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RESEARCH ARTICLE

Bottlenecks and opportunities towards achieving the targeted 95-95-95 HIV services in a rural district in Eastern Uganda

[version 1; peer review: 1 not approved]

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Abstract

Background: Uganda has made progress in reducing its HIV prevalence from 7.3% in 2011 to 6% in 2017, however, more needs to be done to meet the World Health Organization (WHO) target of 95% of the population knowing their HIV status, 95% enrolled on treatment and 95% achieving viral suppression. This study aimed to assess the bottlenecks and opportunities towards achieving the 95 95 95 targeted HIV services in the Bukedea district.

Methods: A mixed-methods cross-sectional study was conducted in the Bukedea district covering males and females aged 18-65 years who had consented to participate in the study. We used a purposive sampling procedure to select our study participants. Qualitative data was collected through focus group discussions, key informant interviews, and document reviews for quantitative data. Quantitative data were analyzed using STATA v 14 whereas qualitative data were analyzed using the thematic analysis approach.

Results: The challenges were grouped as patient-related, medication-related, and facility-related. The patient-related challenges were stigma, fear of taking the medication, poor nutrition, long distances, alcoholism, busy working schedules, and domestic violence. The medication-related challenges were side effects and pill burden. The facility-related challenges were inadequate pretest counseling and stock-outs. The use of anti-retroviral drugs (ART) was common in piggery and poultry and the sources of these drugs were reported to be the people on ART and the health workers.

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The opportunities included home-based counseling, organizing more outreaches, counseling and health education, targeted testing, and strengthening the Village Health Teams (VHT) networks.
Conclusions: The study revealed that the major challenges towards achieving the targeted 95-95-95 HIV services were stigma, inadequate pre-test counseling, fear of disclosure, and poor adherence due to alcoholism, sharing of drugs with animals and partners. The use of anti-retroviral drugs in animal husbandry was common in the Bukedea District.

Keywords
enrolment to care, HIV testing, Viral load suppression, HIV infection, HAART, expert clients, HIV care, Adherence to HIV treatment.



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Introduction

There was a global decline in the number of new HIV infections from 3.4 million in 2001 to 2.3 million, indicating a 33% decline which has brought new hope in the fight against HIV/AIDS.[1] The reductions in new HIV infection has been greatly observed among newborns, decreasing from 530,000 to 260,000 in 2000 and 2013 respectively due to national and global efforts invested in prevention of mother-to-child transmission (PMTCT) programs.[1] Even with this progress, the number of HIV cases is steadily increasing with sub-Saharan Africa being the greatly affected region.[2] Despite the high prevalence of HIV/AIDS in Africa, the Highly Active Anti-retroviral Therapy (HAART) coverage is still low.[2] In Africa, an estimated 66% of eligible people living with HIV were not receiving HAART in 2013,[3] only 45% of adults living with HIV were reported to know their HIV status, 86% of diagnosed persons were initiated on HAART, and an estimated 76% of persons on ART had achieved HIV viral load suppression in 2013.[4] The Uganda Population-based HIV Impact Assessment (UPHIA) results revealed that the country has made significant progress in reducing the HIV prevalence from 7.3% in 2011 to 6% in 2017. There are 1.3 million people living with HIV in Uganda of which 73% know their HIV-positive status, 67% are on HAART, and 60% have achieved viral suppression.[5] The World Health Organization set an ambitious 90-90-90 target[6] which has now been upgraded to the 95, 95, 95 target; meaning 95% of the people living with HIV should know their status, 95% of diagnosed people should be enrolled into care, and 95% of those on ART achieve viral load suppression. In response, the Uganda Ministry of Health also set a 95, 95, 95 target. The progress of Uganda towards these targets is still worryingly low. Cases of low testing, poor adherence, and poor viral load suppression were common in Bukedea district. Our study assessed the bottlenecks and opportunities towards the targeted 95, 95, 95 HIV services in the Bukedea district.

Methods

Study design

A cross-sectional study was conducted between June 2020 and May 2021 in the Bukedea district using mixed methods. The study involved reviewing the existing data from the district information system and in-depth interviews. The study population comprised of people living with HIV, the health care workers involved in HIV care and treatment and the members of the community of Bukedea District. The document review was conducted to collect the summary information on trends in HIV testing, enrolment to care and viral load suppression. In the health facility, the health care workers who were directly involved in the care and treatment of HIV were purposively selected for the key informant interviews using an exploratory qualitative research design. Semi structured face-to-face interviews with the key informants were used to collect the data. The members of the Village health team were involved in a focus group discussion and also guided the selection of the members of the community to be involved in the focus group discussions. Semi structured face-to-face interviews were used to collect the data during the focus groups.

