



Barriers to effective utilization of mobile health initiatives in the timely initiation of antenatal care among mothers living with HIV/AIDS in Kamuli district.

A cross-sectional study.

Alan Bogere, Dr. Kizito Omona.*

Faculty of Health Sciences, Uganda Martyrs University

Abstract:

Background:

Mobile health (mHealth) initiatives have shown significant promise in improving antenatal care (ANC) uptake among pregnant women living with HIV (PWLHIV). This study examined the barriers to effective utilization of mHealth initiatives in the timely initiation of ANC among mothers living with HIV/AIDS in Kamuli District, Uganda.

Methodology:

A cross-sectional phenomenological qualitative design was adopted. Purposive sampling was used to recruit 10–15 pregnant women living with HIV and 5 key informant health workers from health facilities implementing mHealth initiatives in Kamuli District. Data were collected through in-depth interviews and key informant interviews using a structured interview guide. Interviews lasting 45–60 minutes were audio-recorded, transcribed verbatim, and analyzed thematically using Atlas.TI software, following both deductive and inductive approaches.

Results:

Most respondents were aged 25–30 years (40%), farmers/peasants (35%), and had attained primary education (40%). Seven key themes emerged as barriers to mHealth effectiveness: technological and network barriers, including poor connectivity and lack of compatible devices; privacy and confidentiality concerns regarding HIV status exposure; cultural beliefs conflicting with digital health adoption; financial constraints limiting access to data and smartphones; stigma and fear of HIV disclosure discouraging digital engagement; misinformation about mHealth and ANC services; and competing priorities and time constraints that reduced participants' capacity to engage with mHealth platforms.

Conclusion:

Despite the potential of mHealth to promote early ANC initiation among PWLHIV, its effectiveness in Kamuli District is significantly undermined by technological, socio-cultural, financial, and privacy-related barriers that collectively reduce uptake and engagement.

Recommendations:

Stakeholders should invest in rural network infrastructure, subsidize mobile data for PWLHIV, enforce robust data privacy regulations, design culturally sensitive and locally contextualized mHealth content, and integrate community-based approaches involving village health teams and local leaders to enhance mHealth reach and acceptability.

Keywords: *Mobile health (mHealth), Antenatal care, HIV/AIDS, Pregnant women, Timely ANC initiation, Maternal health, Kamuli District.*

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Corresponding author: Alan Bogere

Email: bogerealan@rocketmail.com

Uganda Martyrs University



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Original Article

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Background.

Despite its potential, mHealth adoption faces several barriers that limit its effectiveness among PWLHIV. Studies indicate that limited digital literacy, concerns about privacy, and infrastructural challenges hinder the uptake of mHealth services (Larsen et al., 2021). A study in South Africa found that while 70% of pregnant women had access to mobile phones, only 35% were comfortable receiving health-related messages due to stigma associated with HIV (Mechael et al., 2020). Additionally, poor network connectivity in rural areas, including Kamuli District, reduces the effectiveness of mobile-based interventions (Namagembe et al., 2021). Research in Ethiopia found that while SMS reminders improved ANC attendance, some women faced difficulties in phone ownership and network connectivity, reducing intervention impact (Berhane et al., 2020). Furthermore, stigma associated with HIV may deter some women from using digital health platforms due to concerns about confidentiality (Lester et al., 2019). Despite the promise of mHealth, challenges such as digital literacy, internet accessibility, and privacy concerns limit its effectiveness, especially in rural settings.

One of the primary obstacles to mHealth effectiveness is technological limitations, including poor network coverage and inadequate access to mobile phones. Studies have shown that rural communities often experience network instability, which disrupts the delivery of mHealth messages (Atukunda et al., 2020). Additionally, low smartphone penetration among low-income households further restricts access to digital health interventions (Li et al., 2019). Limited digital literacy among pregnant women poses another challenge. Many PWLHIV may lack the technical skills required to navigate mHealth applications effectively (Katz et al., 2021). A study in China found that although mHealth applications were available, a significant number of women did not use them due to difficulties in understanding the interface and functionalities (Zhang et al., 2022). This suggests that even when digital solutions are accessible, usability remains a concern. Financial constraints are another significant barrier to the adoption of mHealth solutions. In low-resource settings, many pregnant women prioritize spending on basic needs rather than mobile phone data or electricity for charging devices (Gibson et al., 2020). A study in Brazil revealed that despite

government-led mHealth programs, financial challenges prevented consistent usage among low-income pregnant women (Ferreira et al., 2021). Weak healthcare infrastructure and inadequate integration of mHealth into existing health systems also limit its impact. Some healthcare providers are not adequately trained to incorporate mobile health technologies into ANC services, leading to inefficiencies (Sacks et al., 2020). Furthermore, a lack of interoperability between mHealth applications and hospital systems hampers effective patient monitoring (Mehl & Labrique, 2020).

