AIDS and Behavior (2025) 29:2431–2440
https://doi.org/10.1007/s10461-025-04705-y

ORIGINAL PAPER

Acceptability and Feasibility of Remote PrEP Visits for Adolescent Girls and Young Women in South Africa

Makhosazane Nomhle Ndimande-Khoza[1] · Jennifer Velloza[2] · Hlukelo Chauke[1] · Lisa Mills[1] · Nicole Poovan[1] · Nontokozo Ndlovu[1] · Tessa Concepcion[3] · Sybil Hosek[4] · Connie Celum[5,6] · Sinead Delany-Moretlwe[1]

Accepted: 27 March 2025 / Published online: 13 May 2025

Abstract

The World Health Organization recommends differentiated service delivery (DSD) models for HIV prevention, including alternatives to clinic-based PrEP services. This study assessed the acceptability and feasibility of remote PrEP delivery—including HIV and pregnancy self-testing, and phone-based adherence counselling—among adolescent girls and young women (AGYW) in Johannesburg. The research was nested within the PrEP SMART trial (2019–2022), which evaluated scalable adherence support strategies for AGYW aged 18–25. During COVID-19 lockdowns, PrEP refills and testing kits were delivered to participants' homes, and counselling was provided by phone. Using a phenomenological qualitative method, we conducted in-depth interviews with AGYW ($n=14$) who had the option to complete remote PrEP visits (accepting or declining), study staff ($n=12$), and key informants ($n=10$) involved in PrEP programming. Thematic analysis explored experiences of remote delivery, focusing on acceptability and feasibility. AGYW found remote PrEP visits convenient, empowering, and time-saving. Procedures such as self-testing and phone counselling were generally acceptable, though some expressed anxiety about performing tests incorrectly and concerns over privacy, stigma, and unintentional disclosure of PrEP use at home. About half still preferred clinic-based visits. Staff and key informants recognized benefits, but highlighted challenges related to cost, sustainability, and provider workload. Suggestions for improvement included integrating contraception and partnering with community organizations. In conclusion, remote PrEP delivery is acceptable and feasible for many AGYW but not universally suitable. These findings support the inclusion of remote PrEP options in DSD models, with attention to privacy concerns and support for self-testing in this age group.

Keywords Remote health care services · PrEP · Adolescent girls and young women · Differentiated service delivery · HIV self-testing · South Africa

✉ Makhosazane Nomhle Ndimande-Khoza
nkhoza@cartafrica.org

Jennifer Velloza
Jennifer.Velloza@ucsf.edu

Hlukelo Chauke
hchauke@wrhi.ac.za

Lisa Mills
lmills@wrhi.ac.za

Nicole Poovan
npoovan@wrhi.ac.za

Nontokozo Ndlovu
nondlovu@wrhi.ac.za

Tessa Concepcion
concetes@uw.edu

Sybil Hosek
sybilhosek@gmail.com

Connie Celum
ccelum@uw.edu

Sinead Delany-Moretlwe
sdelany@wrhi.ac.za

[1] Wits RHI, Faculty of Health Sciences, University of the Witwatersrand, 22 Esselen Street, Hillbrow, Johannesburg 2000, South Africa

[2] Department of Epidemiology & Biostatistics, University of California San Francisco, San Francisco, CA, USA

[3] Department of Global Health, University of Washington, Seattle, WA, USA

[4] Department of Medicine, University of Illinois Chicago, Chicago, IL, USA

[5] Department of Medicine, University of Washington, Seattle, WA, USA

[6] Department of Epidemiology, University of Washington, Seattle, WA, USA

Introduction

The global landscape has witnessed a shift towards integrating PrEP services into community-based and remote platforms. Mobile clinics, telehealth services, and pharmacy-based models have been employed to decentralize PrEP delivery, making it more accessible to diverse populations. These models have been particularly beneficial during the COVID-19 pandemic, ensuring continuity of services amidst movement restrictions. Remote PrEP delivery models have been explored in sub-Saharan Africa and globally and have demonstrated feasibility and acceptability and a promising strategy to improve PrEP uptake and adherence [1].

In South Africa, adolescent girls and young women (AGYW) face a significant risk of HIV infections. In 2023, HIV prevalence was approximately two-folds higher among AGYW aged 15–25 than other populations [2]. Oral PrEP was introduced in South Africa in 2016, and current guidelines recommend use for all individuals at risk for HIV [3]. Despite the high levels of interest and uptake among AGYW PrEP, adherence and persistence remains a challenge [4, 5]. While several PrEP challenges are individual-level barriers such as forgetfulness and difficulty swallowing the daily pill, AGYW commonly also report health system-level barriers to their PrEP use. These include societal stigma around HIV and PrEP use, long wait hours in clinic queues, overburden and under-resourced facilities, competing healthcare priorities in AGYW and difficulties accessing healthcare due to their busy public clinics and clinic staff [6–8]. A growing body of research suggests that person-centered PrEP services may be a solution to addressing these barriers [9].

The World Health Organisation (WHO) acknowledged the diverse needs of people vulnerable to HIV and recommended differentiated service delivery (DSD) approaches. The DSD approaches are client-centred and calls for adapting the time, mode, and place of health service delivery to meet the clients' needs, preferences and expectations and remove barriers to care, while also considering the resource constraints in the public health system [10, 11]. DSD approaches that move PrEP delivery outside of clinic spaces (e.g., home-based PrEP delivery, PrEP offered at community-based collection points, and multi-month dispensing schedules) could lessen clients' burden of frequent clinic visits by providing alternative to conventional care [12]. Decentralised or remote procedures could improve retention in care, support PrEP persistence, reduce strain on the health facilities, and offer convenience for AGYW saving travel costs and time and could improve PrEP persistence [13].