Study area and setting

The Bukedea district is in Eastern Uganda, and is mainly inhabited by the Iteso tribe. It has a population of 203,600 people according to 2014 Census data, of which 98,684 (48.5%) are males and 104,916 (51.5%) are females, 74,533 are aged 0-9 years, 53,164 between 10-19 years, 45,151 between 20-39 years, 20,367 between 40-59 and 10,385 60 and above years. The biggest population are those under 20 years of age. 96.7% of the population stays in rural areas and 3.3% in urban areas according to the National Population and Housing Census.[7]

The study was conducted in two settings. The first was health facilities in Bukedea district and the second was the communities around the health facilities.

Sampling

We reviewed existing information on HIV testing, enrolment to care and viral suppression from the HIV registers for Bukedea Health Center IV and also analyzed information on the Bukedea district dashboard to draw the general picture of the district's performance towards achieving the 95-95-95 WHO target.

Purposive sampling was used to select the key informant interview participants. The participants were selected based on the knowledge they had about the uptake of HIV services at Bukedea Health center IV and the district as a whole. Members of the village health team (VHTs), local leaders, and health care providers were selected to participate in this study. The participants were approached face to face with the guidance of the member of the Village Health teams. The sample size for the focus group discussions and the key informant interviews was determined by saturation, where the number was obtained after reaching a point where no new information was being gathered.

Males and females aged 15-65 years were selected for the study. The participants below 18 years were included in this study because they make a sizable population of individuals living with HIV and some of them were non adherent. The participants below 18 years provided ascent and their parents/guardians provided consent. For HIV testing, both HIV

positive and negative people were selected. For HIV treatment and viral load suppression, only HIV positive people currently on ART were selected.

Data collection

The documents reviewed included the HIV testing register, enrolment to HIV care register, the viral load testing register and the district dashboard to capture the information from all the HIV care centers in Bukedea district. To assess the prevalence of HIV viral load non-suppression, we reviewed the ART register and the HIV viral load non suppressed clients' register and analyzed the Bukedea district dashboard. The information on viral load suppression, HIV testing, adherence to treatment and the participants demographic data were collected using a data abstraction tool. The data abstraction tool contained the variables of interest of the study.

Focus groups

The focus group discussions were guided by the moderator who introduced topics for discussion to the participants who were given specific codes for identification. A total of 7 focus group discussions each consisting of 6-12 participants were conducted in the communities in Bukedea district. All the focus group discussions and the key informant interviews were audio-taped and transcribed verbatim for analysis.

The focus groups discussions involved people in the same age brackets and men and women were grouped separately. The focus groups discussions were conducted with the VHTs and the community members to collect data about the bottlenecks and the opportunities towards achieving the 95-95-95 HIV service in the Bukedea district. The key questions asked during the focus group discussions in the communities included: 1. What do you think are the obstacles that hinder the uptake of HIV testing services at Bukedea Health Center IV? 2. What could be the problem for the newly diagnosed people with HIV not being enrolled into care? 3. What factors contribute to non-adherence to treatment in your community? 4. What do you think are some of the opportunities that can be used to improve the uptake of HIV services at Bukedea Health Center IV?

Key informant interviews

Semi-structured face-to-face key informant interviews were also used to collect data from the health care workers and HIV clients. Key informants were carefully selected based on the knowledge they had about the uptake of HIV services in the community. The key informants included the health workers of the health facility for example the ART in charge, the counselor, linkage facilitator, HIV viral load suppressed and non-suppressed clients in Bukedea district. The key questions asked during the key informant interviews included; 1. What could be the problem for the newly diagnosed people with HIV not being enrolled into care?, 2. What challenges do you face when providing HIV services to the people at your health facility?, 3. What factors contribute to non-adherence to treatment in among HIV patients?, 4. What do you think are some of the opportunities that can be used to improve the uptake of HIV services at Bukedea Health Center IV?

Data quality control

This was part and parcel of the research process right from data collection to data analysis. During the focus group discussion, the moderators ensured there was equal input all the participants. The separation of the focus group participants by age group and gender minimized the influence of the power dynamics on the information collected.

The tools used for the focus group discussions and key informant interviews were pre-tested before the actual data collection to ensure data quality. Member checking was also done to ensure that accurate information was collected.

Data analysis

Thematic data analysis was used. After data collection, the data was transcribed verbatim and analyzed using NVIVO v12. Two transcribers transcribed the data; the first transcriber transcribed the data and the second transcriber read the transcripts and listened to the audios to ensure the quality of transcription. Member checking was also done to ensure that there was no information loss on transcription. Two independent coders coded the data and the codes were discussed with a wider multi-disciplinary team of 12 members. After coding, all the codes and data extracts were collated for the later stages of data analysis. Themes were identified from the coded data which involved examining the codes and collated data to identify significant broader patterns of meaning. The themes were then reviewed by checking the candidate themes to ensure that a convincing story of the data was obtained and to ensure that the data was in line with the research objectives. The themes were then named and defined by a detailed analysis of each, working out the scope and focus of each theme. The final phase of data analysis involved writing the final report. The researchers then presented the findings and interpretations of the data.