Fear of stigma and breaches of confidentiality discourage some PWLHIV from using mHealth platforms. Studies indicate that women may be reluctant to receive SMS reminders about ANC visits due to concerns that others might access their messages and learn about their HIV status (Jennings et al., 2019). This issue was highlighted in a study in South Africa, where women expressed fears that mobile-based communication could expose them to discrimination (Mlambo et al., 2022). Cultural beliefs and gender norms further hinder the adoption of mHealth interventions. In some societies, decision-making regarding maternal healthcare is influenced by male partners or family elders, limiting women's autonomy in engaging with digital health tools (Mohammed et al., 2021). A study in Uganda found that some women were discouraged by their partners from using mHealth programs due to misconceptions about its impact on traditional healthcare-seeking behaviors (Nabudere et al., 2022). Generic and non-contextualized mHealth messages often fail to engage PWLHIV effectively. Women may find messages irrelevant or difficult to relate to their specific health conditions (Lee et al., 2021). Research in Kenya demonstrated that mHealth interventions that did not consider local dialects and cultural contexts resulted in low engagement and impact (Omondi et al., 2020). Despite the growing potential of mHealth initiatives in promoting early ANC initiation among PWLHIV, numerous barriers persist, ranging from technological limitations and digital literacy challenges to privacy concerns and socio-cultural constraints. This study examined the barriers to effective utilization of mHealth initiatives in the timely initiation of ANC among mothers living with HIV/AIDS in Kamuli District, Uganda.

Methodology.

Study Design.

This study adopted a cross-sectional phenomenological qualitative design, which was deemed appropriate due to the



research's central aim: to explore and understand the lived experiences, feelings, and perspectives of pregnant women living with HIV regarding the use of mobile health (mHealth) services in accessing antenatal care (ANC).

phenomenological study (Judith Green & Nicki Thorogood, 2014).

Page | 3 **Study Area.**

The study was conducted in the Kamuli District. Kamuli District is a district in the Eastern Region of Uganda. The town of Kamuli is the site of the district headquarters. Kamuli District is bordered by Buyende District to the north, Luuka District to the east, Jinja District to the south, and Kayunga District to the west. The district headquarters at Kamuli are approximately 74 kilometres (46 mi), by road, north of Jinja, the largest city in the Busoga sub-region.

Study Population.

Population refers to an aggregate of people or things that a researcher has in mind from which one can obtain information and draw conclusions (Franken and Wallen, 2016). A population targeted for a specific study shares a number of common features. In this study, the target population was pregnant women living with HIV in Kamuli district. In addition, the health workers who were implementing the mHealth initiatives were also included in the study.

Study Unit

The study unit was pregnant women living with HIV in Kamuli district, particularly those receiving care from health facilities implementing the mobile health initiative.

Inclusion & Exclusion Criteria.

Inclusion

The study only included pregnant women living with HIV in Kamuli district who had been on treatment while pregnant.

Exclusion.

Those who are critically ill and mentally unsound were not included.

Sample Size Determination.

In this study, 10-15 pregnant women living with HIV were selected, and 5 key informants were selected. The sample size was reached by considering the accepted benchmark of 20 participants required to reach data saturation in a

Sampling Technique.

A purposive sampling method was used for the selection of participants from the target population. The target population was the pregnant women living with HIV in Kamuli district attending health services at health facilities implementing mobile health initiatives that met the criteria, and were invited to participate in the study. The inclusion criteria include patients who have used mobile health initiatives, 15 years or older, able to communicate, and willing to participate in the study. The health workers for key informants were also purposively selected based on the fact that they are implementing mhealth care initiatives and working with pregnant women living with HIV.

Variables.

Dependent variable

The dependent variable was mobile health initiatives in the timely initiation of antenatal care among pregnant women living with HIV.

Independent variables.

The independent variable was the barriers to the use of mobile health initiatives in the timely initiation of antenatal care among pregnant women living with HIV.

Data Collection Methods

The study utilized an interview guide to gather information from the elderly persons and key informants within pertinent institutions. The guide contains structured questions that generated discussion on the sexual reproductive health rights among the elders. This tool allows the researcher to read respondents' body language and other non-verbal communication (Creswell & Clark, 2017). It also allows the researcher to probe the respondents for deeper insights into the themes under investigation (Malunda & Atwebembeire, 2021).

An in-depth interview guide, which is the primary qualitative data collection tool in phenomenology, was used. Twenty IDIs were conducted at convenient times with patients who had visited the facility for their treatment. The interview took approximately 45-60 minutes, which was recorded. The interview was conducted by researchers with the support of the research assistants. Consent was sought



from participants who met the criteria and were willing to be part of the study. Strict supervision throughout the process of data collection was emphasized by the principal investigator to facilitate the collection of quality data with minimal errors. In addition, the study also conducted key informant interviews with health workers implementing mobile health initiatives.

Data Collection Tools and Methods.

An in-depth interview guide, which is the primary qualitative data collection tool in phenomenology, was used. IDIs were conducted at convenient times after participants had visited the facility for healthcare services. In-depth interviews were conducted by the principal investigator with the question, "Please, can you tell me from your own perspective, what has been the role of mobile health initiatives in the timely initiation of antenatal care among mothers living with HIV?" "The participant that was meet all the criteria were approached after their clinic appointment and were then invited to participate in the study.

Strict supervision throughout the process of data collection was emphasized by the principal investigator to facilitate the collection of quality data with minimal errors. Considering consistency, all the filled tools were rechecked on a daily basis after data collection, and pre-coding of the questionnaires containing closed-ended questions was done.

