Original Article

Impacts of a Pilot of Community Antiretroviral Group Initiative on HIV-Positive Patients in a Tertiary Health Facility in Abuja, North Central Nigeria

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Abstract

Background: Decentralization, as seen in community antiretroviral group (CAG), has resulted in a significant decline in deaths from AIDS-related causes with projected further benefits in middle- and low-income countries, such as Nigeria. After 2 years of CAG implementation in our facility, this study is designed to assess its impacts on the pilot-cohort of patients, (individual and group), and the hospital facility. **Materials and Methods:** Pooled data from the CAG register of the pilot cohort of 84 clients, was used for the study. Review of data at entry and 2 years after was done. A questionnaire was used to obtain additional qualitative data. This was administered to all the eighty-four pilot patients and 31 caregivers. **Results:** There were eight locations, with 84, clients, 62 females and 22 males. The mean/standard deviation of age was 39.38 ± 9.68 years. There were significant increases in weight (kg), (from 65.94 ± 11.012 to 70.69 ± 11.465, $P < 0.001$), body mass index (kg/m^2), (from 24.77 ± 3.879 to 26.79 ± 4.282 $P < 0.001$), packed cell volume (%) from (31.19 ± 5.014 to 35.64 ± 5.131, $P < 0.001$), CD4 (cells/mm^3), (from 394.36 ± 193.094 to 563.87 ± 220.137 $P < 0.001$). The viral load suppression was sustained, reducing even further, from 85.06 ± 182.329 to 31.10 ± 46.648 copies/ml, $P < 0.001$. Retention in care and outcomes were better. **Conclusions:** From this pilot, the CAG model has shown promise in reducing attrition, improving quality of care, and other direct and indirect benefits, including; cardiovascular, nutritional, and socioeconomic. This has justified the scale-up of this laudable model that will further improve the quality of care given to the patients and the overall quality profile of the facility and system.

Keywords: Abuja, antiretroviral-care, decentralization, pilot

Introduction

To mitigate the problem of low antiretroviral therapy (ART) uptake, the 2013 World Health Organization (WHO), consolidated ART guidelines, highlighted the need for decentralization of ART care as an acceptable part of a global effort to scale up ART uptake.[1] This was based on studies showing that; scale-up using this model resulted in a significant decline in deaths from AIDS-related causes.[2] In low- and-middle-income countries such as Nigeria, decentralization of HIV care was projected to help avert millions of deaths and prevent an additional three and a half million new infections between 2012 and 2025.[3] Earlier, decentralization models had facilitated significant improvement in retention in care (RIC) (since drugs were better accessible), better viral suppression, and by extension drop in rates of new transmissions and better outcomes.[4-7] The loss to follow-up at our facility was rising.

To ensure retention of HIV-positive patients in care, (RIC), at the facility, certain interventional models were piloted, adopted and deployed as differentiated models of care (DMCs), namely; community Anti-retroviral group (community antiretroviral group [CAG]), task-shifting,

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fast track, community pharmacy services, and multi-months scripting.

The CAG model, in particular, supported by the facility partner, the Institute of Human Virology, Nigeria (IHVN), was deployed in January 2017. The aims of the intervention were; to ensure or facilitate access to regular drug refills, to ensure RIC, to reduce clinic workload while ensuring good quality of life as well as top quality of care.

Studies elsewhere have reported successes achieved with the CAG model.[4,5,7] Similar studies from Nigeria that assessed the impacts of this model are sparse. Thus 2 years on, it is time to assess some impacts this intervention may have had on the pilot cohort and on the system. This study is designed to assess the impacts of the CAG model on the patients, (individual or group), and the hospital facility.

Methods

Study setting

The study was conducted at a tertiary facility in Abuja, the Federal Capital Territory (FCT), after ethical clearance, which was obtained from the Ethical and Research Committee of the Asokoro District Hospital, Abuja (Approval code FCTA/HHSS/ADH/EC/0051/18). The FCT is located in the center of Nigeria, with a current population of approximately 3.3 million inhabitants.[8] Our facility is a 154-bed tertiary health-care outfit and provides services in all major medical specialties. FCT has an adult HIV prevalence estimated at 1.5%,[9] and its center, Abuja, tops the list of expensive cities in Nigeria.[10] It is surrounded by suburbs that house most of the people working in Abuja. Those needing health-related attention, travel long distances, and through strenuous traffic hold-ups with attendant risks, to access hospital services. Our facility currently cares for about five thousand active adult people living with HIV (PLHIV).

