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Client perspectives and satisfaction with integrating facility and community-based HPV self-sampling for cervical cancer screening with family planning: a mixed method study

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Abstract

Background Invasive Cervical cancer is a largely preventable disease through screening, but access to cervical cancer screening (CCS) remains a challenge in Malawi. Integration of CCS with family planning (FP) services through Human papillomavirus (HPV) self-sampling may increase screening coverage. We aimed to evaluate women's perceptions, motivations, and satisfaction with integration of HPV self-sampling with family planning in Malawi.

Methods In this mixed-methods study, we purposively sampled and interviewed 29 women who underwent HPV self-sampling for CCS through one of two different CCS-FP integration models in Malawi. We also completed 766 Client Exit Surveys with CCS patients from both models. Model 1 involved only clinic-based HPV self-sampling, while Model 2 included both clinic-based and community-based HPV self-sampling supported by community health workers. In-depth interviews (IDIs) were conducted using a semi-structured guide, audio-recorded, transcribed, and translated into English for analysis. Qualitative data were analyzed using NVivo 12.0 software and thematic analysis, and quantitative data were analyzed using statistical software.

Results Women screened in both models reported reduced transport costs for screening. Those clinic-based valued the convenience of accessing both CCS and FP services in a single visit while those screened in the community appreciated accessing services within their communities. Many found HPV self-sampling easy to use and ensured privacy, especially in the community model where samples were mainly collected within their homes, rather than public toilets or clinic consultation rooms. Women were motivated to undergo CCS due to the perceived risks of cervical cancer, particularly among those living with HIV, the availability of services within the community, and the experience of gynecological symptoms. IDI women expressed satisfaction with being able to make decisions without consulting their spouses, and none reported experiencing social harm following the disclosure of HPV results. The client exit survey data showed that 92.5% of women in both models were very satisfied with the procedure.

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Conclusion Our findings highlight that women were satisfied with HPV self-sampling, valuing its convenience, privacy, and cost-effectiveness, which enhanced their willingness to undergo CCS. These findings suggest that integrating CCS self-sampling into FP services could potentially improve CCS uptake in Malawi.

Keywords Cervical cancer screening, Family Planning, HPV self-sampling, Thermo ablations

Background

Cervical cancer (CC) is the fourth most common cancer among women globally and the leading cause of cancer deaths, with the highest burden in low and middle-income countries (LMICs) [1, 2]. In 2020, there were an estimated 604,124 women newly diagnosed with CC, and about 342,000 women died from the disease. CC accounted for 37% of all new cancer cases among females in 2020 [3]. The proportion of new cases and women who die from CC is particularly high in sub-Saharan Africa (SSA) and countries with high HIV prevalence, accounting for 22.2% of all cancer deaths in women globally [4]. Women living with HIV are more than 6 times more likely to develop precancerous cervical lesions compared to the general population, and an estimated 5% of all CC cases are attributable to HIV [5–7].

Malawi, a country with a high HIV prevalence rate, has the highest age-standardized CC incidence and mortality in the world, with an age-standardized incident rate of 72.9 and a mortality rate of 54.5 per 1,00,000 women per year, respectively. CC is responsible for approximately 29% of all female cancers in the country [5]. Despite being a largely preventable and treatable disease through early screening and prompt treatment, alongside vaccination of girls against the human papillomavirus (HPV) [8, 9], CC remains a major public health challenge in Malawi and other LMICs.

Effective prevention programs, such as population-based screening, have significantly reduced the incidence of CC in high-income countries [10, 11]. In 2020, the World Health Organization (WHO) launched a global 90–70–90 strategy for the elimination of CC by 2030. This strategy aims to ensure that 90% of girls are vaccinated against HPV by age 15, 70% of eligible women are screened by age 35 and again by age 45, and 90% of women identified with cervical dysplasia or cancer receive treatment by 2030 [12]. Although cervical precancer screening is a key component of the strategy, screening for CC remains challenging in LMICs due to multiple factors, including resource limitations, logistical issues, such as inadequate infrastructure and sociocultural barriers [13]. The CC coverage and treatment of pre-cancerous lesions remain very limited in LMICs, estimated at 19% compared to 63% in developed countries [9, 14].

The Malawi Ministry of Health National Cancer Control Strategic Plan (2019–2029) includes CCS services using Visual Inspection with Acetic acid (VIA) [15]. However, the use of VIA has not met the program's national goal of 80% screening coverage, with only 26.5% of women having been screened nationwide in 2015 [16–18]. This is mainly due to a lack of trained providers, screening materials, and treatment of early lesions [19]. The country also faces challenges in providing widespread access to CCS in rural areas due to limited health facilities offering screening tests and CC treatment, including chemotherapy, surgery, and radiotherapy [20, 21]. Additionally, a lack of knowledge about risk factors, symptoms, and available preventive measures further contributes to delayed diagnosis and poor treatment outcomes [18, 21, 22].

HPV self-sampling has emerged as an increasingly popular and acceptable method for CCS and is associated with improved participation in CCS among women in LMICs, including Malawi [23–25]. Self-sampling is associated with less shame, anxiety, discomfort, and pain than VIA, leading to increased uptake for CCS [26–28]. This mixed-methods study aimed to explore the motivations, experiences, and satisfaction of women who underwent HPV self-sampling in Malawi to generate evidence that implementing partners, healthcare providers, and policymakers can use for policy decisions on how to improve CCS.