The need for alternative PrEP delivery methods became evident during the coronavirus epidemic (COVID-19) and its related restrictions. There were concerns that the pandemic could exacerbate PrEP persistence challenges among AGYW by limiting their access to PrEP at clinics. In response to these challenges, the South African National Department of Health (NDoH) recommended innovative strategies to facilitate PrEP access. These included virtual medical consultations, self-testing kits, and community-based refill points [14]. The COVID-19 pandemic presented a unique opportunity to evaluate the effectiveness of remote PrEP delivery services in a real-world setting, allowing for the assessment of their advantages and limitations in maintaining consistent PrEP access for AGYW.

While decentralised PrEP procedures seem convenient and likely to be acceptable for many, they may not meet the needs of adolescents requiring more regular in-person support. As observed in a study conducted in Cape Town, as AGYW changed from monthly visits to quarterly PrEP visits, PrEP adherence declined [15]. Additionally, while decentralised PrEP services may streamline processes for healthcare providers, structural barriers such as logistical issues such delays, high costs and unreliable networks can impede timely PrEP delivery. Moreover, there is limited evidence on delivering PrEP outside the traditional clinic setting. Little is known about the acceptability and feasibility of remote PrEP services from the perspectives of both AGYW and healthcare providers. Understanding the acceptability and feasibility of remote PrEP procedures is important to improve PrEP delivery among AGYW. Probing the acceptability and feasibility of decentralized PrEP delivery will be informative in optimizing PrEP delivery for AGYW, particularly those who find clinic visits inconvenient or challenging, while also reducing the burden on busy public clinics.

We studied remote PrEP visits in the context of PrEP SMART—a sequential multiple assignment randomized trial of PrEP adherence support interventions conducted among AGYW in South Africa. Our study aimed to explore the feasibility and acceptability of remote PrEP delivery methods, including refills, HIV and pregnancy self-testing, and counselling during the COVID-19 pandemic in South Africa.

Methods

Study Setting, Design, Participants and Procedures

This phenomenological qualitative sub-study was embedded in the "PrEP SMART" study conducted in Johannesburg, South Africa from May 2019 to January 2022 (ClinicalTrials.gov identifier: NCT04038060). During this period 360 sexually active, HIV-negative women ages 18–25 years were enrolled, initiated on PrEP and randomized in a 1:1

Table 1 PrEP SMART COVID-19 related adaptations

Standard of Care PrEP procedures	COVID-19 Adaptation of PrEP procedures
HIV and pregnancy testing by a clinician at study site	AGYW perform HIV and pregnancy self-test
PrEP refills collected by AGYW at clinic pharmacy	PrEP delivered at AGYW's home by a study driver
In-person counselling	Telephone-based counselling
In-person health assessments	Telephone health assessments

ratio to two-way SMS or peer support through WhatsApp groups. Those with low adherence based on TFV-DP < 500 fmol/punch from a dried blood spot [DBS] sample at their Month 2 visit or who missed PrEP refills at Month 1 and/or Month 2 ("non-responders") were randomized to receive either issue-based counselling visits at Months 4, 5, 7 and 8 or DLFB counselling at Month 3 and 6 [16].

When the COVID-19 pandemic began 10 months into the PrEP SMART trial, the study team developed adaptations to the PrEP delivery process to minimize COVID-19 exposure while maintaining HIV prevention services for AGYW. These adaptations included remote PrEP refill visits at month 3 and monthly phone-based PrEP adherence counselling visits at Months 4, 5, 7 and 8. Table 1 depicts standard of care (SOC) PrEP refill procedures conducted prior to the COVID-19 pandemic: HIV testing and counselling, assessment of PrEP use and adherence counseling, health assessment and refill prescription, and dispensing at the study clinic. The COVID-related adaptations to PrEP delivery included offering HIV and pregnancy self-testing, phone based counselling and PrEP home delivery. The remote PrEP refill visits were only offered to AGYW for follow-up for PrEP visit at Month 3 and monthly counselling follow-up visits at Months 4, 5, 7 and 8, implemented during lockdown. Figure 1 depicts the PrEP SMART remote visit procedures.

Sample Size and Sampling Method

The sample included purposively selected study participants. These comprised AGYW ($n=14$) who were offered the option to complete remote PrEP visits at Month 3 and after Month 6 of their study participation, and who either accepted or declined the option. Although we initially intended to include all young women who were offered remote visits, not all were willing to participate in the interviews and declined. The sample also included PrEP SMART study staff ($n=12$), and key informants (KIs) ($n=10$) who were involved in PrEP programmes for AGYW.