Patient selection-eligibility criteria

This study was a follow-up on a cohort of patients who piloted the CAG interventional model in the hospital. For that cohort, eligibility criteria were; Young adults who were clinically stable, virally suppressed (defined by viral load of <20 copies/ml) on first-line regimen, no opportunistic infection (OI), not pregnant. Clients who failed to meet these criteria were excluded.

The CAG model; description and standard operating procedure.

Background information

As displayed in Table 1, there were fourteen groups in this pilot intervention. Each group had six members. The members of each group lived in the same catchment area, for proximity reasons. This arrangement was agreed to by each member before placement was made.

Figure 1 is the standard operating procedure, SOP, for the CAG intervention used in the facility. It was developed by the facility partner, the IHVN.

Awareness and sensitization about CAG and subsequent client enrolment were done by the clinic manager. This is usually during the routine health education done before the day's clinic commences. The support-group also acted as another platform for such awareness. Copies of the SOP were distributed to clients. Those who opted for CAG were screened using the eligibility criteria before they were grouped accordingly.

After enrolment, the knowledge capacity of each group member was developed during the two meetings held with all groups, to ensure synergy between individuals within each group. Clients opted for the meetings willingly; no incentives, transportation, or accommodation were provided. The SOP was explained in Pidgin-English, good English, Hausa, Yoruba, and Ibo, by the Nursing team and support counselors from the IHVN. Self-designed client, [Table 2a], and health-care providers, [Table 2b] questionnaires were completed during the second meeting after enrolment, at the commencement of CAG. A lead person was chosen for each group by the group members themselves. This lead coordinated the group activities and functioned as a spokesperson for the group.

At the facility

Figure 2 is the flow chart. On bi-monthly basis, on behalf of the group, a member visited the hospital, reported at the CAG-desk manned by the CAG anchorperson (who is an expert-client on hospital payroll). The anchor enabled the process by withdrawing/posting the ART cards of all members of that particular group to the Doctor. That member attended the health talk [Figure 3a], got nursing observation which included; anthropometric measures and blood pressure checks, received medical consultation with the Doctor, attended adherence counseling session [Figure 3b], reported on the adherence status of fellow group members, received laboratory attention as needed, and collected drugs for the entire group, Figure 3c. Group activities were monitored by the clinic manager and the CAG anchorperson.