Materials and methods

Study design and setting

We conducted a mixed-method study of women who underwent HPV self-sampling in a cluster randomized trial to integrate HPV self-sampling into family planning services at 16 health facilities in Malawi. Model 1 involved only clinic-based HPV self-sampling, whereas Model 2 included clinic-based and community-based HPV self-sampling through community health workers. For model 1, providers (medical officers, clinical officers, and nurses) from the study facilities were responsible for providing HPV self-collection, while in Model 2, health surveillance assistants (HSAs) were responsible for offering HPV self-collection in the communities. HSAs are government-employed community health workers in Malawi who provide primary health services to designated villages.

The study was conducted in two districts in Malawi: Lilongwe in the Central Region and Zomba in the Southern Region. These districts were chosen because they are in the two geographical regions of Malawi with the highest HIV prevalence in the country, with the Southern region at 12.8% and the Central region at 5.6% [29]. Nine facilities implemented Model 1, and seven implemented Model 2, with randomization stratified by district and health facility type. Facilities were selected based on where the models were most likely to be implemented, and each district included one Central/District Hospital, one Mission Hospital, one urban health center, one peri-urban health center, and four rural health centers. These 16 health facilities were chosen in consultation with the District Health Management Teams. The trial was implemented from January 2020 to December 2021. Additional details about this trial's design, randomization process, and the conduct have been published elsewhere [24].

Study participants and recruitment procedures

For the qualitative component, we purposely recruited and interviewed 29 women aged 25–50 who underwent CCS through HPV self-sampling from both models soon after receiving their test results. We used purposive sampling to ensure equal representation of women from both models until data saturation was reached [30]. In Model 2, participants were further stratified based on where they collected results. The women who completed the in-depth interviews (IDIs) comprised of a) nine women who underwent HPV self-sampling at a facility in Model 1 (one from each Model 1 facility); b) seven who underwent HPV self-sampling at the facility in Model 2 (one from each Model 2 facility); c) seven who underwent HPV self-sampling in the community through Model 2 and opted to get their results through a community health worker (one from each Model 2 facility); and d) six women who underwent HPV self-sampling in the community but opted to get their results at the facility (one from six of the seven Model 2 facilities). The IDIs were performed in November 2020.

For the quantitative component, we conducted brief Client Exit Surveys with 1,589 women who received either CCS and/or FP services at one of the 16 study facilities. The surveys were conducted at 3 time points: 1) Early Implementation (November 2020), Mid-Implementation (June 2021), and Final Implementation (November- December 2021). The study Research Assistants (RAs) attempted to conduct the Client Exit Survey with each client who received services at either the CCS Clinic and/or FP Clinic on the days assigned to each study facility. Only the 766 clients who received CCS services are included in this analysis. Clients did not receive any remuneration for completing the survey.

Data collection

Qualitative data was collected using a semi-structured interview guide (Supplementary file 1). Participants were asked open-ended questions to explore: 1) knowledge about CC disease and screening; 2) reasons for accepting CCS and experiences with self-sampling; 3) experiences with the two models and challenges faced; and 4) understanding of the results. Additional information was obtained to assess their views on HPV disclosure to partners and anticipated challenges with disclosure. IDIs lasted for about 60 min and were conducted by experienced RAs in Chichewa, the local language. IDIs took place in private rooms within the health facilities and were audio-recorded, transcribed, and translated into English. Quality control was performed by the qualitative research managers both at UNC Project-Malawi and Kamuzu University of Health Sciences. All recordings and transcripts were stored on password-protected computers.

For the Client Exit Survey, trained RAs asked women a series of questions about the services they received that day at the CCS and/or FP clinics, including their satisfaction with the services measured on a five-level Likert scale, the reason(s) they were not very satisfied with the services (if they responded less than "very satisfied" for their satisfaction level), and whether they would recommend the services they received to a friend. Respondents who expressed feeling less than "very satisfied" were provided a list of possible reasons to select from, as well as an option to select "other" and narrate a response. All not "very satisfied" women were additionally asked which specific services they were not satisfied with, which included both pre-set options and an "other"option that also elicited a narrative response (Supplementary file 2). The responses were entered directly by the RAs into password-protected tablets.

Data management and analysis

Several steps were taken to process and analyze the qualitative data. Analysts from the University of North Carolina (UNC) and Kamuzu University of Health Sciences (KUHES) (AB, PM) developed a codebook that combined predefined codes for key concepts related to the study objectives and code derived from the initial reading of 3 transcripts by each team member. New codes were added throughout the coding process. Fifty percent of the transcripts were double-coded collaboratively by the qualitative data team from UNC and KUHES using NVivo version 12.0. The intercoder reliability for this study was

set above 95%, and weekly checks were done with the team from KUHES to discuss any coding disagreement below 95%. Once coding was completed, coding reports were produced, and data was displayed in matrices. Thematic analysis was applied to analyze the data. Narratives for specific themes were written through memos, and the qualitative team met weekly to discuss key findings.

Quantitative and narrative data for the Client Exit Surveys were entered into the study tablets using only the participant's assigned identifier. The data were then entered into an electronic tablet on the ODK platform used by the staff based in the project districts. Narrative data describing specific "other" sources for any dissatisfaction with services were categorized into existing dissatisfaction categories when judged to fall within their intended scope (N= 2), categorized into two new emerging themes (N= 14), or remained classified as "other" (N= 8). Descriptive statistics on client satisfaction by type of visit were generated using STATA v. 14.2.