Ethical considerations
Ethical clearance was sought from the Busitema University Faculty of Health Sciences Institutional Research Board, BUFHSREC02319. Confidentiality of the respondents was ensured and numbers were used for identification during the focus group discussions. Informed consent was obtained from the respondents and this was evidenced by a signature or thumbprint on the key informant guide. The participants were told that the information obtained from them would be reported in an anonymous form and published.

Results
Study participants
A total of 90 participants took part in the study. Of these, 48 were community members, 12 were VHTs, 3 were health care providers which included the ART in charge, linkage facilitator, and the counselor, 12 participants were viral load non suppressed patients and 15 were viral load suppressed patients. 7 focus group discussion sessions and 30 face-to-face key informant interviews were conducted. The full transcripts for this study can be found under *Underlying data.*[18]

A total of 24 community members that participated in the study were females and 24 were males, 32 of the community members were aged 20-65 years, 16 of them were aged between 18 and 20 years. The clients that participated in the study were those who had been enrolled in HIV care, 12 of them were HIV viral load suppressed clients and 15 were HIV viral load non-suppressed clients. 3 health care providers; the ART in charge, counselor, and linkage facilitator were interviewed. 12 VHTs participated in the focus group discussions.[8] The duration of the key informant interviews was between 11 and 30 minutes with an average time of 24 minutes whereas the focus group interviews ranged between 50 minutes and 80 minutes.

HIV testing
The bottlenecks that emerged from the focus group discussions with community members and VHTs were classified as the client-related and facility-related factors. The client-related bottlenecks included; long distances to the health facility offering HIV care services, fear of disclosing their results to partners, stigma, and busy working schedules. The facility-related bottlenecks cited by the participants were bad experiences at the facility.

Stigma was commonly cited in the focus group discussions with the adolescents in the community. The stigma was mainly due to fear of their school peers knowing they are positive and also fear of starting medication:

> *"HIV is a greatly feared disease in our community. People do not want to test for it and those who are tested and found positive refuse to be started on medication. I think the major cause of that is fear for their colleagues knowing about it and also fear to take the drugs." (FG01)*

The community members frequently mentioned that the fear of disclosing their positive HIV results to their spouses made them avoid testing for HIV. This was common among the females who feared intimidation from their husbands if they were found to be positive.

> "*Here in Kachabule, a husband badly beat up his wife because she tested positive without informing him, on informing the husband about the results, he just blamed the lady, beat her up, and chased her away. This makes the wives fear to test." (FG01)*

Some community members confessed that the busy working schedules they had, made them not turn up for testing because they work from the morning until the evening, as illustrated below.

> "*I'm a carpenter and I do my work from morning to evening to get money for survival at home. I hardly get the time to go to the health center for testing and yet the health center is even far. Any time I miss not working is money being missed.*" *(FG02)*

Some people in the community did not test because of the long distances to the health facility. When asked about community outreach programs, they said that they were not aware of any outreach programs that take place in their villages.

The Uganda health system is organized in a hierarchical manner according to the population they serve. The National Referral Hospital serves a population of 30,000,000, the Regional Referral Hospital serves 2,000,000, the General hospital serves 500,000, the Health Center IV serves 70,000, the Health Center III serves 20,000, the Health Center II serves 5,000 and the Health Center I (Village Health Team) serves 1,000.[9]

The focus group discussions cited deterrent costs which they incur when the health facilities lack gloves and other sundries. All focus group discussions cited this challenge.

> *"There is a time I went to the health center when I was suffering from malaria, they told me to buy gloves because since they had got over. From that time, I have never gone back to the facility and also not yet tested."(FG03)*

Enrollment into HIV care

The bottlenecks in enrolment to care (the second 95) were also patient-related and facility-related. The patient-related challenges were fear of disclosure to the partners, fear to take the drugs, failure to believe in the positive results. The health care providers frequently mentioned that some people who turn positive after testing refuse to get enrolled into care because of fear to disclose the information to their partners. Even the ones that start treatment often hide the drugs from their partners. Moreover, because HIV treatment is for life, some people fear starting it. The ART in-charge mentioned that, due to this fear, some patients often said that they need time to think about whether to begin taking the medication or not. Some people take more time to understand their HIV results and end up leaving the facility.