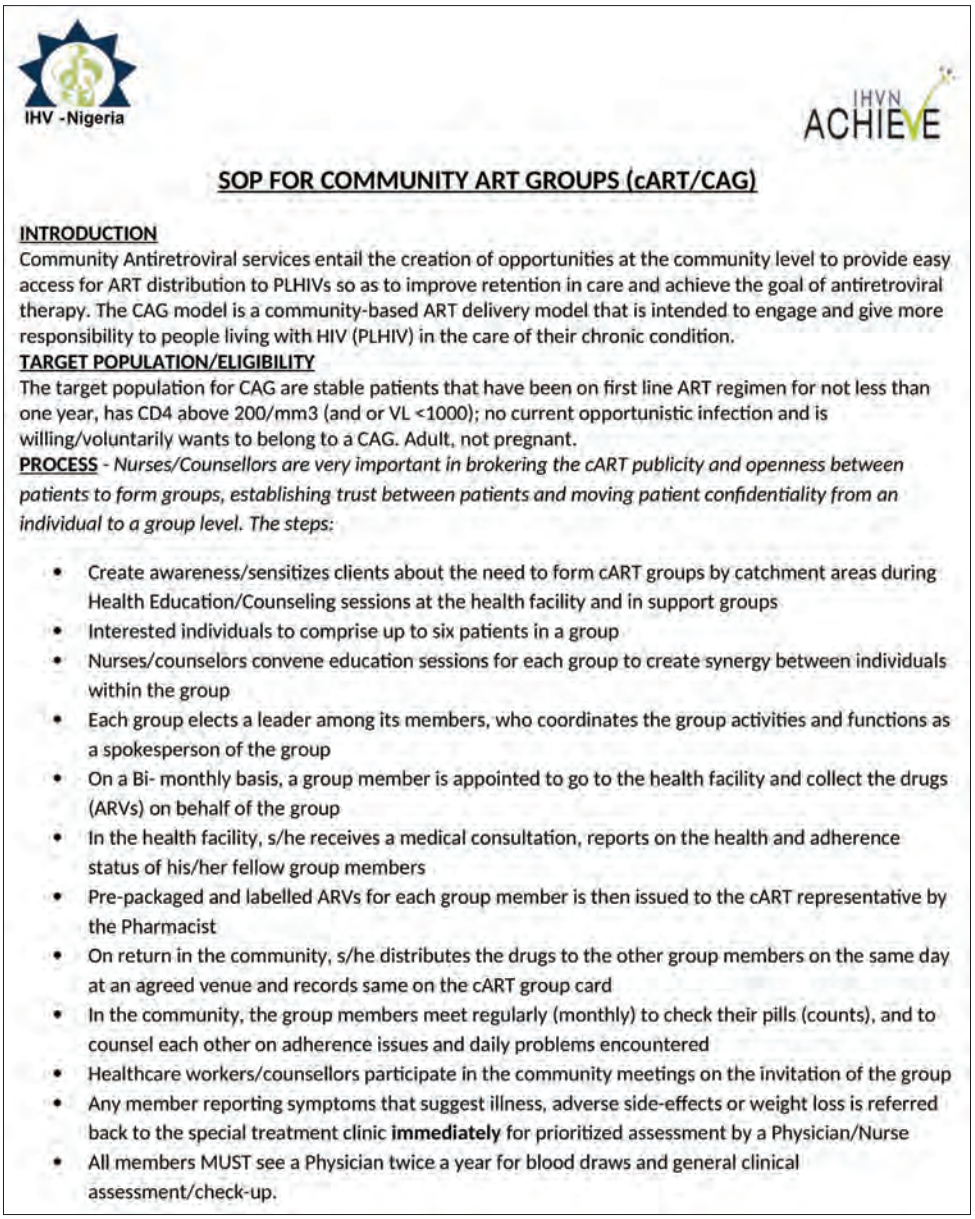
They reported to the facility coordinator of HIV services, who monitored and evaluated the quality of care and coordinated the implementation of the CAG model.

In the community

Back in the community, the member who visited the clinic that month distributed the drugs to the other group members Figure 3d. Group members met regularly to do pill counts, counsel each other on adherence issues/daily problems encountered and support each other psychologically.

Follow-up/support

The clinic manager and the CAG desk-officer participated in the community meetings on invitation by the group. Any member reporting symptoms that suggested illness, adverse drug effects, or weight loss was referred back to the facility immediately for prioritized assessment by a physician. All members saw a physician at least twice a year for a general check-up.



IHV -Nigeria

IHVN ACHIEVE

SOP FOR COMMUNITY ART GROUPS (cART/CAG)

INTRODUCTION

Community Antiretroviral services entail the creation of opportunities at the community level to provide easy access for ART distribution to PLHIVs so as to improve retention in care and achieve the goal of antiretroviral therapy. The CAG model is a community-based ART delivery model that is intended to engage and give more responsibility to people living with HIV (PLHIV) in the care of their chronic condition.

TARGET POPULATION/ELIGIBILITY

The target population for CAG are stable patients that have been on first line ART regimen for not less than one year, has CD4 above 200/mm3 (and or VL <1000); no current opportunistic infection and is willing/voluntarily wants to belong to a CAG. Adult, not pregnant.

