (71.7%), 26-45 years age group (73.3%), the unemployed (71.1%), those on first line HAART regimen (71.3%), those whose last CD4 lymphocyte count between >350 and 500 cells/mm3 (76.6%) and 79.5% of those that have been on ART for five years and less, which was statistically significant with $p<0.001$ (Table 2). Figure 2 shows a line trend with an obvious downward trend in mean viral load levels for each additional EAC done, revealing reduced viral load levels.

**Table 1: Socio-demographic characteristics of respondents.**

| Socio demographic | Frequency | % |
|---|---|---|
| **Factors** | | |
| **Gender** | | |
| Male | 93 | 28.2 |
| Female | 237 | 71.8 |
| **Age group (in years)** | | |
| <25 | 32 | 9.7 |
| 25-45 | 146 | 44.2 |

Continued.

| Socio demographic | Frequency | % |
|---|---|---|
| 46-65 | 152 | 46.1 |
| Occupation | | |
| **Employed** | 181 | 54.8 |
| Unemployed | 149 | 45.2 |
| **Duration on ART (in years)** | | |
| 01 May | 205 | 62.1 |
| 06 October | 125 | 37.9 |
| Total | 330 | 100 |

**Table 2: Relationship between VL suppressions and associated factors in respondents.**

| Characteristics of respondents | Viral load suppression | | Total | df | $X^2$ | P value |
|---|---|---|---|---|---|---|
| **Gender** | No (n %) | Yes (n %) | | | | |
| Male | 29 (31.2) | 64 (68.8) | 93 (100) | 1 | 0.275 | 0.60 |
| Female | 67(28.3) | 170 (71.7) | 237 (100) | | | |
| **Age group (in years)** | | | | | | |
| 15-25 | 9 (28.1) | 23 (71.9) | 32 (100) | 2 | 0.871 | 0.64 |
| 26-45 | 39 (26.7) | 107 (73.3) | 146 (100) | | | |
| 46-70 | 48 (31.6) | 104 (68.4) | 152 (100) | | | |
| **Occupation** | | | | | | |
| Employed | 53 (29.3) | 128 (70.7) | 181 (100) | 1 | 0.007 | 0.93 |
| Unemployed | 43 (28.9) | 106 (71.1) | 149 (100) | | | |
| **Duration on art (in years)** | | | | | | |
| 1-5 | 42 (20.5) | 163 (79.5) | 205 (100) | 1 | 19.418 | 0.000 |
| 6-10 | 54 (43.2) | 71 (56.8) | 125 (100) | | | |
| **HAART regimen** | | | | | | |
| 1st line | 90 (28.7) | 224 (71.3) | 314 (100) | 1 | 0.576 | 0.44 |
| 2nd line | 6 (37.5) | 10 (62.4) | 16 (100) | | | |
| **Last CD4 count group (cells/mm$^3$)** | | | | | | |
| >500 | 23 (27.1) | 62 (72.9) | 85 (100) | | | |
| 350-499 | 11 (23.4) | 36 (76.6) | 47 (100) | | | 0.63 |
| 200-349 | 23 (29.1) | 56 (70.6) | 79 (100) | 3 | 1.689 | |
| <200 | 39 (32.8) | 80 (67.2) | 119 (100) | | | |

## DISCUSSION

The viral load suppression rate of 70.9% observed in this study is consistent with results from several similar studies across sub-Saharan Africa, including Nigeria and Rivers State, which have reported positive outcomes from EAC interventions. This finding aligns closely with 68.5% viral suppression in a South-west Nigerian study, 72.7% suppression in a similar study after three EAC sessions in a tertiary hospital, Abuja, Nigeria and 66.4% in Kampala.[9,10]

Even higher viral suppression rate of 91%, following sessions of EAC, has been reported in a study which was part of the Reaching Impact Saturation and Epidemic Control (RISE) project in Nigeria.[11] However, all mentioned studies confirm that EAC plays a crucial role in addressing adherence barriers in the Nigerian context, especially in regions like Rivers State, which faces high HIV prevalence and significant public health challenges. Statistically high VLS was seen in participants that have been on ART for less than 5 years (79.5%), with 71.3% of those on first line regimen achieving VLS in this study. This corresponds with the study by Nakaye et al in Uganda, where all the study participants who achieved viral re-suppression after EAC did not require ART regimen switch which inherently helped in the preservation of the next line ART medications for when their need is warranted, a very core aim of the intensive adherence counselling intervention.[10]

The bulk of the virally unsuppressed HIV-Infected adults in this study were females (71.8%), with a female-to-male ratio of 2.5:1, middle-aged (46.1%), the employed (54.8%) and those who has been on ART for less than 5 years (62.1%). This finding was similar to other African findings such as that of Izudi et al in Uganda, which noted that 69.2% of their participants were females.[12] Bvochora et al in Zimbabwe, similarly observed in their study that most of their participants who were virally suppressed were females and had been on ART for less than 5 years.[5] Akpan et al in Akwa Ibom state, Nigeria and Ukwueze et al in Delta state in Nigeria also noticed that more females had viral re-suppression and most of

their respondents were employed in their studies.[13,14] The significant logistic regression scores (4.119, p=0.042 and 41.173, p<0.001, respectively) for VLS levels after EAC2 and EAC3 found in this study as well other African studies in Ethiopia, Kampala and Abuja, Nigeria shows the relevance of structured and consistent EAC interventions across diverse African populations.[7,9,11]

## CONCLUSION

The study outcomes emphasize that EAC can significantly improve treatment adherence and contribute to achieving the UNAIDS 95-95-95 goals in African countries, where challenges such as poverty, stigma and illiteracy affect adherence to ART. The overall similarity in viral load suppression rates across these regions demonstrates that EAC is a highly effective strategy regardless of geographical location, as long as it is focused to local needs and challenges.

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