> "*A patient came, he was tested positive, and the patient did not accept that the results were his. He decided to move around various facilities testing to confirm if the results were positive. But after, he came back after some time because he had some complications and had to be started on ART."(KI04)*

The only facility-related challenge was inadequate pre-test counseling. This was reported by the counselor. The ART in charge said that inadequate pre-test counseling was because there were many testing points and only one counselor was attached to the facility.

HIV viral load suppression

The Bukedea HCIV had 960 clients enrolled on ART at the time of this study.

There was a higher number of females attending the HIV clinic than males (Table 2). The HIV viral non suppression was higher among the adult population (26/65 years) and lower among children and young adults below 25 years of age.

The bottlenecks in HIV suppression were classified as patient-related, facility-related challenges, and medication-related challenges. The patient-related bottlenecks included stigma and discrimination, alcoholism, poor nutrition, sharing of drugs with animals and partners, gender-based violence, lack of family support, religious beliefs, multiple partners, and poor medication routine.

Patients and the health care workers frequently reported that stigma and discrimination made the patients stop taking their medication. Such patients ended up abandoning the drugs as illustrated in the quote below.

> *"I used to miss my pills because of the people I used to stay with. My boyfriend did not know about my status and I was worried about revealing the truth because I did not want us to break up. I worry about how they may perceive it if they get to know that I'm on pills."(KI07)*

Some women with undisclosed HIV status would hide their medication in odd areas such as inside the grass in the grass thatched house where drugs sometimes get wet in the rain season for the fear of their husbands discovering them. Some of the female participants confessed keeping their medication under the cooking stones where their husbands are least expected to check and find them.

Table 1. Health service coverage in Bukedea district.

HF Level	Facility ownership		Accreditation for ART services	
	Govt.	PNFP	Govt.	PNFP
Hospitals	00	00	00	00
HC IV	01	00	01	00
HC III	05	00	05	00
HC II	01	05	00	02
Total	**07**	**05**	**06**	**02**

HF=Health facility, Govt=Government, PNFP=Private not for profit.

Table 2. Viral load suppression at Bukedea HCIV.

Demographics	Number	Suppressed (%)	Non- suppressed (%)
Sex			
Male	381 (39.7)	323 (43.7)	58 (56.3)
Female	579 (60.3)	534 (56.3)	45 (43.7)
Age (years)			
<15	252 (26)	234 (93)	18 (7)
15-25	258 (27)	248 (96)	10 (4)
26-65	401 (42)	330 (82)	71 (18)
Above 65	49 (5)	45 (92)	4 (8)

Alcoholism also came out strongly as a driver of non-adherence to the medication and hence non-suppression. Alcohol consumption was common among both men and women and in many cases, children.

> *"I'm an askari, sometimes I take beer with my colleagues the moment I receive my salary just to be happy with them."(KI03)*

From the focus group discussions in the community, there were several mentions of people sharing drugs with animals. The ARVs were given to pigs as fatteners and to chicken as a remedy for avian viral infections. Sharing ARVs was also reported to be common among spouses. Some reasons given for sharing of ARVs were; busy schedules, long lines in the health facilities and that men were afraid of being seen collecting their medication. This was frequently mentioned in the focus group discussions in the community as quoted below:

> *"Here in Kachabule, there was a man who used to give ARVs to the pigs to make them grow fat and to hens to treat coccidiosis and I know many couples that share drugs especially those on the same regimen."(FG01)*

One of the key informants (the counselor) mentioned that gender-based violence greatly contributed to non-adherence. The commonly affected were the women who were abused by their husbands which caused them stress.

> *"Some wives abandon the drugs because of family conflicts with their husbands. Some who divorce leave the drugs behind. This makes them abandon their medication."(KI05)*

Some patients confessed that they missed medications simply due to forgetting to pick them up or not taking them on time. The natures of work and alcohol consumption especially among the security personnel, also often referred to as "askaris" were reported to be the common cause of skipping medication and refill appointments.

> *"With the nature of my work, I have to wake up very early in the morning and report to duty because I'm an askari, sometimes I'm deployed to work in the nights and this makes me miss some days especially when my phone is off to check for the time."*

Patients reported that one of the limiting factors to taking the drugs was lack of food to take them with.

> *"We have been in the dry season, there are days we could only afford one meal a day, and this makes it hard for me to take the drugs because I could not take them with nothing to eat yet the drugs are too strong."*

Some of the people living with HIV (PLWH) reported that they did not have support from their family members and this greatly contributed to missing medication.

> *"When I'm with my wife, I sometimes forget to take the medication and I eat poorly but when I'm taken to my sister's place I find no problem in taking the drugs and I feel better."*

The community members and the adherence counselor reported that some patients who were on ART abandoned it because their religious leaders told them that Jesus would heal them without medication.