PROCESS - *Nurses/Counsellors are very important in brokering the cART publicity and openness between patients to form groups, establishing trust between patients and moving patient confidentiality from an individual to a group level. The steps:*

- Create awareness/sensitizes clients about the need to form cART groups by catchment areas during Health Education/Counseling sessions at the health facility and in support groups
- Interested individuals to comprise up to six patients in a group
- Nurses/counselors convene education sessions for each group to create synergy between individuals within the group
- Each group elects a leader among its members, who coordinates the group activities and functions as a spokesperson of the group
- On a Bi- monthly basis, a group member is appointed to go to the health facility and collect the drugs (ARVs) on behalf of the group
- In the health facility, s/he receives a medical consultation, reports on the health and adherence status of his/her fellow group members
- Pre-packaged and labelled ARVs for each group member is then issued to the cART representative by the Pharmacist
- On return in the community, s/he distributes the drugs to the other group members on the same day at an agreed venue and records same on the cART group card
- In the community, the group members meet regularly (monthly) to check their pills (counts), and to counsel each other on adherence issues and daily problems encountered
- Healthcare workers/counsellors participate in the community meetings on the invitation of the group
- Any member reporting symptoms that suggest illness, adverse side-effects or weight loss is referred back to the special treatment clinic **immediately** for prioritized assessment by a Physician/Nurse
- All members MUST see a Physician twice a year for blood draws and general clinical assessment/check-up.

Figure 1: Standard operating procedure for community antiretroviral group

Data collection

Data, (qualitative and quantitative) was pooled from the CAG register, into Excel Spread sheet then exported to SPSS 21 (IBM, USA) for the analysis. Qualitative data were also obtained from the self-designed questionnaires for clients [Table 2a] and health-care givers [Table 2b]. The CAG register contains the enrolment data and through follow-ups of all the persons on this pilot of DMC. Such data include name, age, sex, enrolment number, the community where they live, viral load, duration on ARV prior to enrolment in CAG, the ART regimen, height, weight, body mass index (BMI), packed cell volume (PCV), CD4 count, blood pressure, and adherence rates. The questionnaires were completed during the second meeting after enrolment, at the commencement of CAG. Caregivers were; doctors, nurses, laboratory scientists, records officers, adherence counselors, and pharmacists. Data obtained at entry were then compared with similar data 2 years after, to examine the changes that may have occurred.

Return-transportation cost was obtained. The distance from patients' residences to the facility was estimated using Google map.[11]

Results

Data were analyzed using SPSS 21 (IBM USA). Means and standard deviations (SDs) were determined. A paired sample test was used to compare the means of variables before and after the CAG intervention. Chi-square test was used to check for statistical significance, and a $P < 0.05$ set as a significant level. There were eight locations with 84 clients, 62 females and 22 males, [Table 1] placed in fourteen groups, each

with six clients. The locations and number of groups (ng), in each location, are shown in Table 1. The mean age was 39.38 ± 9.68 years. The distance between each location and the facility are shown in Table 1 and ranged from 5.4 km to 17.3 km. The average distance was 12.56 km ± 3.78; with a mean return transport cost per clinic visit, per visiting client, of 996.4 ± 183.3 Naira. Per clinic, per group, one member visits, thus saving about 4980 Naira for the group. This totals about 69,720 Naira, at least, for all 14 groups. Thus in 1 year, (bi-monthly visits), at least 418,320 Naira was saved. Over the 2 years period of CAG, for this pilot group of just eighty-four clients, at least 836,640 Naira was saved. This is a reasonable sum of money that must have gone a long way in improving the lives of the clients. Table 3 shows the means and SDs of variables prior to engagement in CAG and then 2 years on in CAG. The following variables were documented; height (H), weight (WT), BMI, systolic and diastolic blood pressures, PCVs, entry CD4 counts, and entry viral loads.

Table 1: Distances between catchment areas and the hospital facility

Location	Number of Clients			Distance (km)
	Total (84)	*M (22)	†F (62)	
Kobi	6	0	6	10.7
Nyanya- 2 groups	12	3	9	17.3
Kurudu	6	1	5	08.2
Masaka- 4 groups	24	9	15	15.8
Maraba- 3 groups	18	7	11	15.8
Asokoro Extension	6	0	6	11.7
Army Barracks Jikwoyi	6	1	5	08.2
Jikwoyi-Non Barrack	6	1	5	10.4

*Males, †Females

Discussion

This appears to be the first study to report the impacts of decentralization in HIV-care in Nigeria beyond the program. Bearing the second-largest burden of HIV infection in Africa, Nigeria was observed to have only one-third of her HIV-positive patients having acceptable access to ART.[12] Hence, the adoption of some strategies such as the hub-and-spoke (HSK), approach in an attempt to meet her treatment targets.[6] Even though the HSK approach (which involved scaling care to lower levels), helped in decongesting crowded clinics, outcomes were not particularly good.[6,13] This was thought to be due to the premature enrolment of patients, independently by the peripheral facility, irrespective of clinical status.[6] Being a key strategy for treatment expansion,[6,14] decentralization needed a review of its approach. The CAG, a drug delivery model that leverages on lessons learned from