Results

Demographic characteristics of study participants

A total of 29 women participated in the IDIs, and 766 clients'exit survey data was included in the analysis. The participants'ages ranged from 25–50 years. Among those who participated in the IDIs, 7 (24%) were aged 36–40, while 6 (20%) were between 26–30 years. The majority, 24 (82%), were married, and over half (56.62%) had attained some primary education. in terms of occupations,10 (34.48%) were involved in small-scale businesses, 8(29.59%) were farmers, and 6 (14%) were farmers (Table 1). For the exit survey participants, 201 (26.4%) were aged 26–30 years, 166 (21.8%) were 18–25 years, and 149 (19.6) were aged 31–40. In terms of occupation, 226 (29.9%) were involved in business or vending, 137(17.9%) were farmers, and 132 (17.2%) were housewives (Table 2).

Table 1 Demographic characteristics of IDI participants N= 29

Age (years	n	%
20–25	3	10.3
26–30	6	20.69
31–35	5	17.24
36–40	7	24.14
41–45	5	17.24
46–50	3	10.3
Total	29	100
Marital status		
Single	2	6.9
Married	24	82.76
Widowed	1	3.45
Divorced	2	6.9
Total	29	100
Education level		
None	2	6.9
Primary	17	56.62
Secondary	9	31.03
Tertiary	1	6.9
Total	29	100
Occupation		
Housewives	7	24.14
Business	10	34.48
Farmers	8	29.59
Formal Employment	2	6.9
Laborer	2	6.9
Total	29	100

Clients'perceptions on integrating facility and community self-sample collection for CCS with family planning

Three main themes emerged from mixed-methods data on how clients perceived the integration of self-sampling for CCS. These are summarized in Table 3 below.

Client time and cost savings

Overall, women from the models reported a positive experience with the self-sample collection process in the community or at the facility level. Those women screened in the community perceived the screening approach as convenient and saving money because they did not need to travel to the hospital for sample collection. Additionally, this was viewed as an opportunity to focus on their daily routines, as Health Surveillance Assistants (HSAs) distributed HPV self-sampling kits to them within the community.

> *It is good that they visit our homes, or we meet at the headquarters at (Name of TA), because as I said it's very far for us to go and access family planning services at the hospital in (name of the hospital), but it's easy for us to access these health services such as under-five services, and family planning services when they come here at (Name of TA). IDI 011, Client, Lilongwe)*

Those who collected samples at the facility level also felt that the integration of cervical cancer screening with family planning was convenient and time-saving because they were able to access two or more services within a single visit.

> *I was very excited because I accessed both services on the same day. A thing which also took me less time, because we have many things to do in the communities. Maybe, had it been that they had advised*

Table 2 Demographic characteristics of the survey participants (*N* = 766)

AGE (years)	N	%
18–25	166	21.8
26–30	201	26.4
31–35	149	19.6
36–40	124	16.3
41–45	70	9.2
46–50	37	4.9
51 +	14	1.8
Missing	5	0.6
Total	**766**	**100**
OCCUPATION	**N**	**%**
Farming	137	17.9
Salaried Work	63	8.2
Business/Trade/Vendor	226	29.5
Housewife	132	17.2
House Worker	15	2.0
Shooling	12	1.6
Piece Work	105	13.7
None	67	8.8
Other	9	1.2
Total	**766**	**100**

me that you should come tomorrow…maybe I could have failed to come. I was very excited because that day it was possible for me to access both services. (IDI 008, Client, Zomba)

Many of the women screened at the health facility appreciated receiving results and treatment on the same and that this helped them to save time and money further since they were not expected to come back for treatment.

"We felt that it was good for us to get our results from the hospital because when we received our results, they also gave us treatment right there at the hospital. "(IDI 011, client, Lilongwe).

On the contrary, some women screened at the community level and those who did not receive same-day results expressed their concerns about the cost incurred to come back to the hospital for results and treatment.

"For the results, they should start giving the results on the same day so that one must know the kind of medication she has to receive because like that time I went home without knowing my results and I didn't get any medication."(IDI 002, Client, Zomba)

Demand creation

Both models were seen as creating more demand for women to get screening for cervical cancer because they were able to reach more women with health talks at the family planning or outreach clinics.

"Some women come to get injectable family planning methods and others to get implants and after the doctors have counseled them, they will feel that it is a good intervention and say "Let me get screened, I came for family planning services but the way the doctor has explained I will do the screening". (IDI 009, Client, Lilongwe)
"For instance, I was failing to go for screening. Of course, I heard that screening is being done in other health facilities, but I was failing to go and do it. So, now it has come to a health facility that is near to where I stay, that is why I found an opportunity to take part." (IDI 008, Client, Zomba)

Screening at the community level was also seen as beneficial to women who are reluctant to visit health facilities, leading to earlier detection of cervical cancer and improved treatment outcomes.

Because as women, we are always occupied; so, if that opportunity comes your way and you find out that people are being screened within the community, you can just say "Ah! I think I should just

Table 3 Themes on clients' perceptions towards integration

Theme	Model 1	Model 2
Saves time and cost	Access to multiple services at one visit Some received results on the same day	Saves money and reduces congestion at facility
Demand creation	More women getting education talks and accessing CCS while accessing other services at the clinic	Women were encouraging one another to accept the testing available in the community Easy access and readily available within the community
Privacy (sample collection)	Good privacy since samples were collected mainly in toilets or their own bedrooms	Self-sample collection in private areas/homes

get screened today, they are already here, yeah." Opportunity never knocks twice on everybody's door, so it means I am just lucky that the sampling equipment is available, then I should just get screened, sure. (IDI 003, Client, Zomba)

Women expressed that they encouraged each other to access the screening services available within their communities.