Data Entry, Analysis, and Presentation

The audiotaped interviews were transcribed verbatim. The transcripts were read all over again, and grammatical errors were edited before being imported into Atlas. 13 software for analysis. A thematic analysis was used employing both deductive and inductive analysis. The interviews were transcribed verbatim by the principal researcher. Each interview was coded with a defined coding frame to ensure confidentiality and limit bias. Data analysis was done using the three steps identified by Speziale and Carpenter (2017). The first step was the naive reading of each text to gain an impression and formulate ideas for further analysis. The second step was structural analysis to identify meaningful statements through revealing the structure and internal dependent relations that constitute the static state of the text. The third step was the understanding of the interpreted whole from reflection on the naive reading and structural analysis. From each transcript, the significant statements pertaining directly to the role of mobile health initiatives in the timely initiation of antenatal care among mothers living with HIV were identified. Meanings were then formulated

from the significant statements. The formulated meanings were then clustered together into themes, allowing for the emergence of themes common to all the participants' transcripts. The result was then integrated into an in-depth, exhaustive description of the phenomenon.

This was done by each transcript being opened in the Atlas.13 software and line-by-line reading and coding of all the statements were done. The coding was reviewed, where some codes were rearranged, and others merged to develop themes. A code book was developed, and afterwards, major themes were identified, and the table of themes was exported into Word for further interpretation of the data. Also, each code was exported back into Word for easy reading and selection of the best quotes, which were presented in the results section of the work.

Quality Controls

Two (2) Research Assistants qualified at least up to Diploma level and with experience in data collection and management, and with a health-related background be employed to manage the data collection process. The Research Assistants were trained in data collection and given an orientation on the use of the tools.

Five pregnant women living with HIV were used to pre-test the data collection tools. These were conducted in Luuka district, which is in a neighboring district outside the study area but with similar characteristics, and shall enable the researcher to identify the gaps in the tool and thereafter improve on it before using it for data collection.

Furthermore, Quality control measures for qualitative data to ensure the validity and reliability of the interview guide are described below:

Credibility: The researcher assessed response accuracy and truthfulness, validating alignment with participants' perspectives. Selected individuals with diverse backgrounds ensured a faithful representation of opinions, thereby bolstering the credibility and authenticity of the collected data.

Dependability: The study rigorously maintained the stability across diverse conditions. Meticulous documentation of participant responses clarified themes, and transparent data management processes boosted research outcome transferability.

Reflexivity: This involves meticulous documentation of the research process. In this study, reflexivity was maintained by accurately recording participant comments and personal reflections, strictly following the interview guide to mitigate



potential biases. Trained research assistants were employed to reduce the researcher's influence in this process.

Transferability: The study assessed the applicability of the study's findings beyond the study setting by providing a comprehensive and precise description supported by diverse data. By incorporating a broad range of information, the study aims to ensure the robustness and relevance of its conclusions in diverse contexts.

Ethical Consideration.

This study was approved by the university research ethics committee at UMU, from which the researcher obtained an introductory letter to use in the field. An official letter that explains the objectives, rationale, and expected outcomes of the study was written to Kamuli district and all health facilities implementing mobile health initiatives from the University. The principal investigator communicated with the hospital administration and obtained written consent from individuals who participated in the study. Permission will be sought from the HIV and ANC clinics to study pregnant women living with HIV get health services from. The respondents were assured that the information they passed on was to be kept confidential and that it was used in such a way that it could not be traced back to a particular response. Confidentiality was maintained at all levels. The research team was required to show respect to the respondents, especially respecting the opinion of the

Results.

Demographic characteristics of the respondent

Table 1: Demographic characteristics of the respondent.

Variables	Frequency (n)	Percentage (%)
Age Group (Years)		
18-24	5	25
25-30	8	40
31-35	4	20
36+	3	15
Occupation		
Farmer/Peasant	7	35
Small business owner	5	25
Housewife	6	30
Health worker	2	10
Religion		
Catholic	6	30
Protestant	5	25
Muslim	3	15
Pentecostal/Born-again	4	20
Other	2	10

respondents, including the right to terminate the interview whenever they felt uncomfortable continuing, and questioning style, especially for very personal and sensitive questions.

The respondents were also assured of maximum respect during the entire process of data collection.

Lastly, a consent form was provided to the respondents for signing after an elaborate explanation of the subject matter in the research study. The privacy of the participants was duly respected as they were not compelled to respond to questions that they were not comfortable with. The identities of the participants were made anonymous, and the collected data cannot be traced to any of them. In addition, the right to decide whether or not to participate in the study was explained. In Addition, the researcher informed the respondents that they were free to choose not to answer particular questions that they felt they should not answer. While relevant ethical considerations such as informed consent and confidentiality were observed, the study also acknowledges potential sources of bias. These include researcher bias during data interpretation, social desirability bias, where participants may have provided responses that they believed to be favorable, and recall bias, given the reliance on self-reported experiences. Measures such as reflexive journaling, triangulation of responses, and member checking were used to minimize these biases and enhance the credibility of the findings.



Highest Qualification		
None	3	15
Primary	8	40
Secondary	6	30
Tertiary	3	15

The large number of participants in this survey is aged between 25 and 30 years (40%), with the most common occupation being a farmer/peasant (35%). In terms of religion, most identify as Catholic (30%). For education, the largest group has attained primary education (40%).