Table 2: (a) Questionnaire for clients. (b) Questionnaire for caregivers

Questions	Yes	No	Not sure
Do you think this intervention model has helped to reduce Patients cost of transportation to and fro clinic?	(100%)	0 (0%)	0 (0%)
Do you think this intervention model has helped you gain valuable time?	84 (100%)	0 (0%)	0 (0%)
Do you think this intervention model may have improved your income since they had more time for their private businesses and concerns?	84 (100%)	0(0%)	0(0%)
Do you think this model may have helped to improve Your Wellbeing and mutual peer support?	81 (96.4%)	0(0%)	3(3.6%)
As a Client, from your observation, has this intervention reduced your clinic waiting time?	84 (100%)	0(0%)	0(0%)
	‡ERIC	§DRIC	No influence
How do you think this intervention may have influenced retention in care?	80(95.2%)	2(2.4%)	2(2.4%)
	GOOD	POOR	No Influence
How do you think this intervention may have affected Quality of care?	81(96.4%)	1(1.2%)	2(2.4%)
Any Mutual exchange of psychosocial support?	84(100%)	0(0%)	0(0%)

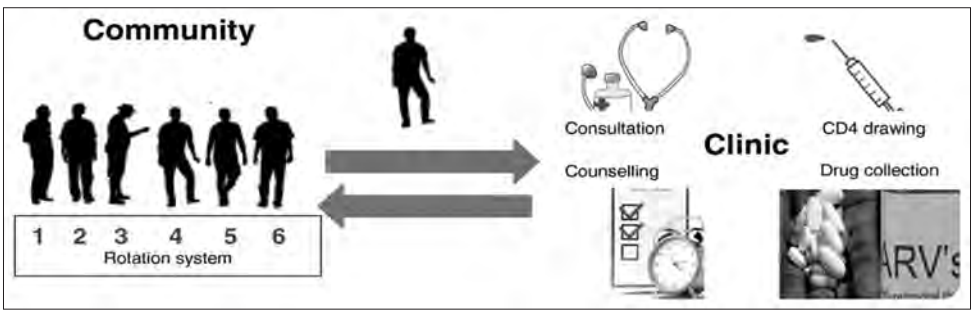


Figure 2: Flow chart

Table 3: Comparison of means before and after CAG

Variables	Mean + SD BCAG‖	Mean + SD ACAG¶	Difference in Mean + SD	95% Confidence interval	*t*	DOF	*P*
Weight(kg)	65.94+11.012	70.69+11.465	4.750+5.594	5.964 L 3.536 U	7.782	83	<0.001
**BMI (kg/m^2)	24.77+3.879	26.79+4.282	2.012+2.402	2.533 L 1.491 U	7.676	83	<0.001
PCV (%)	31.19+5.014	35.64+5.131	4.452+3.345	5.178 L 3.726 U	12.199	83	<0.001
CD4 (cells/mm^3)	394.36+193.094	563.87+220.137	169.512+186.017	209.880 L 129.144 U	8.352	83	<0.001
††VL (copies/ml)	85.06 +182.329	31.10 +46.648	-53.964 +174.453	-16.10L -91.823U	- 62.835	83	<0.001
SBP (mmHg)	124.51+20.984	111.15+18.935	-13.357+15.624	-9.967 L -16.748 U	-7.835	83	<0.001
DBP(mmHg)	74.76+13.288	67.52+12.646	-7.238+15.103	-3.961 L -10.516 U	-4.393	83	<0.001

Comparison of Means before and after CAG and significance. ‖=before CAG, ¶=after CAG, **=Body mass index, L =lower, U=upper, PCV=packed cell volume, SBP=systolic blood pressure, DBP=Diastolic blood pressure, ††=Viral load

Figure 3: (a) Health talk. (b) Adherence counseling. (c) ART pharmacy. (d) Group leader disturbing drugs

community-based management of chronic diseases,[14,15] was then a choice model for Nigeria. It borrowed a leaf from a Malawi pilot,[4] where chosen stable patients were decentralized. Hence, the inclusion criteria motioned above. The CAG model was piloted in our facility, from January 2017 aimed at facilitating access to regular drug refills, RIC, reduction in clinic workload while ensuring top quality of care, and more. The benefits of CAG and its impacts may be visualized in two folds; (A) on the patients and group (B) on the hospital facility and system.