"My additional ideas are that I am supposed to reach out to my friends explaining to them that they should go to the hospital to get screened for cervical cancer to know their health status; I want them to know their healthy statuses." (IDI 010, Client, Lilongwe)

The use of available Health Surveillance Assistants (HSAs) was also seen as a better way to encourage women to undergo CCS within the community because they are already trusted by the community members and chiefs as "Adokotala Akumudzi" *(Meaning village doctors)* and major providers of outreach services within the communities in Malawi.

"Through the advice that the HSA gave us about health issues, we consider them as our doctors and parents such that we accept and adhere to whatever they tell us." (IDI 003, Client, Lilongwe)

Privacy

During IDIs, most women screened in the community were happy and satisfied with self-sample collection within the community because they collected their samples at places convenient to them that ensured good privacy. These included their homes, particularly their bedrooms or bathrooms, at the chief's house, or within the building where the outreach clinic was taking place.

Yes, it was inside the house, and everyone was given a room to use. What happened was that everyone was given the brush and was told to go and do the self-sampling at any place where they felt there was privacy and where they could feel comfortable to collect the cervical samples and then put the brush into a plastic pack and bring it to the community health service provider confidentially. (IDI 012, Client, Lilongwe)

Similarly, some women who collected samples at the facility level reported that there was good privacy because they were allowed to collect samples on their own despite being at the hospital where screening using VIA is common.

"We were told to go to the bathrooms, and they were private because you could lock yourself in. I was all alone. And after I did it, I submitted it by myself; no one saw what I was doing. If there was a person who saw it, it was only the doctor that I handed it to. (IDI 008, Client, Zomba).

However, other women who collected samples at the clinic reported feeling embarrassed due to lack of privacy since they collected the samples within the busiest toilets within the facility with some of their fellow women queuing outside waiting to use the toilets.

"At the hospital, the toilets or private places are few as compared to at home where you can just lock yourself up in a bedroom and collect the sample. Here [at the hospital] someone can find you and when you are doing it in a hurry you can harm yourself." (IDI 011, Client, Zomba)

Additionally, others complained of collecting the samples within the consultation room in the presence of health personnel, which compromised privacy.

"It was the same room where the doctor was…Yeah, there were people. They just gave me the swab and told me to insert it in my vagina, so they told me that I should rotate it five times. (IDI 009, Client, Zomba)

Motivation to undergo self-sampling for CC screening through the two models

Three main themes emerged from qualitative data as motivation for accepting CC Screening among participants in both models, including (1) availability of services, (2) perceived risks to cervical cancer, (3) Gynecological symptoms (Fig. 1).

Availability of services

Most women in both models reported having heard about the CC screening opportunity while at the clinic or within the community when they had gone to access other services, especially family planning and under-five clinics, and decided to participate in the self-sample collection. Most participants expressed their desire to be screened for cervical cancer but reported experiencing challenges due to limited screening days at the nearest health facility (twice a week), suggesting that integrating CC screening education and services with other healthcare services can increase awareness and participation.

" I just met this service by surprise, but I have been wanting to go for cervical cancer screening. So today I came for other services because I heard that cervical cancer screening is done on Wednesday or Thurs-

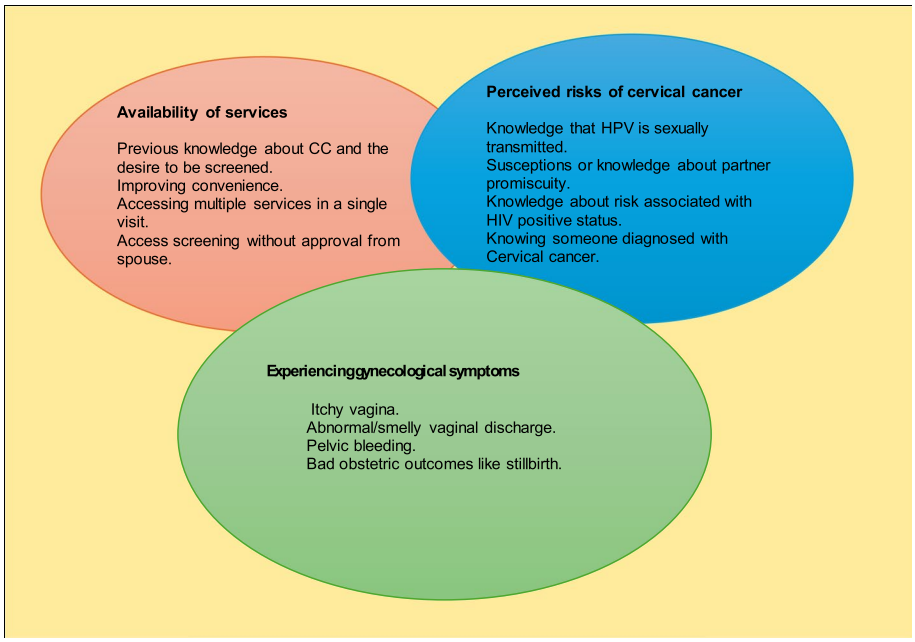

Fig. 1 Motivating factors for screening

day; however, when I was getting FP services, I was told there was a chance of getting cervical cancer screening service today, so I chose to get screened". (IDI001, Client, Lilongwe)

