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Research Article

Enhanced Adherence Counselling (EAC) via Phone: A Strategy to Improve the Effectiveness and Timeliness of EAC Enrollment and Completion among Persons Living with HIV at Nkwen Baptist Hospital, Cameroon

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ABSTRACT

Introduction: We aimed to assess the timeliness and effectiveness of phone-based enhanced adherence counselling (EAC) sessions among people living with HIV with high viral load compared to in-person sessions.

Method: This was a hospital-based retrospective cohort study conducted among 2 groups of randomly selected people living with HIV on ART having a high viral load (>1000 copies/ml) from October 2020 to September 2022. One group of participants included 100 participants who had received ≥1 EAC session by phone and the second group involved 100 participants that had received 3 EAC sessions physically. Proportions of viral re-suppression and average time to enrollment and completion were computed and using logistic regression predictors of re-suppression were identified using SPPS version 24.0.

Result: Participants that received EAC phone sessions had 69% viral re-suppression and 67% re-suppression was achieved for patients that received 3 EAC sessions in-person. Mean time to enrollment for participants that received phone EAC sessions was about 10 days and 23 days for participants, that received only in-person EAC sessions. Average time to EAC completion for participants received phone EAC sessions was 119 days whereas average time to EAC completion for in-person sessions was 130 days. Participants on first line ART regimen were 5 times more likely to be suppressed compared with those on second line, $p \leq 0.001$, AOR=5, (95% CI:2.5, 10.6).

Conclusion: Phone-based EAC is a feasible and effective strategy to reach people far away away from health facilities and in communities where people are frequently displaced.

Keywords

HIV, Viral load suppression, Enhanced adherence counselling by phone.

Introduction

In 2021, 38.4 million people were living with HIV globally with over 70% in sub-Saharan Africa [1]. Following the guidelines in 2015 that recommended the test and treat strategy for all persons living with HIV (PLHIV) there has been a steady increase in antiretroviral therapy coverage from 40% in 2014 [2] to 75% in 2021 [1]. In 2014, the WHO adopted the 90-90-90 strategy [3] which was upgraded to the 95-95-95 targets in 2018 [4]. The 95-95-95 targets aim to have 95% of those who are HIV-infected know their HIV status, 95% of these put on ART, and 95% of those on ART virally suppressed [4]. Globally in 2021, 85% of PLHIV were aware of their HIV status and out of these, 88% were accessing treatment with 92% virally suppressed. In 2018, out of the 520000 PLHIV in Cameroon 46.9% knew their HIV status, with 91.3% on ART out of which 80% were virally suppressed [5].

Viral suppression is key to breaking the chain of transmission of HIV and monitoring people on ART is crucial to ascertain successful treatment, identify adherence challenges, and determine whether ART regimens should be switched in cases of treatment failure [6]. Although Cameroon adopted the WHO 2013 guidelines in 2013 which recommended viral load (VL) testing as the gold standard to monitor patients' responses to ART, the effective implementation only started in 2017 [7]. Initial viral load testing in PLHIV should be after 6 months of initiating ART, then at 12 months for those with an initial suppressed VL and subsequently 12 months routinely [7]. Targeted viral load testing is also recommended for PLHIV with suspected clinical or immunological failure. The result of a VL test could be suppressed (VL count less than 1000 copies/ml) or unsuppressed (greater than 1000 copies/ml) implying that HIV is not controlled by the current ART regimen [6].

Prolonged undetected HVL levels have been associated with increased risk of clinical progression to acquired immune deficiency syndrome (AIDS) and mortality [8]. Because poor adherence has been observed to be the most frequent cause of treatment, failure [9], the WHO recommends enhanced adherence counselling (EAC) sessions for 3-6 months for PLHIV with unsuppressed VL prior to diagnosing treatment failure. EAC is a continual and repeated process that involves an assessment of the current level of adherence, exploring the specific barriers the patient must overcome, and assisting the patient to develop a targeted interventional plan, which improves adherence and potentially improves viral suppression [10]. Repeat VL testing is recommended by the WHO for all PLHIV who complete 3 consecutive EAC sessions with good adherence for 3-6 months in the absence of any opportunistic infection [7]. WHO estimates that about 70% of patients with initial unsuppressed VL achieve viral suppression after 3-6 EAC sessions [11]. However in sub-Saharan Africa VL suppression rates from various studies have been observed ranging from 23%-74% across different countries [12-15]. Although the recommended time to complete 3 EAC sessions is 90 days, two studies in Uganda and Zimbabwe found that only 37% and 47% of enrolled clients completed 3 sessions within the recommended period suggesting that there are significant gaps in the timeliness of implementation [13,16].