Impacts on the patients and group

Virologic and immunologic impacts

Success in HIV-treatment is indicated by the sufficiently reconstituted immune system to levels where opportunistic infections (OIs), become less common and may not threaten patient's survival and quality of life. Achieving and maintaining a suppressed viral load, and an adequate level of CD4 counts, are vital as many OIs are prevented at higher CD4 counts.[16,17] Viral load test remains the gold standard for assessing ART response and early detection of treatment failure.[17,18] Thus, the ability to maximally suppress viral loads to undetectable levels is a key outcome in ART programs.[17,18] Variations in the rates of virologic response to treatment and care have been reported from settings similar to ours, with the majority reporting similar margins of suppression as ours.[16-19] Although our patients were enrolled with a mean baseline viral load that was suppressed, mean/SD of 85.1 ± 182.39, as shown in Table 3, their viral load remained suppressed, 2 years after, with a further and significant reduction, (mean/SD, 31.10 ± 46.648). A similar pattern was observed in the CD4 values, representing a sustained and impressive immunologic response to ART. Similar margins of immunologic response to ART, as depicted by CD4, have been reported by previous studies from Africa,[6,20-22] with even slightly higher increases seen in our study. Since the CAG model involves scale-out to the communities, with a potentially higher burden of OIs, the use of prophylactic agents, particularly cotrimoxazole, may help to further improve immune function and sustain the benefits of ART. These virologic and immunologic benefits partly reflect good adherence.

Improved drug adherence

Successful population-level ART adherence will be necessary to realize both the clinical and prevention benefits of antiretroviral scale-up.[23] For chronic disease treatment programs such as with HIV to succeed, long-term drug adherence has to be ensured. Poor or suboptimal adherence has been reported to be largely responsible for treatment failure in Africa.[6] Our study showed a sustained increase in adherence from 87.55% at entry, to 100% 2 years after, $P < 0.05$, Table 2. This was made possible by the sustained and assured drug availability, corroborating experience from previous studies.[24-26]

Socioeconomic benefits

The patients saved time and money. Before CAG, patients

traveled a minimum of 25.12 km to-and-fro the clinic monthly spending and wasting hours on the way in tight traffic with potential risks. The routes taken by most of the patients, as shown in Table 1, experience heavy traffic on daily basis. The mean cost of this journey per clinic day was 996.4 naira, excluding other indirect/hidden costs. This money and time were saved over most of this 2 years period. The response from the patients, Table 2a, and caregivers, Table 2b, to the questions 1, 2 and 3 respectively, *"do you think this intervention have helped to reduce transport cost for patients to-and-fro the clinic?", "do you think this intervention model has helped patients gain valuable time?" and ''do you think this intervention model may have improved patient's income since they had more time for their private businesses and concerns?'* was impressively affirmative. Their purchasing power also improved as they used saved money to cater for some other needs. The patients were also happier, as all patients responded in affirmation to questions 1and 4 *"has the intervention helped save more time for them and reduce their cost of transportation to and fro clinic" and "do you think this model may have helped to improve patients' wellbeing ?,* with mutual peer support. Some of the patients did not have means of direct income; they worried on how to reach the hospital, and depended on their relatives, who now spend less on their transport to and fro the clinic. ART supply, compliance and proper motivation were guaranteed. These favored good outcomes,[24-26] and of course, better nutrition among others. All the health care workers and patients agreed that the model is helping to improve the quality of care.

Nutrition improvement

Nutritional status is obviously a major determinant of the outcome not only in pediatrics but also in adult HIV treatment and care.[27] HIV infection increases basal energy requirements several folds, and more in cases with OIs, and malabsorption.[28] Furthermore, anorexia, which is common among HIV patients, is a cause of weight loss.[29]

These potential changes in nutritional status may affect PCV,[30] (nutritional anemia), alongside patients' weight and weight changes,[7,31] which may thus be used as indirect measures of nutritional status.[7] There were significant increases in ($P < 0.001$) in PCV, weight and BMI, Table 3, with a possible increase in metabolic risk as depicted by the high mean BMI 26.79 ± 4.282 kb/m^2.