Several women felt empowered by collecting their own samples, citing that this process enabled them to participate in the screening process without seeking approval from their spouses or significant others. This was seen as promoting a sense of control over their own health decisions and also a way to improve their health outcome if detected and treated earlier. "U*pon hearing about cervical cancer screening, I decided to access the service, and after that, all things happened on the same day up to the extent of receiving my results" (IDI 005, Client, Lilongwe).*

Perceived risk of cervical cancer

Several women reported having accepted to undergo the self-sample collection either in the community or at the health facility because they perceived being at increased risk of having cervical cancer disease. Their risk perception emanated from several reasons. Some felt at risk because of the knowledge that HPV is a sexually transmitted disease, and some of them admitted to suspicion or they were aware that their partners have multiple sexual partners.

"What made me get screened for cervical cancer is that I have a partner at home...and I will be able to protect myself since you cannot trust your partner with your health issues. I don't go out with other men, but I doubt the behavior of my partner. I feel that he can transmit the virus to me. That's when I thought it was wise to come because I felt that my husband's. behavior was not perfect." "IDI 009, Client, Lilongwe"

"My Husband might not be able to abstain from engaging in sexual intercourse with other women. That is why I decided to go to the health facility and access cervical cancer screening services" (IDI 013, client, Lilongwe).

Other women living with HIV reported having agreed to be tested due to their knowledge about the risks associated with HIV and HPV co-infections despite being on ARVs. They further explained being advised by the health care providers at the ART clinic to undergo cervical cancer screening and the importance of yearly screening for cervical cancer when HIV-positive. However, most of them reported facing challenges to undergoing screening due to a lack of screening services at their nearest health facilities, and the availability of the self-testing team created an opportunity for them to be screened for cervical cancer.

"So, they advised us to say; those that who are on medication are at risk. They should be screened for cervical cancer. So, I felt it in my heart that I should go and get tested, and I got tested" (IDI 001, Client, Zomba)

Some participants reported having accepted to be tested because of a family history of cervical cancer or because they had seen friends and other people in their communities who had cancer. Some also reported feeling at risk, having seen some of their friends who were diagnosed with HPV or cancer during the study. They acknowledged the importance of early screening and diagnosis for cervical cancer and treatment to prevent further spread of the disease.

> *"Uhmm…in the first place, I heard about the screening through health education, the second thing that made me do it was that at home there are people who suffering from it [cervical cancer] that are closely related to me, so this made me also go for screening." (IDI 011, client, Zomba)*

Experiencing gynecological symptoms

The majority explained they had been experiencing gynecological and other health problems such as itching of the vagina, abnormal/smelly vaginal discharge, and pelvic bleeding for some time, which they attributed to symptoms of cervical cancer. Consequently, they accepted being screened for cancer and reported having wanted to be screened, but the services were not available.

> *I was not feeling well in my body and my vaginal fluid was mixed with pus I was also feeling some pains in my private part mostly the top part of it. So, I said that if the government has provided us with these tools (Self-test kits), I better get them and collect the samples to be tested so that I know how I am in my body." (IDI 007, Client, Lilongwe)*

Those who were on family planning and experiencing vaginal bleeding associated the bleeding with cervical cancer disease and wanted to rule out whether it was cervical cancer despite the knowledge that pelvic bleeding could be caused by FP use, especially Injectable Depo Provera which is commonly used by women in Malawi.

> *"Yes, for me to have doubts, maybe it was because of the injections, but I noted that recently, for a month, I was just bleeding and bleeding. Then, I realized that this was not true. could it be that I was experiencing the symptoms of cancer since I was experiencing the signs that I have heard people talk about regarding when a person has cancer?" (IDI 008, Client, Lilongwe)*

Other women, on the other hand, associated bad obstetric outcomes such as abortion, stillbirth, and neonatal death as a risk factor/symptom of cervical cancer disease and, hence, wanted to confirm the diagnosis through screening.

> *"The problem I have is that I gave birth to the first child just fine. The second one was also fine, but the third child it only lived for a week and died, and I thought this might be caused by cervical cancer." (IDI 003, Client, Lilongwe)*

Disclosure of screening and results to significant others

Interestingly, the majority further reported having disclosed the testing to their spouses and significant others despite deciding to be screened without consulting them. Those who had same-day screening and results also reported having disclosed the results to their spouses and significant others regardless of the outcome (either positive or negative).

> *On that day, as I have already said, I came here with my sick child, and I did not discuss it with anyone about testing, but when I went back home from the clinic, I told my husband that I had been screened for cervical cancer." IDI 005, Client, Lilongwe).*

Those with positive results reported having disclosed to their partners and relatives so that they could get support in case they fell sick. *I disclosed because it can happen that someday I might get sick, and I will be able to tell them that this is the disease I told you about. (IDI010, ZA)*. Interestingly, they all reported being supported by their idea to get screened regardless of the results, despite the cultural norms that emphasize the need for male partner approval in health-seeking matters, especially in rural communities.

> *My husband welcomed the issue (HPV positive), and he was very excited when I told him that I went to the hospital, and I had been found with a virus that causes cervical cancer. He commends me for deciding to be screened. (IDI 011, Client, Lilongwe).*

With this positive experience with disclosure, some women reported having disclosed their results to their friends as one way of encouraging them to go for a test.