Data Collection

We conducted in-depth interviews (IDIs) with AGYW, study staff and KIs using a semi-structured interview guide. IDIs with AGYW participants explored their experiences of remote visits, including perceived benefits and challenges, and preferences between remote and in-person visits. IDIs

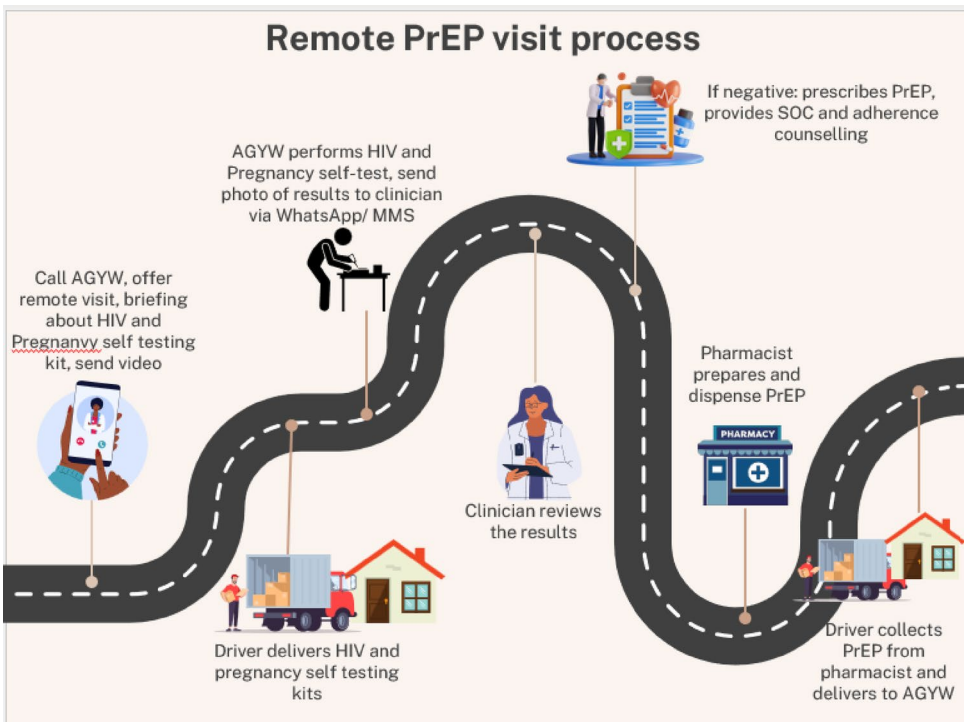

Fig. 1 Remote PrEP visit process

with staff and KIs focused on the acceptability and feasibility of remote visits, as well as potential benefits, and barriers.

A research assistant (HC) contacted all participants listed in the remote visit log via telephone to invite them to participate in IDIs, while KIs were invited via email. All participants interested in IDIs provided written consent prior to data collection. IDIs were conducted by three trained female research assistants. Interviews with AGYW (14) and staff ($n=12$) were conducted in-person at the study site (Wits RHI), while interviews with KIs ($n=10$) were conducted remotely via Microsoft Teams. They were conducted in isiZulu (10) and/or English (26) based on participant preferences and were audio-recorded. Each interview lasted approximately 60 min. IDIs with Mock interviews were conducted with youth community advisory board members to pilot the interview guides, which were subsequently revised as needed.

Data Analysis

The interview audio files were transcribed and translated from a local language (isiZulu) to English by translators who are fluent in both languages. A few transcripts were checked against the voice records to ensure the transcription quality. The data were organised and coded by five coders (MNK, JV, HC, LM, TC) in Dedoose version 6.1.18. The codebook was developed using both a deductive and inductive approach. The first codebook was developed based on the topic guide. The codebook was tested on three transcripts, and coders independently coded transcripts and held monthly meetings check intercoder reliability. This was done by comparing coding and discussing and resolving discrepancies and disagreements in code application via discussion. Consequently, codes were added, re-defined, or merged based on data emanating from the transcripts. A final codebook was applied to all transcripts. This same process was followed for staff and KI interviews. For this analysis, a thematic-content analysis approach was used. We extracted codes specific to remote visits (experiences of remote PrEP visit, including facilitators, barriers, and practicalities of implementing remote PrEP visits, and considerations for scale-up)—and created memos for each according to the type of participants. Data were also categorised by the different components of remote visits and procedures (HIV and pregnancy self-testing, remote monthly counselling, and home PrEP delivery). All participants were assigned pseudonyms to conceal their identity and ensure anonymity. The pseudonyms were selected by the first author and applied during the analysis.

Table 2 Themes and subthemes

Main themes	Sub-themes
General perceptions and experiences of the remote PrEP visit package	Satisfaction with remote visits Convenience Privacy
Acceptability of specific remote procedures	HIV and Pregnancy self-testing Remote (Home) PrEP delivery Remote counselling
Recommendations for remote procedures	Planning is key Alternative delivery options

Ethical Statement

This study was approved by the Human Research Ethics Committee (HREC) of the University of the Witwatersrand and the University of Washington Institutional Review Board (IRB). All participants provided written informed consent.

Results

Participant Characteristics

Fourteen AGYW participated in IDIs, including ten remote visits acceptors and four remote visit decliners. Most of the participants had completed secondary school. Half of them were unemployed, and almost half lived with their parents. Twelve study staff were interviewed. Study staff ranged from professional/managerial staff to community health workers and drivers. The key informants ($n=10$) in this study consisted of the non-study healthcare providers, policymakers, and researchers representing several organizations in Johannesburg and Cape Town. Table 2 presents the main themes and subthemes emanating from the data.