In Cameroon the prevalence of HIV among adults aged 15-64 years is estimated at 3.7% and according to the CAMPHIA survey in 2018, 80% of PLHIV accessing ART in Cameroon were virally suppressed implying that 20% needed EAC and repeat VL testing after 3-6 months [5]. The effectiveness of behavioral interventions such as EAC can vary from one context to another [17] and the implementation of this intervention is potentially even more challenging in settings that are experiencing conflict as well as pandemics such as covid-19 that restrict in-person contact between patients and health service providers.

Since 2017 across the North West and South West regions of Cameroon access to comprehensive package of health services is often challenging due to the sociopolitical crisis. This became acute with the advent of the covid-19 pandemic in 2020 that further disrupted the seamless provision of health services especially with the need for limited contact with patients. In this context differentiated service delivery models EAC had often been provided in-person. Nkwen Baptist Hospital, which has one of the largest HIV treatment, centers in the North West region of Cameroon is one of the facilities most affected with the limitation to provide in-person EAC to its patients. In order to offer patient centered services, the facility adapted service delivery for patients with high viral load by offering EAC sessions physically for patients that were able to make it to the facility and by phone for patients who could not make it to the facility. The national standardized script for EAC was used to offer the service in both cases by trained case managers that were routinely offering counselling services to patients and tracking them through reminder phone calls as part of activities for patient retention in care.

To our knowledge no research has been found in Cameroon that assesses the effectiveness of phone-based EAC. Therefore, context specific evaluations are needed to improve and enhance the effectiveness of this intervention. We sought to assess the effectiveness of phone-based EAC at Nkwen Baptist Hospital with specific objectives including: To determine and compare timeliness of enrollment and completion of EAC sessions among clients with high viral load who received at least one of 3 consecutive EAC sessions by phone and clients who received 3 consecutive EAC sessions in-person. Furthermore we compared viral suppression rates among patients with high viral load who received at least one EAC session via phone and clients who received 3 consecutive EAC sessions in-person.

Methods

Study Setting

Nkwen Baptist Hospital is situated at the heart of the cosmopolitan city of Bamenda the capital of the North West region of Cameroon and has one of the largest pioneer HIV treatment centers in the region that started since 2001. The treatment center has over 4400 patients enrolled on ART and started offering routine viral load follow up services for clients since 2017 according to the national

guidelines.

Study Design and Period

This was a hospital-based retrospective cohort study that considered the period from October 2020 to September 2022.

Study Participants

This study involved the use of the files of HIV positive adults enrolled on ART at Nkwen Baptist Hospital with a first time viral load greater than 1000 copies/ml and who had at least one repeat viral load after completion of EAC between October 2020 and September 2022.

Inclusion Criteria

The files of all PLHIV enrolled on first or second line anti-retroviral therapy, above 21 years, who had been on treatment for ≥6 months, with documented initial viral load greater than 1000 copies/ml. They also needed to have been enrolled on EAC with at least one repeat viral load after completion of EAC.

Exclusion Criteria

All PLHIV with an initial HVL that died, became lost to follow up, or were transferred out in the course of EAC.

Sampling

The ART codes of all patients that met the inclusion criteria were downloaded from the data manager (DAMA) into an excel sheet and simple random sampling using excel was used to select the files of participants for each study group.

Sample Size Calculation

The required minimum sample size was calculated using the formula for calculation of sample size for comparing two proportions with the following assumptions [18]:

- 95%CI
- 80% power
- Proportion of PLHIV with suppressed viral load after completion of in-person EAC from previous studies [11]=70%% (P_1)
- Proportion of PLHIV with suppressed viral after completion of EAC via phone (P_2), previously unknown estimate [19] =50%

$$N \text{ (each group)} = \frac{(z_{\alpha/2}+z_{\beta})^2 x\ p_1(1-p_1)+p_2(1-p_2)}{(p_1-p_2)^2}$$

Where α (type 1 error) = 0.05, critical value=1.96

β (type 2 error) = 0.02, critical value=0.84

$$N = \frac{(1.96+0.84)x\ 0.7(1-0.7)+0.5(1-0.5)}{(0.7-0.5)^2}$$

N=90

By adding 10% for incomplete data, the final sample size reached 100 for each arm of the study.

Technique and Instrument for Data Collection

Data was collected using a pre-tested data collection forms. Information was collected from:

- DAMA
- Patients files
- Viral load register
- HVL register

Using DAMA and according to the national guidelines the list of clients eligible for viral load testing was extracted Information on when the HVL results were received in the facility were obtained from the viral load register whereas dates of enrollment on EAC were extracted from the high viral load register. DAMA was also used to get information on completion and timing of all 3 EAC sessions, repeat VL testing and suppression status among patients.