> *"I was very open to my friends because I wanted them to join me (to be screened) and I gave them advice according to the counseling that I also received" (IDI 012, Client, Lilongwe)*

On the contrary, some women from model 2 reported having discussed with their partners or relatives before screening since the community was already aware of the program through community sensitization talks, and it was difficult for women to make decisions without seeking consent from their partners. Similarly, the

overwhelming majority of women mentioned receiving support from their partners on their decision to undergo cervical cancer screening, highlighting the importance of partner involvement in cervical cancer screening programs at the community level.

> *I explained to him that HSAs had come into this community at the chief's compound and were screening for cervical cancer. He then welcomed the decision and encouraged me to go and access the service so that I could know my status regarding cervical cancer. (IDI0 16, Client, Lilongwe)*

Client satisfaction with self-sampling for CC screening

Both the qualitative and quantitative data demonstrated that women from both models felt satisfied and appreciated the convenience of self-sampling at both the community and facility levels. In the Client Exit Surveys, we found that 92.5% of those who performed self-sampling in either model responded that they were "Very satisfied" with the procedure, with 6.1% at least somewhat satisfied and less than 2% reporting being somewhat or very dissatisfied (Table 4). However, their satisfaction level was similar to those who were screened with VIA, for which 95.4% reported being "very satisfied".

A high level of satisfaction was also noted during the IDIs, in that the majority found the self-sampling kit easy to use and expressed confidence that they had collected the right amount of the sample. Participants confirmed that the information and counseling provided to them made it easy to collect the samples.

> *was confident that the procedure (self-sample collection) was done correctly because upon pulling out the brush from the cervix, the samples were there (IDI 016, client, Lilongwe).*

Most of them also trusted the results they received after self-sample collection and reported not being worried about the positive results because they received same-day treatment.

> *I received it, and I accepted it because they told us that if they find the viruses, they told us that they are able to provide that person who has tested HPV positive with treatment by blowing some hot air to burn the viruses through a process called thermocoagulation. I welcomed it because they had to do that procedure so that the viruses would die if they were found. in so doing, it means that you have been protected from being at risk of developing cervical cancer. (IDI 004, Client- Lilongwe)*

Their satisfaction also emanated from the fact that self-sampling was also seen as fast and convenient compared to VIA, where women are delayed because of congestion while waiting for the healthcare workers (HCW) to collect samples.

> *"Mmmh, I think this is a good method because sometimes you may go to the hospital just to find that there is congestion, sometimes you may be interested in accessing cervical cancer screening services, but you may just return; hence it's better to collect samples on your own." (IDI0 11, client, Lilongwe)*

Table 4 Satisfaction by Visit Type

	N	1) Very Satisfied (%)	2) Somewhat Satisfied (%)	3) Neither Satisfied nor Dissatisfied (%)	4) Somewhat Dissatisfied (%)	5) Very Dissatisfied (%)	Don't know (%)	Total (%)
A) HPV Screen Only	*543*	92.5	6.1	0.0	0.7	0.6	0.2	100.0
B) VIA Screen Only	*152*	95.4	2.6	0.0	0.7	1.3	0.0	100.0
C) Both Screenings Only	*6*	83.3	0.0	0.0	16.7	0.0	0.0	100.0
D) Treatment With or Without Screening	*59*	94.9	5.1	0.0	0.0	0.0	0.0	100.0
E) Referral With or Without Screening	*5*	100.0	0.0	0.0	0.0	0.0	0.0	100.0
F) Both Treatment & Referral	*1*	0.0	100.0	0.0	0.0	0.0	0.0	100.0
Total	*766*	**93.1**	**5.4**	**0.0**	**0.8**	**0.7**	**0.1**	**100.0**
		713	***41***	***0***	***6***	***5***	***1***	***766***

The majority were also happy with this type of screening due to fear of pain from speculum use during VIA.

> *"It is a good and helpful method because you do not feel any pain, and there is no one with you [when collecting the sample] as long as you understand what you have been told" (IDI 012, Client, Zomba).*

They also found self-sampling more private because HCWs do not see their private parts, and there was no pelvic exam involved, reducing embarrassment and discomfort.

> *This is a very good method because with this method, one cannot feel embarrassed as compared to the VIA method whereby they examine you using the speculum while with this method, you collect the samples on your own in a private room, so you do not feel shy. (IDI 014, Client, Lilongwe)*

Results from the Client Exit Surveys further demonstrated that almost all the 765 participants interviewed (99.89%) reported that they were willing to recommend self-sampling for CC screening to their friends (Table 5).

Qualitatively, several women from both models also reported that they would recommend self-sampling to other women in their communities because it will help to increase the number of women being screened for CC, particularly among those living in rural communities due to the unavailability of services within the nearest health facility.