General Perceptions and Experiences of the Remote PrEP Visit Package

Remote PrEP visits and remote counselling were generally acceptable among most AGYW taking PrEP, PrEP SMART staff, and KIs working in PrEP delivery spaces. AGYW who completed the remote visit were satisfied with the overall remote PrEP visit. Most AGYW reported that they stayed far from the clinic and needed transport money to get there, which they often borrowed from family members; thus, the remote visits were convenient because they did not have to travel to the clinic, saving them time and transport costs.

> "I think they [remote visits] are all right, because it saves time for coming there, doing the tests, waiting for the results, waiting for transport, no." (Ntokozo, 21, Acceptor).

AGYW felt that remote visits were more convenient than clinic visits. They stated that due to other commitments, such as work and school, they had difficulties finding time to attend their PrEP clinic visits and counselling visits. The remote procedures offered them flexibility and an option that accommodated their busy schedules.

> "You find that I'm going to school on that day, and I don't have time, I feel like I can do the tests after school instead of coming there, I can do it in the house after school. I think it (remote visits) can work cause sometimes I would have an hour that I can use to do the tests and send them pictures then they deliver the medication." (Fikile, Acceptor).

AGYW reported that they dreaded the long clinic waits and queues; the remote PrEP visits allowed them to undergo procedures in the privacy of their homes, thereby avoiding the long clinic queues. As one participant stated:

> "What I liked the most about the remote visit was that I didn't have to queue for a long time… And it was private cause I'm in my house, in my flat, in my bedroom, so it was fine." (Gugu, 25, Acceptor).

Some participants reported that completing the procedure at home, instead of at the clinic, offered them more privacy. They said that remote PrEP visits reduced the stigma associated with accessing HIV services. One participant, who had declined a remote visit, still acknowledged its benefit:

> "In a way that they [AGYW] won't be afraid to go to clinics, so it would be easy for them to do the tests in their own space privately without being judged by saying, "I saw you yesterday at the clinic; what were you doing?"." (Gugu, 25, Decliner).

During the interviews, AGYW and KIs noted that completing procedures at home was not only convenient for AGYW but for the providers as well. From the KIs' perspective, remote PrEP services or decentralising PrEP services is a 'way forward', given the general challenges associated with accessing health services such as crowdedness and workload. They reported that remote visits reduced the number of patients visiting the clinic. One KI highlighted the benefits of reduced clinic congestion, decreased workload at the facility, saved time, and ability to focus on clients who required more intensive clinical care, such as sick patients. Participants also noted that having fewer patients at the clinic allowed social distancing and reduced the risk of spreading COVID-19.

> "PrEP is a prevention option, so it's not like we are sick, so it means people now wouldn't want to come and stay a long in a queue just to get prevention medication." (Mercy, KI, Researcher).

Another KI stated:

> "I think they [remote visits] can work and be quite effective… exploring how remote everything could work is smart for us to do in 2021 with all of this technology and potentially everything we've learned when we were all forced to be remote… It can cut down so much on time getting to the clinic. It can cut down time for healthcare workers." (Judy, KI, Funder).

In contrast, project staff indicated that remote visits took a lot for them in terms of organising and execution. Specifically, they had difficulties balancing remote visits with on-site visits.

> "You have to plan for this participant; I'm going to phone; there's a possibility that the clinic is full. You have to see other participants (on-site), and then you have to do this remote visit." (Malesa, study staff).

Several KIs indicated that remote PrEP delivery improved PrEP uptake, adherence, and retention in care. It reduced the effort and burden associated with preparation for an in-person clinic visit, ensured that clients received their medications and remained engaged in PrEP services.

> "That's why Mr. Delivery [food delivery service] is so successful, cause you do nothing and they come to you, or you don't do as much, you know, that's why these Mr. Delivery and Uber Eats and them, they work because it's convenient, you know, you talk on the phone for an hour or however long then you put the phone down, later on you get your medication, done, as opposed to getting up, bathing, leaving your children, or not leaving, taking the effort" (Zelda, KI, Psychologist).

All participant types expressed concerns or challenges regarding remote visits. Privacy was a significant concern, highlighted by AGYW, staff, and KIs. Many young women lived in shared confined spaces with family members, making it difficult to complete PrEP visit procedures at home. One participant declined an offer to do a remote visit because she did not want her mother to know she was on PrEP:

> "Hence, I said because of privacy and even if I were to do those things (remote procedures), my mom

sometimes is at home the whole time. So, I'd have to lock my room and do a lot of things, I just don't want to do that." (Penny, 25, Decliner).

Staff members could also sense lack of privacy during remote procedures.

"We asked them about privacy, and they said they'd have privacy, but you could hear that there was someone else in the background… like maybe that person was there to support them. But I don't know how fully comfortable they felt doing that visit with someone else around. So, I know that privacy is sometimes a challenge for people." (Khosi, study staff).

One participant who had completed a remote visit swore never to do it again because of the interruptions she experienced when she did the remote visit. Reflecting about her previous visit that was done remotely, she said:

"I was bored, I don't want it [remote PrEP visit]; there was too much noise and disturbances, asking you, "what is this; what are you doing?" I'm busy this side talking, and the child would be touching stuff. You can't even talk he would be asking, "Mama what are you doing, what is this?"". (Nene, 26, Acceptor)

Acceptability of Specific Remote Procedures

HIV and Pregnancy self-testing

In the quantitative survey, all AGYW who completed remote PrEP visit reported that HIV and pregnancy self-testing was easy to do and understand. They all indicated they would do self-testing again. Most AGYW liked the self-test because it offers privacy. AGYW described remote PrEP visits as quick, easy procedures, which they could conduct independently in their own spaces. Staff also emphasised the easiness of self-testing. This process was facilitated by the instructions included with the testing kits and a video illustrating the testing steps. AGYW stated that after completing HIV and pregnancy self-testing procedures, they felt satisfied and empowered. They learned how to administer and interpret the test and were the first to see their test results.