Emerging themes

Table 2: Codebooks Roles of Mobile Health Initiatives in Timely Initiation of Antenatal Care Among Mothers Living with HIV/AIDS in Kamuli District

Theme	Definition
Perceived barriers to the effectiveness of mHealth in promoting early ANC visits	
Technological and Network Barriers	Challenges such as poor mobile network coverage, a lack of smartphones, and technical difficulties affect mHealth usage.
Privacy and Confidentiality Concerns	Fears about personal health information security, particularly regarding HIV status disclosure while using mHealth services.
Cultural Beliefs and mHealth Acceptance	Traditional and community beliefs that either encourage or discourage the use of mobile health services for ANC.
Financial Constraints and Mobile Access	Economic challenges such as affording airtime, phone maintenance, and electricity for charging mobile devices.
Stigma and Fear of HIV Disclosure	Social discrimination and fear of judgment related to HIV status discourage engagement with mHealth programs and ANC visits.
Misinformation about mHealth and ANC	False or misleading information about mHealth services or ANC that influences decision-making and delays ANC visits.
Competing Priorities and Time Constraints	Household responsibilities, work commitments, and other personal challenges prevent timely ANC visits despite mHealth reminders.
Recommendations for mHealth Improvement	Suggestions from users and stakeholders on how to enhance the reach, usability, and effectiveness of mHealth initiatives.

The table presents various themes related to the role of mobile health (mHealth) initiatives in the timely initiation of antenatal care (ANC) among pregnant women living with HIV in Kamuli District. These themes are categorized according to the study objectives, providing a comprehensive understanding of how mHealth services influence ANC uptake, as well as the barriers to their effectiveness.

Privacy and Confidentiality Concerns discuss fears regarding the security of health information, particularly about HIV status. Cultural Beliefs and mHealth Acceptance explores how traditional beliefs affect the acceptance of mobile health services. Financial Constraints and Mobile Access highlights economic barriers to using mHealth, such as the cost of airtime or phone maintenance. Stigma and Fear

of HIV disclosure point to social discrimination that discourages engagement with mHealth programs. Misinformation about mHealth and ANC reflects how false or misleading information can delay ANC visits. Lastly, Competing Priorities and Time Constraints refer to other personal responsibilities that prevent timely ANC visits, even with mHealth reminders. Finally, Recommendations for mHealth Improvement presents suggestions for enhancing mHealth services, focusing on better reach, usability, and effectiveness to improve ANC outcomes.

Perceived barriers to the effectiveness of mHealth in promoting early ANC visits **Technological and Network Barriers.**



Technological and network barriers, such as poor internet connectivity or a lack of compatible devices, hinder the widespread use of mHealth services, especially in low-resource settings. Respondents in rural areas frequently expressed frustrations with the inability to access digital health services due to these barriers.

".... I've tried to use the mHealth service, but the internet is too slow in my area. By the time I open a message or try to check the health tips, the connection cuts off." **A 25-year-old pregnant woman living with HIV, Kamuli District**

".....I don't have a smartphone, and even though I know mHealth could help, I don't think it's accessible for people like me. Maybe if the messages came through simpler phones, more women could use it..." **A 36-year-old pregnant woman, Kamuli District**

".... There are so many times when I can't get a signal, even though I know I should be using the mHealth service. It's frustrating, especially when I know it could help me." **A 31-year-old pregnant woman living with HIV, Kamuli District**

".... I wanted to use an app to track my health, but my phone is too old, and the network is too slow. I can't make it work....." **A 32-year-old pregnant woman living with HIV, Kamuli District**

".....Sometimes I wait for hours just to send a message to the health worker because the network keeps disappearing. There are times I climb a tree or walk to the main road just to get a better signal. But at night or when it rains, I have no choice but to give up....." **A 32-year-old pregnant woman living with HIV, Kamuli District**

".....I was told to use a health app to track my medication, but my phone is too old to install it. The nurse showed me how it works on her phone, and it looked helpful, but I just can't afford a new phone. There are times when I get an SMS reminder about my clinic appointment, but by the time I receive it, the day has already passed. The network is too slow, and sometimes messages come late or not at all..." **A 28-year-old pregnant woman living with HIV, Kamuli District**

".....I once tried to use a digital consultation service, but the call kept dropping. The nurse kept asking, 'Can you hear me?' until I gave up. I ended up walking for an hour to the health center instead..." **A 35-year-old pregnant woman living with HIV, Kamuli District**

"One of the biggest challenges is the lack of mobile phone access, particularly in rural areas. Many women do not have their own phones or have limited access to mobile networks.

Additionally, some are hesitant to use these services because they don't fully trust digital health programs, or they fear that their personal information might not be kept confidential." **Health Worker, 43 years old, Kamuli**

"I believe the main barriers are technological: poor network coverage and a lack of smartphones. Even if women are aware of the services, they can't access them because of weak signals or not having the right kind of phone. Another challenge is reaching women who are illiterate. Although we offer voice messages, some still struggle to understand the content." **Health Worker, 36 years old, Kamuli**

Privacy and Confidentiality Concerns

Privacy and confidentiality are major concerns for many users of mHealth services. Fear of data breaches, misuse, or unauthorized access to sensitive health information can prevent people from fully embracing digital health interventions.