> *More women will be prevented from dying because I have held that cervical cancer is a very dangerous disease, once you delay getting treated you can die for sure. I am supposed to reach out to my friends and explain to them that they should go to the hospital to get screened for cervical cancer to know their health status because cervical cancer screening is something of great value. I want them to know their status. (IDI10, Client, Lilongwe).*

Table 5 Responses to whether clients would recommend the services they received

Would Recommend Services	N	Percent
Yes	766	99.87
No	1	0.13
Total	**767**	**100**

Table 6 Cited reasons for reporting being less than "very satisfied"

	A) HPV Screen Only	B} VIA Screening Only	C) Both Screenings Only	D) Treatment With or Without Screening	E) Referral With or Without Screening	F) Both Treatment & Referral	All visits %	N
Not enough privacy (%)	2.5	--	--	--	--	--	1.9	*1*
Providers did not adequately answer questions (%)	7.5	14.3	--	--	--	--	7.7	*4*
Providers not respectful (%)	2.5	--	--	--	--	--	1.9	*1*
Results delayed or not available (%)	25.0	--	--	--	--	--	19.2	*10*
Services were un-comfortable (%)	7.5	42.9	--	66.7	--	--	15.4	*8*
Unsure if properly performed self-sampling (%)	15.0	--	--	--	--	--	11.5	*6*
Waiting too long for visit completion (%)	15.0	14.3		--	--	100.0	15.4	*8*
Multiple reasons (%)	12.5	14.3	--	--	--	--	11.5	*6*
Other (%)	12.5	14.3	100.0	33.3	--	--	15.4	*8*
N	*40*	*7*	*1*	*3*	*0*	*1*		*52*

Dissatisfaction with self-sampling

Client Exit Survey results demonstrated that among the 40 women who reported less than "very satisfied" with HPV self-sampling, timeliness was the most common concern. Specifically, 25.0% cited delayed or unavailable results, and 15% mentioned long wait times for completing their visits as other reasons for dissatisfaction. Additionally, 15% of women screened with HPV self-sampling next reported feeling uncertain that they had performed self-sampling correctly or preferring to rely on trained provider expertise for their screening (15%). "Other Reasons" was also a common selection (12.5%), and 12.5% reported multiple reasons. Dissatisfaction with VIA was most commonly cited as being due to services being uncomfortable (42.9%), and though one woman cited long wait times for services, no woman screened with VIA cited delayed or unavailable results as concerns nor did they indicate a lack of confidence in the process. Of the three women not "very satisfied" with visits that included treatment, two cited services being uncomfortable and one cited "Other" reason (Table 6).

Qualitative findings from IDIs also supported the above findings in that women reported being dissatisfied with the self-sample collection because they waited too long to receive their results. Some reported not receiving the results on the same day of screening, leading to depression due to the uncertainty of the outcome.

> *"For the results, they should start giving the results on the same day so that one has to know the kind of medication she has to receive because like that time I went home without knowing my results and I didn't get any medication." (IDI 002, Client, Zomba)*

Some women preferred their samples to be collected by the HCW because they felt that they might not collect the sample correctly and felt that health workers are well-trained and have the right instruments to examine women and collect the samples. Some felt they would feel shy to undress in front of a provider.

> *"I cannot deny being screened by the service providers because if you are to be screened by the service providers, sometimes it is beneficial. The benefit is that the service providers have different instruments and equipment because it can happen that doing the self-sampling might result in me being unable to collect the samples." (IDI 003, Client, Lilongwe)*
> *The good thing with VIA is that it is done by people who are experts (HCW) than the self-sample collection, we just take the samples anyhow without being sure if we have followed the instructions or not. (IDI 013, Client, Lilongwe)*

Discussion

This study provides insight into the screening participants' perceptions and satisfaction with integrating self-collection for cervical screening with family planning at the hospital and community levels. The findings of our study revealed that women had positive perceptions and were highly satisfied with self-sampling and integration with family planning at community and hospital levels. Consistent with other studies, most women in our study found self-sampling at the community and facility levels easy, convenient and reduced transport costs [31, 32].

Our findings also show that integration of CCS at both community and facility levels also played an important role in improving screening uptake among women who have never screened since many women were reached with information about screening and the services were also available within their vicinity (within the community and nearest health facility). Further, our IDIs indicated that in addition to convenience, one reason for undergoing CC screening was the perceived risk of sexually transmitted diseases and gynecologic symptoms that they had been experiencing before the screening as another main reason for accepting to be screened for cervical cancer [33]. Earlier studies have also documented that knowledge and perceived risks for cervical cancer are key in influencing screening behavior because women lacked a clear definition of what they were suffering from and wanted to know the diagnosis of their symptoms [33–35]. Potentially, integration with FP may be selected for women experiencing issues that promote screening acceptance. This finding also suggests the need for more awareness about the importance of CC screening for all women, regardless of sexual history, HIV status, and presence of symptoms.

Consistent with findings from earlier studies, fear of the Pelvic exam and high travel cost and travel time to the health facilities were reported as some of the major barriers to undergoing CC screening. As a result, the self-sample collection was seen as an alternative screening modality by the participants that overcame these barriers and was an easy and preferable way to undertake CC screening, especially in hard-to-reach areas [23, 28, 36, 37]. In addition, the distribution of self-sample test kits within the community created an opportunity to reach more women, particularly women not willing to undergo VIA and those reluctant to visit the health facilities [28]. Allowing women to collect samples in their homes created a conducive environment that ensured privacy as compared to the facility-based self-sample collection [38]. These findings provide clear evidence in favor of self-collection as an alternative screening pathway within population-based cervical screening programs that will

play an important role in improving the global coverage of CCS.

Another key finding was that women screened at the health facility incurred double transportation costs since they did not receive their results and treatment on the same day and needed to return compared to women screened in the community who could choose to receive their results in the community without having to come to the health facility. Similar to findings from earlier studies, failure to receive same-day results resulted in some women screened at the health facility being unable to return for their results [39, 40]. This suggests the need for proper planning for sample testing to meet the demands and improve the number of women receiving their HPV results.