"Okay, for me, it was fun, like it was a good experience because you are now able to do your own tests and stuff, HIV and pregnancy tests, like see how it's done. Yeah, then when going to the clinic and have to wait for the results and stuff, so you just do them at home and get the results the same time." (Tsatsi, 19, Acceptor).

However, some AGYW participants anticipated or encountered challenges, these included a lack of private and quiet space for self-testing, conducting the self-test incorrectly, a fear of blood or self-pricking during the HIV self-test. Consequently, some expressed a preference for in-person clinic visits. Participants were concerned that if pricking and testing were done incorrectly, it could lead to inaccurate test results or complications like continuous bleeding. As a result, not everyone offered remote PrEP procedures was keen to do them. Participants who expected these challenges chose not to do the remote visit and instead opted for an in-person clinic visit. Some AGYW expressed a dislike and fear of blood. One young woman declined the offer for a remote PrEP visit, preferring a clinic visit. She stated:

"I hate blood. Just imagining myself pricking myself, I said, "I could not do that (HIV self-testing)."" (Makwena, 19, Acceptor).

Another participant who declined the remote visit expressed preference for undergoing PrEP procedures at the clinic, where experienced doctors conduct the tests in a way that puts them at ease and in a friendly environment.

The only concern about HIV and pregnancy self-testing that AGYW participants and staff highlighted was the possibility of some AGYW testing others and presenting clinicians with false results. The tests could be done on someone else and mispresented as their own. One staff member expressed these sentiments:

"Yeah, it's working even though we are unsure whether they're taking PrEP. Yeah, and we are not 100% sure if she's using or taking her blood or her pee. Yeah, that's the one I have more doubts about." (Dumo, study staff).

Remote (Home) PrEP Delivery

Participants who received PrEP remotely mostly discussed the procedures involved in receiving PrEP but seldom spoke about their personal experiences with PrEP home deliveries. However, they expressed concerns about privacy, confidentiality, or unintentional PrEP disclosure. A participant declined PrEP home delivery, expressing:

"I don't think there are any benefits in the remote visits." (Sindi, 22, Decliner).

She was worried about the possibility of not being at home during PrEP delivery, someone else receiving her PrEP package, and subsequently, not receiving the pills.

Another participant, who declined PrEP home delivery was concerned about not receiving PrEP-associated counselling. Sindi was uncomfortable with receiving PrEP without interaction and just hearing, *"Here is your PrEP; please sign here. No PrEP advises."*. She instead preferred a warm hand off with instructions for use despite these being PrEP refills and wanted interactions with healthcare providers.

The safety of staff delivering PrEP also emerged as a significant concern. Staff spoke about the "*dodgy*" areas they work at, with high crime levels and the potential risk of being robbed, requiring them to be '*streetwise*' and alert. Study staff's safety concerns limited them on the number of testing kits or PrEP pills per trip. They adapted their practices based on their safety concerns, for example, they carried only five bottles of PrEP pills per trip, "*just in case we are robbed*", said Maya, a staff member. Coordinating deliveries was challenging. They frequently had to return to the study clinic to collect additional PrEP bottles. Situations where multiple visits were made to a participant's home, especially if the initial delivery time was not successful, were not uncommon. Another challenge drivers faced was locating the participants' homes, especially when participants lived in informal settlements.

Staff also pointed out that home deliveries might unintentionally cause conflict between participants and their partners. For instance, if a male member of staff delivers PrEP, partners might accuse the AGYW of cheating. Such instances could result in a backlash and unplanned PrEP disclosure. One provider indicated that it might be best for some AGYW to keep PrEP visit as a clinic-based facility, stating:

> "Some (AGYW) are very private; they want their clinic life to be their clinic life and their home life to be their home life." (Ncamsile, study staff).

She further stated that delivery vehicles branded with clinic logos could attract unwanted attention from neighbours.

Remote Counselling

The majority of AGYW liked receiving counselling remotely. Participants noted that remote counselling is most convenient when they do not need to see a health provider for additional clinic services. They appreciated not having to visit the clinic and wait in long queues just for counselling. One participant who received monthly counselling commented:

> "I live very far, and now I'm writing exams, so I had to come here and not go to school and come here." (Thoko, 19, Acceptor).

Staff, KI and AGYW voiced several challenges associated with counselling sessions done remotely. One concern raised by staff was about getting hold of the participants at the scheduled date and time. Either their phones were off, there was no response, or they could not talk because they were not in a private or quiet space. KIs spoke about the potential difficulty participants may encounter in expressing themselves freely during counselling if they lacked a private space. One AGYW participant who experienced remote monthly counselling expressed that she was concerned about discussing personal matters, such as her intimate relationship, over the phone. Another participant declined the remote counselling session was concerned about missing calls from the counsellor and disclosure over the phone, stating:

> "Some things are better when they are face to face. It's different compared to the phone." (Sindi, 22, Decliner).