This positive nutritional impact may be explained by the fact that these patients who now had a better understanding of the disease and were better motivated by the group membership had better nutrition, good drug compliance, and negligible rates of secondary infections. During the 2 years period, none of the patients, as followed, had a major illness, hospital admission, or died. The BMI trend, which shows increasing metabolic risk, calls for lifestyle education, and this should be done early.

Cardio-metabolic impacts

Cardiovascular disease (CVD) risk factors, such as hypertension, are common in the HIV population as well and may predispose them to related complications.[32] Our study used hypertension, height, weight, and BMI as cardio-metabolic risk assessment tools.[7,31] The CAG model showed some cardio-metabolic impacts on the patients with a significant reduction in blood pressure, inferring reduced CVD risk profile[33] and improved anthropometric measures, as shown in Table 3. Aside from the blood pressure reduction, the patients gained weight with a significant increase in BMI. As previously noted, studies now show that PLHIV experience a disproportionate amount of noncommunicable disease burden, partly due to the high prevalence of traditional risk factors among them[32] and increased life-expectancy. No wonder atherosclerotic cardiovascular-disease is a leading cause of non-HIV-related death among ART-experienced PLHIV.[34-36]

Thus increase in mean BMI above the accepted healthy limits[37] in this study is a wake-up call for early lifestyle intervention for ART-treated PLHIV, especially those with good drug compliance.

Overall impact on quality of care and the facility

This is obviously a major impact following the significant reduction in the group mean viral load, a significant increase in CD4 counts, improved RIC among others. None of the patients dropped out of care, had treatment failure, died, or needed emergency review by the physician during the review period. Adherence to drugs was impressive as it improved even more. The mean adherence at entry and after 2 years was 87.55% and 100% respectively, ($P < 0.001$). Interestingly, these impacts on individuals rubbed off on the groups. From the questionnaire, most of the patients believed that the intervention had increased their quality of life. Table 2 showed that group members received and exchanged valuable mutual psychosocial support, and particularly, advised each other on adherence issues. This may have resulted in better disease knowledge, drug compliance, better nutrition, all impacting on and yielding an impressive adherence. Such group-membership as depicted in CAG, and seen as a family, has been shown to enable patients to realize that they are not the only ones living with HIV and needing treatment, thus creating strong bond and network between the members.[38-43]

On the hospital facility and system; overall, the CAG model was perceived as contributing to improved health outcomes. Both the patients and caregivers reported better retention on ART with no patients lost to follow-up and/or died. The CAG model has also impacted on the knowledge, attitude and practice of caregivers and clients. Earlier, Rasschaert *et al*.[14] reported that, in the CAG model, group members assume some other informal health-care responsibilities in both the clinic and community. Such responsibilities include; education and motivation of peers as well as tracing of other HIV-patients who were lost to follow-up.[14] Other roles as seen in our setting, were; identification of ill people and even sensitization of people in the community to go for HIV testing. Patients in our facility carry out these roles passively, and such action

may have contributed to the increased uptake of health-care services, including HIV testing and care in our facility.

Many HIV-positive patients are employed to work in our hospital, acting as a veritable support to the system. This is because, as coordinator, I have observed that, the more patients were involved in the health-care service system, the better the trust and communication. Recall that the CAG desk-officer is an expert client. There is better communication within patients' groups and between patients and care-givers. Some of our patients proffer advice on some hospital health-related policies. Workload at the clinic is reducing and will be felt more when the CAG model is scaled up, freeing up more time to attend to complicated cases.

The main limitation of the study was the seemingly small sample size. Despite the small size, (which was the number we had for the CAG pilot), it has obviously revealed some usefulness of this model, thus justifying the on-going scale up in our facility.

Conclusions

The CAG model has shown promise in improving attrition, quality of care, with many direct and indirect benefits including cardiovascular, nutritional, and socioeconomic. This has justified the scale-up of this laudable model that will further improve the quality of care and overall quality profile of our facility.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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