We found that the satisfaction related to the screening program emanated an important part from the feeling of being empowered to make an informed decision to undergo cervical cancer screening in an environment where women often do not have any control over their health-seeking behavior due to cultural and gender norms. Unlike findings from other studies, the women in our study did not report experiencing any blame or social harm for choosing to undergo screening without seeking approval from their partner or significant others. This highlights the demand for cervical cancer screening within the communities [41]. furthermore, community sensitizations by the program team created an opportunity for men and other community members to learn about the importance of early screening for cervical cancer and the availability of the cervical cancer screening program in their community. This contributed to the support for women who were screened.

Fewer than 2% of women rated themselves as "somewhat" or "very dissatisfied" with the cervical cancer screening and treatment services they received. Delayed or unavailable results were an important reason for experiencing less than high satisfaction with HPV self-sampling, which was a concern that did not impact on VIA screenings. The expected timeframe for receiving HPV screening results should, therefore, be discussed with women when selecting between available screening options. Further, some women performing HPV self-sampling experienced a lack of confidence that they had done so correctly, which also was not a concern during VIA. Methods for instilling confidence in the HPV swabbing process are a potential area of future research. Conversely, VIA screening was reported by a proportionally higher percentage of respondents as being uncomfortable than those screened with HPV self-sampling. Despite these occasional concerns, approximately 93% of women reported feeling "very satisfied," another 5% reported feeling "somewhat satisfied" with their cervical cancer services, and in nearly all cases surveyed, women would recommend the services to a friend. These findings support the high client acceptability of integrated CCS and FP services.

A key strength of our study is the inclusion of clients from multiple locations across two districts, which enabled a richer understanding of clients' perspectives on self-sampling and the two models of cervical cancer screening. This geographical variation enhanced the credibility of our findings by capturing the experiences of women across different settings. However, our study does have some limitations. Our cohort was limited to women who attended community outreach or facility-based family planning services and agreed to participate in cervical cancer screening. As a result, our sample did not include women who refused to be screened, who may have unique reasons for not participating, such as fear of the procedures, anxiety about positive results, and stigma. Consequently, our findings do not capture the reasons for non-participation among those women who declined screening or did not present themselves at the clinic or community to undergo self-sample collection. Additionally, this may have also introduced selection bias, as the findings primarily reflect the perspectives of only those who underwent the screening and were willing to participate in the interview. Despite these limitations, the use of both qualitative interviews and client exit survey data strengthened the comprehensiveness of our findings, thereby providing an understanding of women's perceptions and satisfaction with the models.

Conclusion

Our findings highlight that women had high levels of satisfaction with HPV self-sampling and the integration of self-sample collection for CCS with family planning at both community and facility levels. They valued this approach due to its convenience, privacy, and reduced financial barriers, such as transportation costs and time. Additionally, the ability to collect their own samples within their communities without requiring a speculum examination contributed to greater trust and comfort with the screening process, increasing their willingness to undergo CCS self-sampling.. These findings highlight the significant opportunities for further integration of CCS with other reproductive health services such as family planning, antenatal, postnatal care, at facility and community level. A key factor contributing to positive perceptions of self-sampling and the integration was the autonomy it offered in decision-making, with many women across both models feeling empowered to accept screening without requiring prior consultation with their

partners and significant others.as a result, the disclosure of results was notably high across both models, despite making independent decisions about the screening, and most women reported that their disclosure of screening and results were met with understanding and support from their partners and significant others. This kind of social support plays an important role in strengthening cervical cancer prevention efforts by encouraging women to accept cervical cancer screening services. Scaling up these integrated models could enhance access to CCS, increase uptake rate, and contribute to improved cervical cancer prevention among women in Malawi and other similar settings.

Abbreviations

CC	Cervical Cancer
CCS	Cervical Cancer Screening
FP	Family planning
IDI	In-depth interviews
HAS	Health Surveillance Assistants
HCW	Health Care Workers
HPV	Human Papilloma Virus
VIA	Visual inspection Using Acetic Acid
ART	Antiretroviral Therapy
SSA	Sub-Saharan Africa
LMICs	Low and middle-income countries
KUHEs	Kamuzu University of Health Sciences
NHSRC	National Health Sciences Research Committee

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-025-22761-w.

Supplementary Material 1. Client In-Depth Interview Guide (English), Version 1.0, dated 15 August 2019.

Supplementary Material 2. Client Exit Survey (English), Version 1.4, dated 25 Nov 2019.

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Informed consent statement
We obtained informed consent from all subjects analyzed in the study.

Authors' contributions
Conceptualization, funding acquisition, and development of data collection tools, JHT, LC, VM, JSS,FL, SG and EC; Data collection, coding, and analysis: PM, WM, MT, PK, and KG; AKB drafted the manuscript and reviewing and editing was done by all authors. All authors have read and approved the final version of the manuscript.

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Data availability
The datasets used in the study are available from the corresponding author on request.

Declarations

Ethics approval and consent to participate
We obtained ethics approval from the University of North Carolina at Chapel Hill Institutional Review Board (Study #19–0638) and the National Health Sciences Research Committee of Malawi (NHSRC) (Protocol # 2255). Both IRBs have Federal-Wide Assurance. The study was conducted according to the regulations and guidelines of the Declaration of Helsinki.

Consent for publication
Not Applicable.

Competing interests
The authors declare no competing interests.

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