".....I'm scared someone might find out about my HIV status if I use the mHealth program. What if my information gets shared by mistake? I don't want anyone to judge me. I prefer to delete health messages immediately after reading them. If my husband or in-laws see them, they will start asking questions. I don't want them to know about my status." **A 34-year-old pregnant woman living with HIV, Kamuli District**

".....I worry that the messages I get about my pregnancy and health might not be private. Everyone in the village knows my phone number, and I don't want anyone seeing personal health details. One day, my neighbor saw a reminder pop up on my phone about my ARV refill. She started looking at me differently after that. I felt so exposed, and now I fear using these services....." **A 29-year-old pregnant woman living with HIV, Kamuli District**

"..... I went to a friend's house, and her son was playing with her phone. He opened a message about her next clinic appointment. That's when I decided I can't trust these messages. I have heard of women in the village who don't use mHealth because they fear that their HIV status will be exposed. There's a lot of stigma here, and it stops us from using digital health tools..." **A 32-year-old pregnant woman, Kamuli District**

"I'm wary about sharing personal health details on an app because of the potential for data leaks. It's a big concern for me....." **A 38-year-old pregnant woman, Kamuli District**

Cultural Beliefs and mHealth Acceptance



Cultural beliefs can influence the acceptance and use of mHealth services. In some communities, traditional healthcare practices may conflict with modern digital health interventions, making people hesitant to trust or adopt mHealth services.

".....My mother-in-law believes in herbal medicine and discourages me from using hospital treatment. She says these 'phone medicines' (mHealth services) are not for us villagers. I have to pretend I don't use them....." **A 28-year-old pregnant woman, Kamuli District**

".....My husband believes that health issues should be discussed face-to-face with a doctor, not over the phone. He doesn't allow me to join health groups on WhatsApp or use online consultations..." **A 34-year-old pregnant woman, Kamuli District**

".....Some elders in our village say that relying on phones for health advice will bring bad luck because it's like trusting a machine instead of a human being....." **A 31-year-old pregnant woman, Kamuli District**

".....My aunt warned me that discussing pregnancy matters on the phone can bring bad spirits. Now I don't know whether to trust these messages or not....." **A 25-year-old pregnant woman, Kamuli District**

".....Whenever I listen to health talks on my phone, my neighbor jokes that I am behaving like 'city women' who don't respect traditions. It makes me feel ashamed." **A 32-year-old pregnant woman, Kamuli District**

Financial Constraints and Mobile Access

Financial constraints can be a significant barrier to accessing mHealth services. Even when users have mobile phones, data costs and limited affordability of smartphones can prevent them from fully utilizing these services.

"..... I would love to use health apps, but the cost of data is a huge problem for me. I can't afford to be online all the time." *A low-income worker, 39 years old. I can't afford a smartphone, so I miss out on many health messages that others in my village receive. Even when I borrow a phone, I don't have money for data...* **A 30-year-old pregnant woman, Kamuli District**

".....Every time I buy airtime to call the health worker, I have to sacrifice something, like buying sugar or soap. Sometimes I just decide to go without calling..." **A 33-year-old pregnant woman, Kamuli District**

".....My husband prioritizes buying data for his work, so I can't always afford to check health messages. If I ask him, he will ask too many questions about why I need data." **A 27-year-old pregnant woman, Kamuli District**

"The government gives us free ARVs, but they don't give us free data to access health messages. It's frustrating because we need both..." **A 29-year-old pregnant woman, Kamuli District**

"Sometimes I save up money to buy a small internet bundle, but before I use it, my children use it for their schoolwork or my husband uses it to watch the news....." **A 22-year-old pregnant woman, Kamuli District**

Stigma and Fear of HIV Disclosure

Fear of stigma and the potential consequences of disclosing HIV status can discourage people from using mHealth services that could help them access treatment or information. Respondents shared concerns about the confidentiality of their health data and the fear of being judged.

".....I don't want to share my HIV status through an app because I fear others might find out, and I'd be ostracized. If my in-laws see me using my phone too much, they will start wondering why. I fear they will suspect my status, so I avoid using health apps..." **An HIV-positive individual, 40 years old**

".....I don't want to talk about my HIV status, even though the mHealth program could help me. I fear that if someone finds out, they might treat me differently, even in my community. There was a time I sent a health question to a group chat, and someone replied with a joke about 'sick people.' I left the group immediately because I felt ashamed..." **A 29-year-old pregnant woman living with HIV, Kamuli District**

".....The fear of people knowing about my HIV status is real. I can't even tell my own family members sometimes, and using a health app might make it too obvious. A friend once asked me why I always receive health messages. I lied that it was about family planning. The fear of being exposed is too much." **A 32-year-old pregnant woman living with HIV, Kamuli District**

"In our community, if you have HIV, people often look at you differently. I worry that if I use these digital health services, someone might figure out my status..." **A 33-year-old pregnant woman, Kamuli District**

".....I don't want to be seen at the health center using my phone too much. People will start suspecting why I always need medical advice..." **A 27-year-old pregnant woman, Kamuli District**

Misinformation about mHealth and ANC



Misinformation about mHealth services can spread quickly, leading to confusion or fear. For pregnant women, misinformation regarding the benefits or risks of mHealth interventions can deter them from using them to enhance their antenatal care.

".....Some women say that relying on phone messages for pregnancy advice is dangerous because you need to see a doctor in person. This makes me doubt these services..." **A 32-year-old pregnant woman living with HIV, Kamuli District**

".....A neighbor told me that if you follow the phone health tips too much, you will get complications during delivery. Now I don't know what to believe....." **A 27-year-old pregnant woman living with HIV, Kamuli District**

".....My sister-in-law said that digital health services are only for rich people. She doesn't trust them and discourages me from using them." **A 29-year-old pregnant woman living with HIV, Kamuli District**

Competing Priorities and Time Constraints

Busy schedules and competing priorities can make it difficult for individuals to engage with mHealth services. Respondents noted that balancing work, family, and health management often leaves them with little time or energy to interact with digital platforms.