The other medication-related challenges included the pill burden, side effects, and resistance.

> *"I stopped taking the drugs because I was tired of waking up every early morning which was so inconveniencing."*

Adverse effects for example nightmares, confusion, dizziness, vomiting, and rashes on the skin made some patients stop taking the medication as illustrated below from an interview with a non-suppressed client.

> *"From 2013, I was not having any challenges till recently when I began getting side effects for example dizziness. The challenge that I think is bringing about this is the shortage of food. I sometimes have nothing to eat and when I swallow the drugs, I begin feeling dizzy."*

One of the key informants reported that there were a few cases of the regimen failure for the patients especially those on second-line treatment. Stock-outs of vacutainers, loss to follow-ups were also common occurrences at the health facility.

> *"There was a time they had stock outs for vacutainers and this made viral load monitoring for the patients and CD4 counts hard at the facility. The option they had was to refer the patients to other health facilities to check for their viral loads."*

This graph highlights the previous WHO targets of 90-90-90. The performance of the Bukedea district was still below the WHO set previous targets (Figure 1). While the district HIV detection and enrolment rates were getting closer to the previous targets, the viral suppression rates were still much lower.

Opportunities

From the focus group discussions and key informant interviews we had with the community members, patients, VHTs, and health workers, we were able to identify several opportunities that could be utilized to achieve the targeted 95-95-95 HIV services in the Bukedea district.

Counseling was seen as one of the ways stigma would be reduced and one of the factors that would contribute to adherence to treatment. At the facility, pre-test counseling was not adequately given and this explains why some people feared starting medication. Health education about the importance of taking the medication, the ways of ensuring proper adherence to treatment, and sensitization on the dangers of alcohol consumption could be used as an opportunity to improve adherence to treatment.

Targeted testing was also identified as one of the ways of ensuring that all people living with HIV get tested. The targeted testing was done through testing the people more at risk of contracting the virus (HIV) for example the commercial sex workers, the truck drivers, the private security personnel, police officers, prisoners, and substance abusers.

Although Assisted Partner Notification (APN) was used, it was, unfortunately, limited by inadequate funding. Assisted Partner Notification ensures that all the sexual partners of a positive client are screened and tested for HIV.

Family tracking was seen as one of the ways of making sure all people living with HIV test and get to know their status (Figure 2). This involves knowing the HIV statuses of the family members of the positive client comes from because of the possibility that they could have been born with the virus.

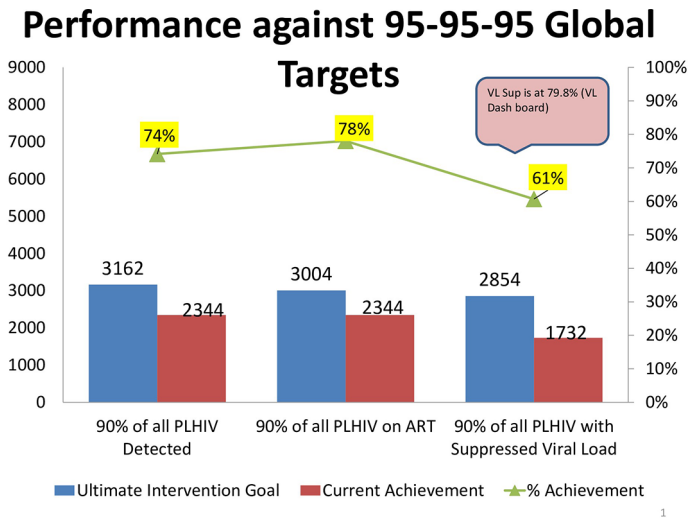


Figure 1. Progress towards the 90-90-90 global targets in the Bukedea district.