From the staff perspective, remote counselling compromised the quality of the session. The virtual nature affected the rapport between participants and the counsellors, potentially leading to communication barriers. Another challenge was the counsellor's inability to read facial expressions or body language, which is an essential component of counselling. Also relating to quality, one counsellor shared that sometimes sessions were interrupted when participants' phones ran out battery, often due to load shedding. This shortened the counselling or ended it abruptly.

> "Because sometimes the participant can say she has time, but now we are doing a visit and then they are calling, "Hey, you, your child is crying. Somebody is looking for you." (Lydia, study staff).

Recommendations for Remote Procedures

Staff, KIs, and a few AGYW suggested factors to consider when organising or implementing remote visits. Study staff emphasised that the key to successful remote visits is planning of procedures. A staff member suggested:

> "It is feasible, especially if you have a script on what to do. And then, who is next? What to do next." (Malesa, study staff).

KIs and staff stated that remote services also require putting resources such as enough PrEP stock, transportation to delivery testing kits and PrEP, staff to package and deliver, etc., in place, but also acknowledging the challenges and constraints inherent in the public health systems, such as

staff shortages. Furthermore, the staff indicated planning on the patient's end is important. It is essential to ensure they have a private and uninterrupted space for self-testing and that they are reachable by phone.

Regarding PrEP delivery, KIs suggested alternative PrEP delivery options. Instead of directly delivering PrEP at the participants' homes, they should identify locations within the community where PrEP packages can be dropped off. Participants could then pick them up at a convenient time. Mavis, a professional nurse, recommended integrating PrEP to the central chronic medicine dispensing and distribution (CCMDD medication list) to enable collection at external pick-up points. This strategy is anticipated to address other challenges related to home PrEP delivery. Staff also recommended ensuring that participants receive the test kits well in advance to enhance coordination. One possible suggestion was to provide the self-testing kits during one of their in-person visits, prepping them for their subsequent remote visit. However, they noted the importance of being aware of the kits' expiration date and to guide the participant on proper storage.

Discussion

This study explored the acceptability and feasibility of remote PrEP and counselling visits among AGYW in South Africa using oral PrEP. Two main findings emerged: (1) Remote PrEP visits were generally acceptable and (2) they were somewhat feasible, though accompanied by implementation challenges.

In terms of acceptability, remote visits were well-received, echoing findings from other studies [13, 17]. Participants appreciated the convenience, simplicity, avoidance of long queues, time saving benefits, elimination of transport costs, and empowerment of conducting and interpreting their own tests. Similar benefits were noted in Mississippi and eastern and southern Africa, where remote visits addressed barriers to PrEP or ART refills and improved accessibility, privacy, and reduce waiting times and transport costs for clients [13, 18]. However, in our context, some participants faced privacy challenges at home, leading to interruptions during remote visits and other AGYW declining the offer or opting out from remote visits.

AGYW in our study found pregnancy and HIV self-testing associated with PrEP procedures acceptable and feasible. They perceived procedures like HIV self-testing, as quick, easy to perform and simple interpret, with no complications or errors. The instructional video on self-testing and phone counselling were also beneficial. These findings align with a Kenyan study among AGYW on PrEP where HIV self-testing was deemed easy and empowering, recommending it as a strategy for HIV testing between PrEP refills [19]. However, some AGYW had concerns about self-pricking, blood, potential errors, and privacy at home which made the self-testing procedures associated with remote PrEP visits less appealing. These insights suggest that non-invasive HIV testing methods such as oral swabs, may be a preferred option, although there are concerns about their sensitivity [20]. Providers viewed HIV self-testing as crucial for community-based PrEP delivery services, especially for PrEP continuation (as opposed to initiation) and recommended this approach to support DSD of PrEP and reduce frequency of clinic visits [21].

In terms of feasibility, the KIs suggested that remote PrEP visits could alleviate the clinic loads, allowing providers to focus on more critical patients. However, experiences in PrEP SMART indicated that remote visits did not substantially reduce providers' responsibilities. In our study, logistical challenges encountered by staff during the implementation of remote PrEP visits included compromised staff safety, decreased service quality, difficulties in reaching participants, and increased workload. Similar implementation challenges were noted in a study done in Uganda on remote ART refills [21]. The current study was done with research staff; therefore, feasibility may look different in a public PrEP delivery setting where resources are often limited, and staff overburdened. A new cadre of staff may be required to do outreach or remote services in the community [12].

The cost of delivering testing kits and PrEP refills was a concern, but strategies like providing kits during a prior visit or arranging central drop-off points for AGYW could mitigate these expenses. This approach could save delivery costs and time while addressing issues of reach. While remote may not be cost-effective in all settings, evidence from Kenya, Uganda and Tanzania shows that home-based ART delivery can achieve positive outcomes at a similar to standard of care [22, 23]. Remote visits can offset visit costs, as seen in a HIV treatment study, where community and home ART delivery removed logistical barriers and improved adherence, treatment continuity leading to improved viral suppression rates and saving costs for clients and the health system [24, 25].

Overall, our findings suggest remote visits present an appealing option for healthcare delivery but may face practical implementation challenges, especially in under-resourced settings with high crime rates, informal settlements, etc. These findings align with reports from healthcare providers in low-income settings, where workforce limitations and supply constraints limit the ability to provide PrEP services outside of healthcare facilities [21]. This suggest remote delivery are context sensitive with environment and socio-economic factors, tailored strategies might be necessary for different settings. KIs and staff highlighted that

efficient communication among the clinic staff is vital to streamline implementation process of remote visits.