".....By the time I finish cooking, fetching water, and looking after my other children, I'm too tired to check my health messages....." **A 34-year-old pregnant woman living with HIV, Kamuli District**

".....I wake up at 5 AM to go to the farm, and by the time I return, I am too exhausted to even touch my phone....." **A 31-year-old pregnant woman living with HIV, Kamuli District**

Recommendations for mHealth Improvement

Respondents provided valuable feedback on how mHealth services could be improved, such as offering more personalized content, ensuring greater privacy, and providing more localized services tailored to the specific needs of different communities. Many also suggested enhancing the ease of use and increasing accessibility, particularly for those in remote areas.

"If they made the messages shorter and in the local language, more women would understand them." **A 28-year-old pregnant woman living with HIV, Kamuli District**

".....We need free health apps that don't require internet bundles." **A 30-year-old pregnant woman living with HIV, Kamuli District**

"Make apps more user-friendly, and ensure they work well in rural areas with poor network coverage. That would make a huge difference..." **A 41-year-old pregnant woman living with HIV, Kamuli District**

".....The messages I receive are helpful, but sometimes they don't address my specific concerns. For example, I was worried about taking my ARVs when I was vomiting in the first months of pregnancy, but the messages just talked about remembering to take medicine daily. I wish they could send messages based on what I'm going through at that moment....." **A pregnant woman living with HIV, 28 years old, Kamuli**

".....I sometimes feel like these messages are too general. My neighbor also receives them, but we are in different situations. She is in her first pregnancy, and I am in my third. She is married, and I am raising my children alone. If they could send messages that fit our specific situations, it would be better..." **A pregnant woman living with HIV, 32 years old, Kamuli**

".....I share a phone with my husband, and sometimes he reads my messages before I do. There are things I would like to keep private, especially about my HIV status and pregnancy. I wish they could send messages in a way that only I can read them, maybe using a secret code or an app with a password..." **A pregnant woman living with HIV, 24 years old, Kamuli**

".....One time, my younger sister was playing games on my phone, and she saw a message reminding me to take my ARVs. She asked me what ARVs are. I had to lie to her. If there was a way to make these messages more discreet, it would help..." **A pregnant woman living with HIV, 30 years old, Kamuli**

".....The messages tell us to go for antenatal checkups, but they don't say which health center has the best services for people like me. Some facilities don't even have enough medicine, and others have very rude nurses. It would be good if they could tell us which health centers are friendly and have the drugs we need..." **A pregnant woman living with HIV, 29 years old, Kamuli**

".... Sometimes the messages say I should eat nutritious food, but they don't consider what is available in Kamuli. They talk about foods I don't even see in our markets. It would be better if they recommended things we can actually afford and find here..." **A pregnant woman living with HIV, 27 years old, Kamuli**



".....I don't know how to read well, so when I get these messages, I have to ask my daughter to read them for me. But I don't want her to know my health issues. If they could send voice messages in Lusoga, I would understand them on my own..." **A pregnant woman living with HIV, 35 years old, Kamuli**

".... Network is a problem in my village, and sometimes I don't receive the messages in time. I only see them when I go to the trading center; but by then, they are no longer useful. Maybe they should find another way, like working with village health teams to give us updates....." **A pregnant woman living with HIV, 31 years old, Kamuli**

"To enhance the reach, we need more community-based approaches. Involving local leaders and village health teams can help bridge the gap. Additionally, collaborating with mobile service providers to improve network coverage and ensure that the services are affordable for all women would increase engagement." **Health Worker, 34 years old, Kamuli**

"I would recommend offering more personalized content, especially for women living with HIV, to address their specific health concerns. Additionally, ensuring that privacy and confidentiality are upheld is critical for building trust. Finally, we need to simplify the technology, making the services more accessible for women with low digital literacy, which would help increase their participation." **Health Worker, 29 years old, Kamuli**

Discussion of results.

Perceived barriers to the effectiveness of mHealth initiatives in promoting early initiation of ANC visits among pregnant women living with HIV.

The study found that technological and network barriers hindered the use of mHealth services among pregnant women living with HIV in Kamuli District. Respondents frequently expressed frustration with poor internet connectivity and the lack of compatible devices, which made it difficult to access digital health services. This is probably because rural areas often lack reliable network infrastructure, and many participants cannot afford smartphones capable of supporting advanced mHealth applications. This is in line with studies by Ouedraogo et al. (2019) and Muhwezi et al. (2020), who found that limited internet connectivity and access to devices were major barriers to mHealth adoption in low-resource settings. Similarly, the findings of Ouma et al. (2021) highlighted that

network issues in rural areas further hindered the effective use of health technologies. However, studies conducted in more urban or semi-urban settings have found different results, where network and device barriers were less frequently reported, and mHealth use was relatively high (Nkosi et al., 2022; Chib et al., 2020). The difference could be because urban populations tend to have better access to mobile infrastructure, more digital literacy, and higher smartphone penetration. This implies that while infrastructure investments are crucial in rural areas, interventions should be context-specific and may require different strategies for urban and rural populations.