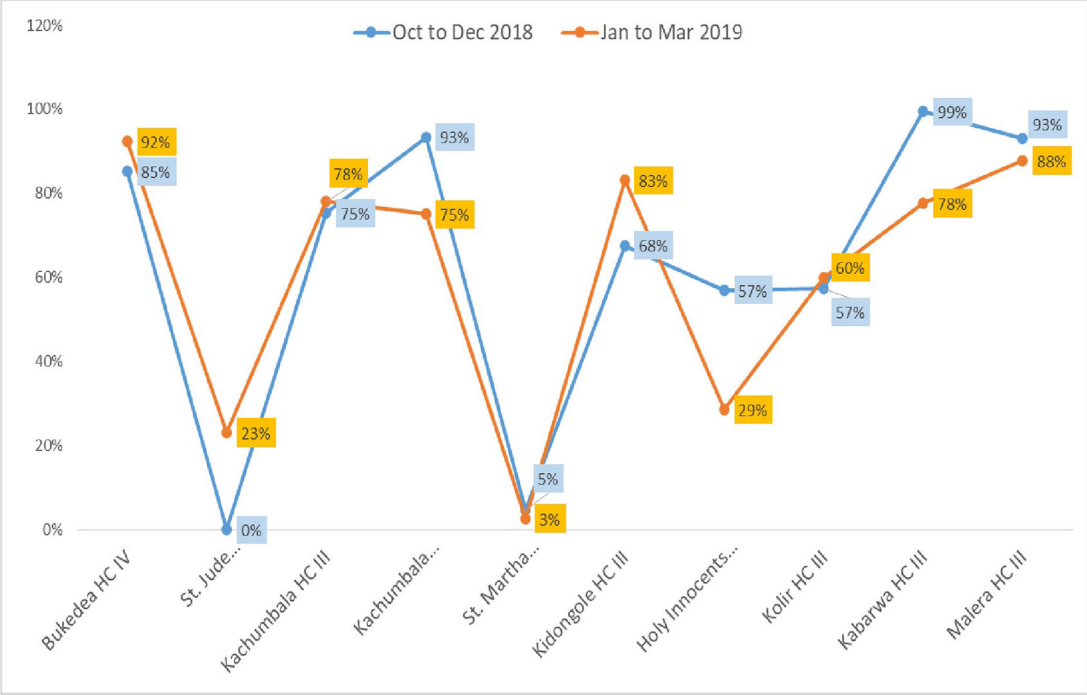


Figure 2. Male partner testing in Bukedea District.

From our study, we found out that self-disclosure by the expert clients on ART would help reduce the fear for stigma and also make the PLWH believe that if all the instructions for taking the medication are followed, a person living with HIV can have better quality of life and viral load suppression. The expert client in this study refers to the experienced HAART clients who have achieved viral load suppression. The expert clients have been co-opted to the Ugandan health care system to help in the management of HIV, especially to champion the message of adherence to treatment.

Many people in the community said that they had not tested due to fear of being seen at the health facility while testing. We therefore saw home to home testing as one of the opportunities to make sure that all the people living with HIV know their status.

Many people were not adhering to treatment because of gender-based violence and lack of family support. Linkage to social support networks ensures that the affected people are supported emotionally and financially.

VHTs played a major role in providing counseling, ensuring that the clients in their communities keep appointments and go for refills, and also picked up refills for those who were unable to due to fear or other challenges.

One of the reasons patients gave for missing medication was forgetfulness. Setting reminders on phones for the clients who have them was seen as a way for patients to manage their medication.

One of the reasons why some people feared to be enrolled into care and also abandoned their medication was fear of disclose their positive status to the partners. We saw couple testing (Figure 3) as one of the ways of reducing the challenge because, through adequate pretest counseling, the married partners can prepare for either accordant or discordant results.

Discussion

Our study sought to identify the challenges and opportunities towards achieving the targeted 95-95-95 HIV services in the Bukedea district. The challenges were classified as client-related, facility-related, and medication-related challenges. The challenges people face in getting tested for HIV included stigma, fear of disclosure of results to partners, long distances to health facilities, and busy working schedules.

Stigma, fear of disclosure of results, and long distances were identified as the major challenges that people encounter in getting to know their HIV status. Stigma was majorly reported from adolescent focus group discussions and this was due

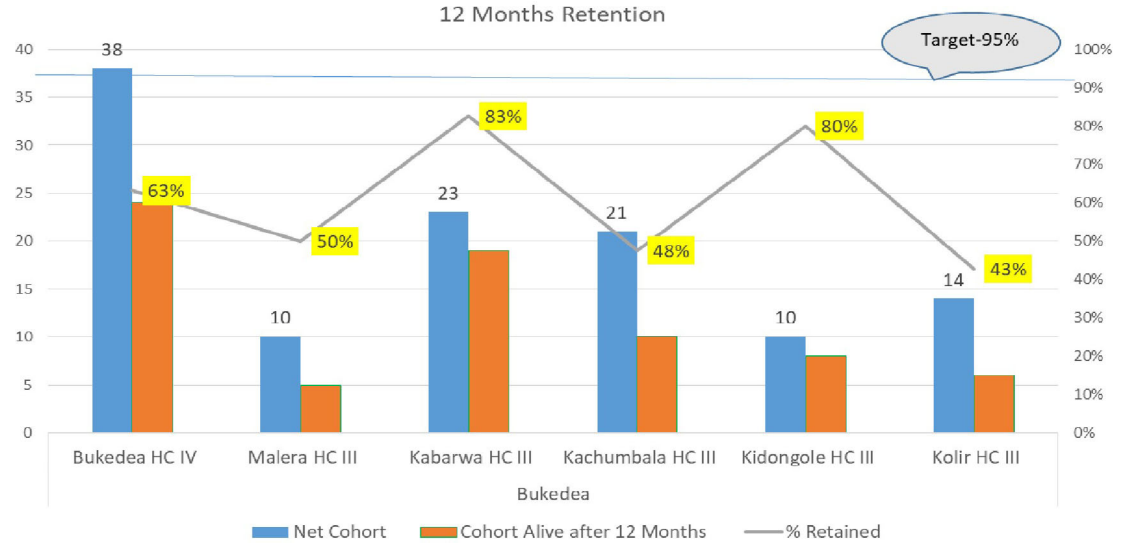


Figure 3. The 12 months' retention to care.