Using patient files the data collection form was used to collect information on specific patient socio-demographic and clinical characteristics (age, sex, marital status, occupation, level of education, disclosure status, stage of disease at enrollment, BMI, disclosure status, ART regimen, duration on treatment, and comorbidities. Pretesting of the data collection form was done using several files to make sure that all the information requested on the form was available from the chosen sources. All ambiguous questions were modified to ensure that all requested information was available in the respective source documents.

Data management and analysis

Data from the forms was entered into SPSS version 24.0. Measures of central tendency (means, proportions) were used to describe the quantitative variables or characteristics of patients. Chi Square test was used to evaluate the relationship between the dependent variable (viral suppression) and each of the independent variables (age, sex, marital status, level of education, occupation, disclosure status, baseline clinical staging, presence of comorbidity, BMI, ART regimen, duration on ART) with 95%CI. Logistic regression was used in multivariate to determine the effects of independent variables found to be significantly associated with viral suppression in bivariate analysis. A p-value < 0.05 was considered statistically significant.

Ethical considerations

Ethical clearance was obtained from the institutional review board of the Cameroon Baptist Convention Health Board (IRB study number: 2023-51). Protection of patients' personal information was ensured by the using only ART codes for data collection. All data collection forms were stored in a locked cupboard and information in electronic form was pass-worded. All data collected was kept confidential and only the study investigators had access to the patients' data.

Results

Baseline Characteristics of Study Participants.

A total of 200 participants were included in the study, of whom 118 (59%) were female. The mean age of study participants was 45 years. Majority 93 (46.5%)) participants were married, and 98 (49%) participants had completed the primary educational level. At baseline, most of the participants were staged WHO clinical stage 1 (60.5%), and 78% of participants were on first line ART. From all participants, 169 (84.5%) had disclosed their HIV status to a significant other and 51% were farmers (Table 1).

Table 1: Sociodemographic and clinical characteristics of high viral load HIV seropositive people from October 2020 to September 2022, Nkwen Baptist Hospital, Cameroon.

	Category	Frequency	Percentage (%)
Gender	Female	118	(59.0%)
	Male	82	(41.0%)
Age	21-30	13	(6.5%)
	31-40	49	(24.5%)
	41-50	62	(31.5%)
	>50	76	(38.0%)
Marital Status	Currently Married	93	(46.5%)
	Never Married	66	(33.0%)
	Divorced/ Separated	14	(7.0%)
	Widowed	27	(13.5%)
Occupation	Trader	53	(26.5%)
	Farmer	102	(26.5%)
	Technician	23	(11.5%)
	Teacher	11	(5.5%)
	Retired	11	(5.5%)
Level of Education	Primary	98	(49.0%)
	Secondary	84	(42.0%)
	Post-secondary	18	(9.0)
Disclosed to Confidant	Yes	169	(84.5%)
	No	31	(15.5%)
BMI	<18.5	7	(15.5%)
	18.5-24.9	91	(45.5%)
	25-29.5	59	(29.5%)
	>30	43	(21.5%)
Presence of comorbidity	Yes	9	(4.5%)
	No	191	(95.5%)
Clinical Stage	I	121	(60.5%)
	II	39	(19.5%)
	III	38	(19.0%)
	IV	2	(1.0%)
Line of ART Regimen	First Line	156	(78.0%)
	Second Line	44	(74.5%)
Type of Regimen	DTG-Based Regimen	149	(74.5%)
	EFV-Based Regimen	18	(9.0%)
	ATV/r-Based Regimen	33	(16.5%)
Duration on ART	≤ 12 Months	48	(24.0%)
	> 12 Months	152	(76.0%)
EAC Modality	Phone	100	(50.0%)
	In-Person	100	(50.0%)
Repeat Viral Load result	Suppressed	136	(68.0%)
	Unsuppressed	64	(32.0%)

Proportion of Viral Load Suppression after EAC

From a total of 200 participants, 136 (68%) had viral load suppression after enhanced adherence counseling. Out of 100 participants that received ≥1 EAC session by phone 69% had suppressed viral load and out of the 100 participants that received all 3 EAC sessions in-person 67% had suppressed viral load. From all viral load suppressed participants, 62.5% were female and 46.3% were married. Majority (47%) of viral load suppressed participants had primary educational status, and approximately 74.5% of participants with suppressed viral load were on Dolutegravir (DTG) based ART regimen. About 80% of viral load suppressed patients had disclosed their HIV status to a significant other and 54% were farmers (Table1).