These results support the potential inclusion of remote PrEP visits options in person-centered, differentiated HIV prevention packages. Other AGYW simply valued the human interaction provided by in-person clinic visits. For them PrEP visits are more than just accessing services: they represent physical expert care, meaningful interactions with non-judgemental health providers, and a welcoming environment. These findings suggest that remote PrEP visits are a suitable alternative for AGYW who are unable to attend in-person clinic visits due to other competing activities [26]. Thus, remote visits could be provided as an option for AGYW PrEP users. Remote procedures may be ideal from those who unable to attend clinic due work, school, lack of transport and time and have privacy; however, they may not be ideal for those who lack private space, want in-person interactions with staff, etc. These findings support the DSD approach to provide services tailored according to client needs and preferences. However, the potential benefits on PrEP adherence and continuation need to be explored. For those lack privacy but also similar barriers to getting to the clinic - decentralised services with a provider in their community could an alternative option.

This study provides formative work, gathering perspectives from remote visit acceptors, decliners, staff, and key informants. It lays the groundwork for researchers and underlines the need for further research on remote visits for AGYW using PrEP. A limitation of the study is that it was conducted in research setting as opposed to a real-life healthcare setting. Moreover, it was conducted among a small sample, hence it is framed as a formative study. The future implementation science studies are needed. Additionally, randomized controlled trials are needed to evaluate the effect of remote PrEP visits on adherence. These insights will further determine the value of remote visits. Another limitation is that remote procedures were developed and implemented as a reaction to the COVID-19 pandemic, however, the remote visits procedures were part of the original study design.

Conclusion

Remote PrEP visits can help overcome PrEP access barriers for AGYW with limited time or facility access. However, they may not suit everyone, especially those without privacy, uncomfortable with self-testing or who prefer in-person healthcare interactions. This highlights the need for diverse HIV prevention service delivery options tailored to individual needs. We have identified several implementation challenges for remote PrEP visits that should be addressed before scaling up. These findings support de-medicalising PrEP services and increasing access to PrEP for AGYW, irrespective of pandemic status. Programmes should focus on overcoming barriers to remote delivery, particularly around privacy, and HIV self-testing in this age group. Telemedicine, online PrEP care and community depot pickups could address logistical difficulties identified in this study.

Acknowledgements We thank the PrEP SMART participants, key informants, and study staff for their contributions.

Author Contributions MNK: Conceptualisation, funding, study design, data collection, coding and data analysis, write-up. JV: Conceptualisation, funding, study design, data collection, coding and data analysis, review and editing manuscript. HC: Data collection, coding, result interpretation, review and editing manuscript. LM: Data coding, result interpretation, review and editing manuscript. NP: Study operational oversight, result interpretation, manuscript review, and editing. NN: Study operational oversight, result interpretation, manuscript review, and editing. TC: Data coding, result interpretation, review and editing manuscript. JQ-A: Data coding, result interpretation, review, and manuscript editing. SH: study design, result interpretation, review, and editing of manuscript. CC: Funding, study design, result interpretation, review and editing manuscript. SDM: Funding, study design, study operational oversight result interpretation, review and editing manuscript.

Funding This project was supported by award number 67155 from the Adolescent HIV Prevention and Treatment Implementation Science Alliance (AHISA) (PI: MNK) and R01MH114544 (MPI: SDM, CC) from the National Institutes of Mental Health (NIMH) of the National Institutes of Health (NIH). However, the statements made, and views expressed do not necessarily reflect the department's official policies; they are solely the responsibility of the authors.

Declarations

Conflict of interest The authors declare that they do not have any competing interests.

References

1. Vanhamel J, Rotsaert A, Reyniers T, Nöstlinger C, Laga M, Van Landeghem E, et al. The current landscape of pre-exposure prophylaxis service delivery models for HIV prevention: a scoping review. BMC Health Serv Res. 2020;20(1):704.
2. Global A, Update. 2018: miles to go: closing gaps, breaking barriers, righting injustices. Geneva: Joint United Nations Programme on HIV. AIDS. 2018.
3. Fonner VA, Dalglish SL, Kennedy CE, Baggaley R, O'Reilly KR, Koechlin FM, et al. Effectiveness and safety of oral HIV preexposure prophylaxis for all populations. AIDS. 2016;30(12):1973–83.
4. Marrazzo JM, Ramjee G, Richardson BA, Gomez K, Mgodi N, Nair G, et al. Tenofovir-based preexposure prophylaxis for HIV infection among African women. N Engl J Med. 2015;372(6):509–18.
5. Van Damme L, Corneli A, Ahmed K, Agot K, Lombaard J, Kapiga S, et al. Preexposure prophylaxis for HIV infection among African women. N Engl J Med. 2012;367(5):411–22.