to fear of their friends knowing about their positive HIV status and fear of the lifelong treatment. Fear of disclosure of results was majorly reported by married females who feared intimidation from their husbands and also losing their marriages. The study also found out that long distances to the facility contributed to the poor turn up for the HIV testing services as reported by community members in the focus group discussions. These findings are similar to the results from a study carried out in 19 Ugandan districts to assess the availability, access, and utilization of HIV services.[10] Results from several studies also reveal stigma, long distances, and fear of disclosure of results to partners being the major challenges faced by people when getting tested for HIV.

An important new finding this study was busy work schedules are a major hindrance to HIV testing as many people reported that they were always busy throughout the day and hardly get time for HIV testing.

For enrollment into care, the challenges found were fear of taking medication, fear of disclosure of the results, failure to accept positive results, and inadequate pre-test counseling. Because ARVs are taken over one's lifetime, many people who tested positive for HIV didn't want to enroll in care due to the daily bill burden and preferred to be initiated to care much later. There was fear of social discrimination as revealed by a study carried out in Bangladesh, Indonesia, and Vietnam to assess facilitators and barriers to retention in HIV care.[11] Most married women refused to be enrolled into care for fear that they will receive abuse from their husbands if the results came out positive and they go back home with ARVs.

An important new finding from this study is the inadequate pretest counseling at the health facilities. Adequate pretest counseling prepares one's mind to receive the results and the clients enroll into care with adequate information. The challenge was majorly reported by the community members in the focus group discussions. The ART in charge attributed this to the fact that the health facility has many testing points with only one counselor attached to the facility making adequate pretest counseling a challenge.

For HIV viral load suppression, the challenges were alcoholism, stigma, and discrimination, sharing drugs with animals and partners, gender-based violence, pill burden, side effects, and resistance. The study found that alcoholism greatly contributes to poor HIV viral load suppression as confessed by some of the clients during the key informant interviews. After consuming alcohol, these clients get drunk and forget to take their medication hence affecting their treatment adherence. Alcoholism also changes the eating habits of HIV clients, which is a factor that greatly contributes to poor adherence. Some clients attributed poor adherence to pill burden as they have many ARV tablets and for life. A similar study in Zimbabwe about the failure of viral load suppression among adolescents on ART in Zimbabwe found out that the factors that contributed to the failure of viral load suppression among the clients included alcoholism, poor adherence, smoking, non-disclosure of the HIV status, and having more than one sexual partner in the previous twelve months.[12]

Stigma and discrimination remain a problem that was greatly reported by most of the clients who even confessed to abandoning their medication because of the community's perception of them. Due to fear of stigma and social

discrimination, the clients end up abandoning the treatment leaving them to non-adherence. A similar study conducted in rural Uganda and Kenya found out that the challenges to achieving viral load suppression among children and adults in rural Uganda and Kenya included stigma and structural barriers to care for example, long wait times, frequent visits, opportunity costs to work, and inconvenience; all of which degrade retention in care hence poor adherence to treatment thus resulting in low viral load suppression.[13]

Religious beliefs also majorly contributed to non-adherence to treatment. This was common amongst the clients who receive healing prayers from their religious leaders that make them lose confidence in the medication, leading to viral load non-suppression. A similar study conducted in Uganda to assess HIV viral load failure among perfect adherent HIV-positive adolescents showed that the rates of viral load suppression were higher among the adolescents who were adherent. However, 71% of the adherent adolescents had failed viral load suppression. The challenge to achieving viral load suppression among the adolescents was low adherence for people with strong spiritual beliefs who tend to miss medication during fasting and after receiving healing prayers and long exposure to antiretroviral therapy.[14]

An important new finding in this study is the sharing of medication with animals and partners which was reported by some participants during the focus group discussions and key informant interviews. Some of the reasons they gave for giving the drugs to animals were to enhance fattening in pigs and prevent diseases in chickens. The clients who confessed sharing drugs with partners reported that the long distance to the facility made them share drugs so that they could both come for their refills at the same time.