Factors Associated with Viral Load Suppression

On bivariate analysis using Chi square ART line and type of ART regimen were found to have statistically significant relationships with viral suppression (Table 2). However, on multivariate analysis using logistic regression only ART line had a statistically significant effect on viral suppression, p≤0.001, AOR=1.4. Participants on first line ART regimen were 5 times more likely to be suppressed compared with those on second line, p≤0.001, AOR=5, (95% CI:2.5, 10.6).

Table 2: Results showing relationship between baseline characteristics and viral load re-suppression among study participants.

Variables		Repeat Viral Load		
	Values	Suppressed (n=136) (%)	Unsuppressed (n=64) (%)	*P* value
Gender	Female	85 (42.5)	33 (16.5)	0.142
	Male	51 (25.5)	31 (15.5)	
Age	21-30	8 (4.0)	5 (2.5)	0.109
	31-40	27 (13.5)	22 (11.0)	
	41-50	47 (23.5)	15 (7.5)	
	>50	54 (27.0)	22 (11.0)	
Marital Status	Currently Married	65 (31.5)	30(15.0)	0.977
	Never Married	44 (22.0)	22 (11.0)	
	Divorced/ Separated	10 (5.0)	4 (2.0)	
	Widowed	19 (9.5)	8 (4.0)	
Occupation	Trader	35 (17.5)	18 (9.0)	0.232
	Farmer	74 (37.0)	28 (14.0)	
	Technician	12 (6.0)	11 (5.5)	
	Teacher	6 (3.0)	5 (2.5)	
	Retired	9 (4.5)	2 (1.0)	
Level of Education	Primary	64 (32.0)	34 (17.0)	0.462
	Secondary	61 (30.5)	23 (11.5)	
	Post-secondary	11 (5.5)	7 (3.5)	
Disclosed	Yes	112 (56.0)	57 (28.5)	0.221
	No	24 (12.0)	7 (3.5)	
BMI	<18.5	5 (2.5)	2 (1.0)	0.967
	18.5-24.9	62 (31.0)	29 (14.5)	
	25-29.5	41 (20.5)	18 (9.0)	
	>30	28 (14.0)	15 (7.5)	

Presence of comorbidity	Yes	6 (3.00)	3 (1.5)	0.930
	No	130 (65.0)	61 (30.5)	
Clinical Stage	I	87 (43.5)	34 (17.0)	0.115
	II	27 (13.5)	12 (6.0)	
	III	20 (10.0)	18 (9.0)	
	IV	2 (1.0)	0 (0.0)	
Line of ART Regimen	First Line	119 (59.5)	37 (18.5)	<0.001
	Second Line	17 (8.5)	27 (13.5)	
Type of Regimen	DTG-Based Regimen	111 (55.5)	38 (19.0)	<0.001
	EFV-Based Regimen	15 (7.5)	3 (1.5)	
	ATV/r-Based Regimen	10 (5.0)	23 (11.5)	
Duration on ART	≤12 Months	31 (15.5)	17 (8.5)	0.561
	> 12 Months	105 (52.5)	47 (23.5)	
EAC Modality	Phone	69 (34.5)	31 (15.5)	0.762
	In-Person	67 (33.5)	33 (16.5)	

Mean Time to the Start of EAC Session after High Viral Load Detected

The average time to enrollment for all participants was 16 days and the average time to EAC completion for all participants was 124 days (Table 3). The mean time to enrollment for participants that received ≥1 EAC session by phone was about 10 days and the mean time to enrollment for participants that received all 3 EAC sessions physically was 23 days (Table 3). In addition, the average time to EAC completion for participants who received ≥1 EAC session by phone was 119 days whereas average time to EAC completion for those that received 3 EAC sessions physically was 130 days (Table 3).

Table 3: Average time to enrollment on EAC and average time to completion of EAC for participants that had ≥1 EAC session by phone and all 3 EAC sessions in-person.