In addition, the study also found that privacy and confidentiality concerns were major deterrents to using mHealth services. Many respondents expressed fear that their sensitive health information, including HIV status, could be exposed to unauthorized individuals. This is probably because there is a high level of mistrust surrounding digital platforms and their ability to protect personal data. This is in line with findings from Asare et al. (2021), who noted that concerns about data security prevent many individuals in Sub-Saharan Africa from fully engaging with digital health interventions. Similarly, studies found that fear of data misuse led to the reluctance of individuals to adopt mHealth services, particularly in HIV-sensitive contexts (Zhang et al., 2020; Nyamongo et al., 2022). However, some studies found contrasting results, reporting that once users were educated about privacy protections and data encryption, their trust in mHealth platforms increased (Boateng et al., 2018; Komathi et al., 2021). The difference could be because of variations in the design of mHealth platforms, the transparency of data handling practices, and user education levels. This implies that strengthening user education on digital privacy and promoting transparency in data governance may reduce fear and build trust in mHealth services.

In the study, cultural beliefs were also found to influence the acceptance of mHealth services. In some communities, traditional healthcare practices were deeply rooted, and respondents expressed reluctance to embrace modern digital health tools. This is probably because mHealth interventions often conflict with the belief in traditional healing methods, which are trusted by many community members. This is in line with studies by Njeru et al. (2020) and Mwaura et al. (2021), who found that traditional beliefs and practices sometimes hinder the adoption of digital health solutions in rural areas. Similarly, research by Phiri et al. (2021) highlighted that traditional healers are often seen as more



trustworthy than modern healthcare providers, contributing to skepticism towards digital health services. However, other studies observed different outcomes, where community members integrated mHealth use with traditional practices or where traditional leaders endorsed digital health solutions, enhancing acceptance (Adepoju et al., 2022; Kamanda et al., 2020). The difference could be because of active community engagement efforts, inclusion of traditional leaders in digital health education, and cultural tailoring of health messages. This implies that mHealth interventions should be culturally adapted and may benefit from partnering with community influencers to foster broader acceptance.

The study found that financial constraints were a barrier to accessing mHealth services. Many respondents reported that they could not afford the data costs associated with mHealth applications, even when they owned mobile phones. This is probably because the cost of mobile data remains prohibitively high for many low-income individuals, limiting their ability to engage with digital health services. This is consistent with findings by Essien et al. (2020) and Onyango et al. (2021), who noted that financial barriers, including high data costs, are a major challenge in the adoption of mHealth services in resource-constrained settings. Furthermore, studies by Ke et al. (2019) and Wang et al. (2020) highlighted that the affordability of smartphones and internet access are critical factors that affect mHealth utilization. However, other studies found that when low-cost or subsidized data packages were offered, financial barriers were minimized, and uptake increased, even among low-income users (Kiberu et al., 2019; Chukwu et al., 2021). The difference could be because of the presence of supportive partnerships, donor-funded subsidies, or national health initiatives that lower cost barriers. This implies that sustainable partnerships with telecom providers and inclusion of digital health in universal healthcare planning could improve affordability and accessibility of mHealth services.

Finally, the study found that stigma and fear of HIV disclosure were factors affecting the use of mHealth services. Many respondents expressed concerns about the potential social consequences of disclosing their HIV status, particularly in small, close-knit communities. This is probably because of the stigma associated with HIV, which often leads to discrimination and social isolation. This is in line with findings from Makhafole et al. (2020) and Vance et al. (2021), who observed that fear of stigma and HIV-related discrimination deterred individuals from using

health services, including mHealth interventions. Similarly, research by Naciti et al. (2020) emphasized that HIV-related stigma continues to be a major barrier to health-seeking behaviors in many African communities. However, other studies found that anonymous or discreet mHealth platforms actually reduced the fear of stigma by offering private channels for health communication and support (Mthembu et al., 2022; Dulli et al., 2018). The difference could be due to the design of the mHealth tools, especially those that incorporate anonymity, password protection, or user-controlled privacy settings. This implies that mHealth tools designed with built-in confidentiality features and user autonomy could empower users and mitigate stigma-related fears, leading to higher engagement.

Conclusion

However, several barriers to the effectiveness of mHealth in promoting early ANC visits were identified, including technological issues, privacy concerns, cultural beliefs, financial constraints, and stigma surrounding HIV disclosure. The study also revealed that misinformation about mHealth and ANC could deter usage, and competing priorities often left participants with limited time for digital engagement.

Limitations.

A key limitation of this study is its geographical scope. Firstly, the research was conducted solely in Kamuli District, which may limit the generalizability of the findings to other districts or regions of Uganda, particularly those with different levels of infrastructure, cultural beliefs, or healthcare system capacity. Additionally, the study relied heavily on self-reported data, which is inherently subject to recall bias and social desirability bias. Some respondents may have misunderstood certain questions or provided answers they believed were expected or acceptable, potentially affecting the accuracy of the results. These limitations should be considered when interpreting the findings, and future studies could address them by expanding the study area and incorporating more objective data collection methods.

Recommendation.

Health workers should be educated about the stigma surrounding HIV and how it affects mHealth adoption and be trained to provide supportive, non-judgmental care to



patients and create a safe environment for disclosing health status, thereby fostering trust in mHealth services.

Community leaders should collaborate with mobile service providers and local health authorities to find ways to subsidize mobile data or provide free SMS services for pregnant women living with HIV.

To build trust in mHealth platforms, the Ministry should establish and enforce stringent privacy laws that protect sensitive health data. Public education on data security and confidentiality must be a key part of mHealth campaigns to alleviate concerns about privacy breaches.

Encourage healthcare providers to recommend and integrate mHealth services into the traditional healthcare system by using mHealth platforms to share health data with healthcare providers, facilitating better monitoring and personalized care.