Another important finding from this study was the gender-based violence reported by the HIV counselor at the facility and study participants in the focus group discussions as one of the causes of poor adherence to treatment and majorly affected female clients who undergo psychological torture and stress. This makes them abandon the medication hence poor adherence and viral load suppression.

The opportunities towards achieving the targeted HIV services included home-based testing, targeted testing family tracking, counseling and health education, assisted partner notification, setting reminders, couple testing, linkage to social support networks, self-disclosure, strengthening the VHT network, and demonstrations on effects of alcohol.

Routine testing and counseling by the health care providers increases awareness about the importance of HIV testing and also encourages the clients to adhere to the medication because they get to know the importance of taking the medicine. This finding is similar to one from a study conducted in Uganda, Tanzania, and South Africa to assess factors strengthening HIV testing access.[15]

Another important opportunity is strengthening the VHT network through training them to help disseminate information to the community members through meetings and home visits hence increasing awareness about HIV. This is in line with a study conducted in rural Uganda to assess the perceived HIV testing norms. This study also suggests strengthening increased awareness about HIV testing through radio messages, billboards, and short text messages.[16]

Self-disclosure of the HIV status by the expert clients especially during intensive adherence counseling sessions and health education talks to the HIV clients leads to a reduction of fear to take the drugs and also fear for social discrimination amongst the HIV clients. Self-disclosure is consistent with findings from a study conducted in Harare city Zimbabwe.[12] The same study also revealed that social support networks give support to the clients for example affected by gender-based violence, food shortages, unemployment, and those with no family support.[12]

Home-based testing was also frequently mentioned in focus group discussions as one of the opportunities to increase uptake services. This helps to address the challenge of fear of confidentiality and also long distances to the health facility. A similar study conducted in southwestern Uganda about expanding HIV linkage into care found out that training of community extension workers led to home-based HIV testing.[17]

New important opportunities from our study include couple testing, assisted partner notifications, and demonstrations about alcohol effects. Demonstrations for clients about the effects of alcohol helped reduce the issue of alcoholism. This was done by putting one set of ARVs in water and the other set in alcohol. The one in water immediately dissolves and the one in alcohol doesn't. This helped reduce alcoholism and increased proper adherence to medication. Couple testing ensures with adequate couple pretest counseling reduces the challenge of fear of disclosure of the results to the marriage partners and also prepares the couple for the HIV results as a couple. The other important opportunity from this study is Assisted Partner Notification. This involves following up with all the sexual partners of an individual who tested positive and ensuring that all of them are screened and tested for HIV.

Conclusion and recommendations

The study revealed that the major challenges towards achieving the targeted 95-95-95 HIV services were stigma, inadequate pre-test counseling, fear of disclosure, and poor adherence due to alcoholism, and sharing of drugs with animals and partners. Therefore, continuous sensitization about HIV and the importance of adherence to drugs, continuous and adequate counseling of the clients on ART, and close monitoring of their viral load could help to improve enrollment into care, adherence to HIV treatment, and HIV viral load suppression.

Author contributions

MSN, AMS, SL, KJ, MC and CB concieved the idea, participated in data collection and wrote the first draft of the manusript, CN, PO, JO, RN, and JS did data curation, supervised data collection and conducted critical reviews. All authors read and approved the final version to be published.

Data availability

Underlying data

OSF: Bottlenecks and Opportunities towards Achieving the Targeted 95-95-95 HIV Services in a Rural District in Eastern Uganda. https://doi.org/10.17605/OSF.IO/BGNZ7.[18]

This project contains the following underlying data:

- 95 95 95 transcript.zip

Extended data

This project contains the following extended data:

- INTERVIEW GUIDES.docx

Data are available under the terms of the Creative Commons Zero "No rights reserved" data waiver (CC0 1.0 Public domain dedication).

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✗ **Kombatende Sikombe**
Implementation Science Unit, Center for Infectious Disease Research in Zambia, Lusaka, Lusaka Province, Zambia

Abstract- HIV prevalence from 7.3% in 2011 to 6% in 2017. Please provide more up to date data for this

Introduction- 3.4 million in 2001 to 2.3m in what year

Ref 5 is old. Are you sure the most up to date report for Uganda will report 73, 67, 60

For Key informant interviews in methods. Why not provide a supplement of the guide rather than list the questions asked. Write this to say we explored XYZ

Your methods section is written to reflect that you collected Viral Load and did HIV testing but this isn't the case right. Like you say collected using a data extraction tool but was this from paper charts or the electronic health records.

Table 1 should be your patient characteristics

How the health system is organised should go in the background and don't discuss this in the results

Is the work clearly and accurately presented and does it cite the current literature?
No

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
No

If applicable, is the statistical analysis and its interpretation appropriate?
No

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: HIV treatment

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

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