EAC MODALITY		Time to EAC enrollment	Time to EAC completion
≥1 session by phone	Mean	**10.03**	**119.01**
	N	100	100
	Std. Deviation	14.764	32.173
In-person	Mean	**22.79**	**130.31**
	N	100	100
	Std. Deviation	62.407	50.959
Total	Mean	**16.41**	**124.66**
	N	200	200
	Std. Deviation	45.683	42.883

Discussion

This is probably the first study in Cameroon that has assessed the outcome of the EAC program on HIV seropositive people with high viral load count comparing suppression outcomes among those offered EAC by phone and patients who received EAC sessions in-person exclusively. Our findings suggest that the overall viral load suppression after enhanced adherence counseling sessions was 68%. This re-suppression rate is similar to the WHO target (70%) [11]. But it is much higher than the viral suppression rates reported in Zimbabwe and Uganda [12,13]. Most importantly, the current finding supports WHO recommendations that suspected virologic failure (viral load count>1,000 copies/μl at the first test) should be addressed by enhanced adherence counseling as well as repeat measurement before consideration of treatment switch to a second-line drug [20] Additionally our findings showed that viral re-suppression among patients who received ≥1 EAC session was 69% and among patients that received all 3 EAC sessions physically was 67%. Though current literature on this subject is seemingly very limited, our observations are consistent with findings recently reported in Nigeria where viral re-suppression rates of 90.5% and 86.5% were observed among key populations following EAC by phone and in-person respectively [21]. In a recent meta-analysis, telehealth-assisted interventions were found to significantly improve ART adherence and treatment outcomes among PLHIV [22]. More importantly, our findings suggest that EAC via phone is a feasible and effective approach that could complement the in-person approach for patients that have challenges having access to health facilities.

We also observed that participants on first line ART regimen were 5 times more likely to achieve re-suppression following EAC compared to those on second line ART. In Cameroon, current first line ART regimen consists of a combination of three ARV drugs including two Nucleoside Reverse Transcriptase inhibitors as backbone and an Integrase inhibitor or a non-Nucleoside Transcriptase. Also standard second-line antiretroviral therapy consists of a combination of a combination of three ARV drugs (at least two of which are new to the patient); two Nucleoside Reverse Transcriptase Inhibitors (NRTIs) as a backbone; Lamivudine (3TC) and Abacavir (ABC), or Zidovudine (ZDV) or Tenofovir (TDF) and one Protease Inhibitor (PI); Lopinavir/ritonavir (LPV/r) or Atazanavir/ritonavir (ATV/r) [23]. First line regimens are often fixed dose once daily formulations whereas second line regimens often require more pills and higher frequency of administration. Various studies have reported better adherence among PLHIV on once daily regimens compared to those taking twice-daily regimens [24,25]. This could possibly explain the observed difference in the effect of first line ART on viral suppression in our study.

We observed an average time to enrollment of participants on EAC after high viral load detection of 16 days (2.3 weeks) and mean time to completion of EAC of 124 days (18 weeks). In a recent study in Ethiopia, a median time to enrollment of 8 weeks and median time to EAC completion of 17 weeks were reported [26]. This suggests relative delays in completions rates compared with the expected 12 weeks which could be the consequence of long travel distance and lack of money for travelling to health institutions for clinic follow-up visits [27,28]. The shorter duration of time to enrollment on EAC could possibly reflect better management of high viral load results in our setting. Additionally our findings showed that the mean time to enrollment and completion of EAC for PLHIV who received ≥1 EAC session by phone was relatively shorter compared to those who received all 3 EAC sessions in-person. Our observations suggest that tele EAC has the potential to mitigate

these barriers among vulnerable patients.

This is one of few studies to assess the effect of an ART adherence intervention using a comparison group. A major strength of this study is that the data were collected mainly from the patients' files, viral load register and high viral load register, which are the primary levels of documentation of the patient information in the country. The major limitation of our study is that as our study methodology involved review of records, and hence our analysis and interpretation of the data are limited to only those variables that are routinely collected from patients/care givers and captured in the patient records. Some important variables like socio-economic status of the patient, distance of patients' residence to the ART center, which could have played a major role in initial viral load testing, enrolment for EAC, repeat viral load testing and viral suppression, were not available. Since we did not measure these other variables, we are unable to account for the influence of these factors in our analysis. Besides there could have been selection bias arising from the fact that the participants with recorded second viral load could have been obtained from individuals who had regular follow-up or that patients who did not have regular follow-up/drop out patients could have been more likely to be non-suppressed.

Conclusions

In this study, 68% of all the patients had viral load suppression at 3 months or later and the only factor found to be statistically associated with viral load suppression on repeat testing at 3 or more months was the line of ART. Though viral re-suppression between the 2 arms of the study were comparable, re-suppression among patients who received ≥1 EAC session by phone was relatively higher (69%) than viral re-suppression among those who had all 3 EAC sessions in-person. Additionally average time to enrollment and average time to EAC completion among patients that had EAC sessions via phone were shorter. Our findings suggest that tele EAC is a feasible and effective strategy to reach people far away from health facilities, in areas where people are frequently displaced from home, and has the potential of scale up to improve timeliness of enrollment and completion. It could also be useful in situations where over-crowding is avoided in health facilities such as during the high waves of COVID-19.

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