6. Lanham M, Ridgeway K, Mireku M, Nhamo D, Pillay D, Murire M, et al. Health care providers' attitudes toward and experiences delivering oral PrEP to adolescent girls and young women in Kenya, South Africa, and Zimbabwe. BMC Health Serv Res. 2021;21(1):1112.
7. Nyblade L, Ndirangu JW, Speizer IS, Browne FA, Bonner CP, Minnis A, et al. Stigma in the health clinic and implications for PrEP access and use by adolescent girls and young women: conflicting perspectives in South Africa. BMC Public Health. 2022;22(1):1916.
8. Ongolly FK, Dolla A, Ngure K, Irungu EM, Odoyo J, Wamoni E, et al. I just decided to stop: Understanding PrEP discontinuation among individuals initiating PrEP in HIV care centers in Kenya. J Acquir Immune Defic Syndr. 2021;87(1):e150–8.
9. Ramraj T, Chirinda W, Jonas K, Govindasamy D, Jama N, McClinton Appollis T, et al. Service delivery models that promote linkages to PrEP for adolescent girls and young women and men in sub-Saharan Africa: a scoping review. BMJ Open. 2023;13(3):e061503.
10. Grimsrud A, Wilkinson L, Delany-Moretlwe S, Ehrenkranz P, Green K, Murenga M, et al. The importance of the how: the case for differentiated service delivery of long-acting and extended delivery regimens for HIV prevention and treatment. J Int AIDS Soc. 2023;26:e26095.
11. Hoke T, Bateganya M, Toyo O, Francis C, Shrestha B, Philakone P, et al. How home delivery of antiretroviral drugs ensured uninterrupted HIV treatment during COVID-19: experiences from Indonesia, Laos, Nepal, and Nigeria. Glob Health Sci Pract. 2021;9(4):978–89.
12. Huber A, Pascoe S, Nichols B, Long L, Kuchukhidze S, Phiri B, et al. Differentiated service delivery models for HIV treatment in Malawi, South Africa, and Zambia: A landscape analysis. Glob Health Sci Pract. 2021;9(2):296–307.
13. Barnabee G, O'Bryan G, Ndeikemona L, Billah I, Silas L, Morgan KL, et al. Improving HIV pre-exposure prophylaxis persistence among adolescent girls and young women: insights from a mixed-methods evaluation of community, hybrid, and facility service delivery models in Namibia. Front Reprod Health. 2022;4:1048702.
14. Health NDo. Guidance to Implementing Partners Regarding Managing Clients on Pre-Exposure Prophylaxis during the State of Emergency COVID-19. South Africa2020.
15. Stoner MCD, Rucinski KB, Giovenco D, Gill K, Morton JF, Bekker LG, et al. Trajectories of PrEP adherence among young women aged 16 to 25 in cape town, South Africa. AIDS Behav. 2021;25(7):2046–53.
16. Velloza J, Poovan N, Ndlovu N, Khoza N, Morton JF, Omony J, et al. Adaptive HIV pre-exposure prophylaxis adherence interventions for young South African women: study protocol for a sequential multiple assignment randomized trial. PLoS ONE. 2022;17(4):e0266665.
17. Ntinga X, Musiello F, Pita T, Mabaso N, Celum C, Szpiro A, et al. People living with HIV's perspectives of acceptability of fee for home delivery of ART: a qualitative study. BMC Health Serv Res. 2024;24(1):88.
18. Bochner AF, Meacham E, Mhungu N, Manyanga P, Petracca F, Muserere C, et al. The rollout of community ART refill groups in Zimbabwe: a qualitative evaluation. J Int AIDS Soc. 2019;22(8):e25393.
19. Ngure K, Ortblad KF, Mogere P, Bardon AR, Thomas KK, Mangale D, et al. Efficiency of 6-month PrEP dispensing with HIV self-testing in Kenya: an open-label, randomised, non-inferiority, implementation trial. Lancet HIV. 2022;9(7):e464–73.
20. O'Reilly A, Mavhu W, Neuman M, Kumwenda MK, Johnson CC, Sinjani G, et al. Accuracy of and preferences for blood-based versus oral-fluid-based HIV self-testing in Malawi: a cross-sectional study. BMC Infect Dis. 2024;22(1):979.
21. Henderson M, Schmidt H-MA, Chitembo L, Peralta H, Alaama AS, Johnson C, et al. The future of pre-exposure prophylaxis (PrEP) for HIV prevention: a global qualitative consultation on provider perspectives on new products and differentiated service delivery. AIDS Behav. 2023;27(11):3755–66.
22. Guthrie T, Muheki C, Rosen S, Kanoowe S, Lagony S, Greener R, et al. Similar costs and outcomes for differentiated service delivery models for HIV treatment in Uganda. BMC Health Serv Res. 2022;22(1):1315.
23. Selke HM, Kimaiyo S, Sidle JE, Vedanthan R, Tierney WM, Shen C, et al. Task-shifting of antiretroviral delivery from health care workers to persons living with HIV/AIDS: clinical outcomes of a community-based program in Kenya. J Acquir Immune Defic Syndr. 2010;55(4):483–90.
24. van Heerden A, Szpiro A, Ntinga X, Celum C, van Rooyen H, Essack Z, et al. A sequential multiple assignment randomized trial of scalable interventions for ART delivery in South Africa: the SMART ART study. Trials. 2023;24(1):32.
25. Larki M, Roudsari RL. Home-based care, the missing link in caring of patients living with HIV/AIDS and their family members: a narrative review. Int J Community Based Nurs Midwifery. 2020;8(3):190.
26. Rousseau E, Bekker L-G, Julies RF, Celum C, Morton J, Johnson R, et al. A community-based mobile clinic model delivering PrEP for HIV prevention to adolescent girls and young women in cape town, South Africa. BMC Health Serv Res. 2021;21(1):888.