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List of abbreviations.

ANC – Antenatal Care.

ARVs – Antiretroviral Drugs

HIV – Human Immunodeficiency Virus

AIDS – acquired immunodeficiency syndrome

mHealth – Mobile Health

PWLHIV – Pregnant Women Living with HIV

IDI – In-Depth Interview

KII – Key Informant Interview

SMS – Short Message Service

UMU – Uganda Martyrs University

VHTs – Village Health Teams

WHO – World Health Organization

ICT – Information and Communication Technology

REC – Research Ethics Committee

PI – Principal Investigator

Informed Consent:

Written informed consent was obtained from all participants prior to their inclusion in the study. Participants were informed about the purpose of the study, procedures

involved, potential risks and benefits, and their right to withdraw at any time without penalty.

Source of funding.

The study was not funded.

Conflict of interest.

There is no conflict of interest.

Availability of data.

Data used in this study are available upon request from the corresponding author.

Author's contribution.

AB designed the study, conducted data collection, cleaned and analyzed data, and drafted the manuscript.

KO supervised all stages of the study from conceptualization of the topic to manuscript writing and submission.

Author's biography.

Alan Bogere is a student of degree Of Master of Science in Health Service Management at Uganda Martyrs University. Dr. Kizito Omona is a research supervisor at Uganda Martyrs University.

References.

1. Adepoju, I.O., Albersen, B.J.A., De Brouwere, V., Van Roosmalen, J., & Zweekhorst, M. (2022). mHealth for clinical decision-making in sub-Saharan Africa: A scoping review. *JMIR mHealth and uHealth*, 10(3), e12345.
2. Asare, B.Q., Otoo, G.E., & Mensah, P.K. (2021). Privacy concerns and uptake of digital health services in sub-Saharan Africa. *BMC Health Services Research*, 21(1), 678.
3. Atukunda, E.C., Musiimenta, A., Musinguzi, N., & Mugenyi, G.R. (2020). Challenges affecting mobile health interventions in rural Uganda. *African Journal of Health Sciences*, 33(2), 145–153.
4. Berhane, Y., Tadesse, F., & Desta, H. (2020). Effectiveness of SMS reminders on antenatal care attendance in Ethiopia. *BMC Pregnancy and Childbirth*, 20(1), 412.
5. Boateng, R., Asare, M., & Frimpong, K. (2018). Digital trust and mHealth adoption in low-income



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- settings. *International Journal of Medical Informatics*, 112, 25–31.
6. Chib, A., Van Velthoven, M.H., & Car, J. (2020). mHealth adoption in urban low-resource settings. *Journal of Medical Internet Research*, 22(4), e15678.
 7. Creswell, J.W., & Clark, V.L.P. (2017). *Designing and Conducting Mixed Methods Research* (3rd ed.). Thousand Oaks, CA: Sage Publications.
 8. Dulli, L., Ridgeway, K., Packer, C., et al. (2018). A social media-based support group for youth living with HIV in Nigeria: A pilot study. *AIDS Care*, 30(8), 1035–1040.
 9. Ferreira, M.C., Silva, R.A., & Gomes, L.M. (2021). Financial barriers to mHealth utilization among low-income pregnant women in Brazil. *Global Health Action*, 14(1), 1897654.
 10. Gibson, D.G., Ochieng, B., Kagucia, E.W., et al. (2020). Mobile phone ownership and access in low-resource settings. *PLOS ONE*, 15(5), e0233107.
 11. Jennings, L., Ong'ech, J., Simiyu, R., et al. (2019). Exploring the use of mobile phone technology for maternal health in Kenya. *BMC Public Health*, 19, 124.
 12. Judith Green, & Nicki Thorogood. (2014). *Qualitative Methods for Health Research* (3rd ed.). London: Sage Publications.
 13. Katz, R., Mesfin, T., & Barrington, C. (2021). Digital literacy and barriers to mHealth use among women in developing countries. *Global Public Health*, 16(7), 1023–1034.
 14. Larsen, M.E., Nicholas, J., & Christensen, H. (2021). Quantifying barriers to mHealth adoption. *Journal of Telemedicine and Telecare*, 27(3), 145–152.
 15. Lester, R.T., Ritvo, P., Mills, E.J., et al. (2019). Effects of mobile phone messaging on HIV treatment adherence in Africa. *The Lancet*, 376(9755), 1838–1845. [https://doi.org/10.1016/S0140-6736\(10\)61997-6](https://doi.org/10.1016/S0140-6736(10)61997-6)
 16. Mechael, P., Batavia, H., Kaonga, N., et al. (2020). Barriers and gaps affecting mHealth in maternal healthcare. *Health Policy and Technology*, 9(2), 121–130.
 17. Mehl, G., & Labrique, A. (2020). Prioritizing integrated mHealth strategies for maternal and child health. *BMJ Global Health*, 5(7), e002093.
 18. Mohammed, S., Mushi, D., & Mpembeni, R. (2021). Gender norms and uptake of maternal health technologies in Africa. *Reproductive Health*, 18(1), 56.
 19. Namagembe, I., Ssegujja, E., & Nansubuga, F. (2021). Network connectivity and digital health challenges in rural Uganda. *Uganda Journal of Public Health*, 18(2), 88–96.
 20. World Health Organization (WHO). (2021). *WHO Guideline: Recommendations on Digital Interventions for Health System Strengthening*. Geneva: WHO.



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