

Facilitators and Barriers to Elimination of Mother-to-Child Transmission of HIV (eMTCT) at a Tertiary Hospital in Uganda: A Qualitative Study

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Short Report

Keywords: eMTCT, mother-to-child transmission, qualitative study, Uganda

Posted Date: October 12th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10910337/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background: Despite progress in the elimination of mother-to-child transmission (eMTCT) of HIV, Uganda continues to report substantial numbers of new paediatric HIV infections, frustrating the elimination efforts. Understanding factors that facilitate or hinder eMTCT service delivery and utilization is essential for strengthening program performance. This study explored facilitators and barriers to eMTCT at Masaka Regional Referral Hospital, Uganda

Objective: This qualitative study explored facilitators and barriers to the elimination of mother-to-child transmission (eMTCT) of HIV among mothers living with HIV and healthcare workers at Masaka Regional Referral Hospital, a tertiary hospital in Uganda, informed by the Capability, Opportunity, Motivation–Behaviour (COM-B) framework.

Results: Twenty-seven participants (15 mothers and 12 healthcare workers) took part in in-depth interviews, key informant interviews, and two focus group discussions, analyzed thematically. Four themes emerged. Health system facilitators included integrated HIV services and antiretroviral therapy, while barriers included commodity stockouts and staff shortages. Facilitators related to maternal knowledge and behaviour included positive health-seeking practices, while barriers included limited knowledge and delayed HIV testing. Sociocultural facilitators included male partner and peer support, while barriers included stigma and gender-based violence. Structural facilitators included community outreach, while barriers included transport costs, food insecurity, and breastfeeding-related challenges. Strengthening health systems, addressing stigma, and reducing socioeconomic barriers may improve eMTCT outcomes.

Background

HIV remains a major global public health challenge that continues to disproportionately affect children through mother-to-child transmission (MTCT) [1, 2]. In 2023, approximately 180,000 children acquired HIV globally, and 1.8 million children under 15 years were living with HIV [3].

Uganda has made substantial progress in implementing eMTCT interventions, including universal HIV testing, lifelong ART, and early infant diagnosis, yet MTCT remains a significant source of new HIV infections, accounting for approximately 18% of incident HIV cases nationally [4]. In 2023, Uganda recorded 466 new paediatric HIV infections per 100,000 live births, nearly tenfold above the elimination target [5].

Previous studies have identified factors influencing eMTCT outcomes, including antenatal care access, HIV testing uptake, treatment adherence, stigma, and socioeconomic constraints [6–8]. However, existing evidence has largely focused on quantitative measures of service coverage, with limited attention to the experiences of mothers and healthcare workers, leaving important contextual factors insufficiently understood.

This gap is particularly relevant in the Masaka region, where HIV prevalence remains high at 11.2%, compared with the national prevalence of 5.1%, with women disproportionately affected [6]. Understanding the perspectives of mothers and healthcare workers is critical for identifying health-system, community, and individual-level factors influencing eMTCT implementation. The interview guides and analytic approach were informed by the Capability, Opportunity, Motivation–Behaviour (COM-B) framework, which posits that behaviour is a function of capability, opportunity, and motivation [7]. This study explored the facilitators and barriers influencing eMTCT service delivery and utilization at Masaka Regional Referral Hospital, Uganda (MRRH).

Study design and setting

This qualitative study was nested within a larger cross-sectional mixed-methods study of factors, barriers, and facilitators to eMTCT, conducted at MRRH, a public regional referral facility serving eight districts of Central Uganda. The qualitative component used focus group discussions and key informant interviews to explore the experiences and perspectives of mothers living with HIV and healthcare workers regarding eMTCT service delivery and utilization.

Masaka Regional Referral Hospital provides comprehensive HIV prevention, treatment, and care through two specialized HIV clinics, Uganda Cares and The AIDS Support Organization (TASO) Masaka, offering integrated eMTCT services including HIV testing and counselling, antiretroviral therapy, maternal follow-up, viral load monitoring, and early infant diagnosis.

Study population and sampling

The study population comprised two purposively selected groups: mothers with HIV who had completed the eMTCT cascade of care, and healthcare workers involved in eMTCT service delivery at MRRH. Eligible mothers were identified from the Early Infant Diagnosis [9] register and DHIS2 records and had infants with documented HIV test results between 2020 and 2022; those with unknown or pending results were excluded. Healthcare workers were eligible if they had provided eMTCT services for at least six months.

Purposive sampling with maximum variation was employed to capture a broad range of experiences relevant to eMTCT implementation[10]. Among mothers, variation was sought in age, parity, education, employment, and infant HIV outcome; healthcare workers were selected across professional cadres and experience. Participants were recruited iteratively as data collection and preliminary analysis progressed.

Sample size was guided by the principle of information power, whereby recruitment continued until the data generated sufficient depth and breadth to address the study aim [11]; adequacy was supported by the focused research objective, participants' direct experience, and rich, information-dense data from multiple groups. Recruitment ceased once iterative analysis indicated thematic saturation, with no new codes emerging and redundancy across accounts.

Data collection

Data were collected through in-depth interviews (IDIs), focus group discussions (FGDs), and key informant interviews (KIIs). Semi-structured interview guides were developed specifically for this study, informed by the Capability, Opportunity, Motivation–Behaviour (COM-B) framework, and are provided in English as Additional file 1. The guides included open-ended questions examining individual, social, and health system factors influencing engagement with eMTCT services.

Mothers participated in IDIs conducted in Luganda by trained qualitative research assistants in a private clinic setting, while healthcare workers participated in FGDs and KIIs conducted in English. Interviews explored experiences with eMTCT services and recommendations for improving program implementation. IDIs lasted approximately 45–60 minutes, whereas FGDs and KIIs lasted 60–90 minutes. All interviews were audio-recorded with participants' written informed consent, and field notes documented contextual observations and non-verbal cues.

Data analysis

Audio recordings were transcribed verbatim and translated into English where necessary, then reviewed against the recordings for accuracy before being imported into ATLAS.ti version 9. Data were analyzed using an abductive approach to thematic analysis. Initial coding was inductive and data-driven, generated directly from participants' accounts; a subsequent deductive step interpreted findings through the COM-B framework of capability, opportunity, and motivation. Two members of the research team [AM and JK] independently reviewed transcripts, generated initial codes, and iteratively compared and grouped these into broader categories and overarching themes. Discrepancies were resolved through discussion and consensus among the research team.

To enhance trustworthiness, credibility was strengthened through triangulation across participant groups and data collection methods, increasing confidence that findings reflected convergent perspectives rather than a single group or method. Dependability was supported through an audit trail of analytic decisions. Confirmability was enhanced through regular discussions among the research team during coding and interpretation, while transferability was facilitated through detailed descriptions of the study setting, participants and study procedures.

Ethical considerations

Ethical approval was obtained from the School of Medicine Research and Ethics Committee of Makerere University (Reference No. MAK-SOMREC-2022-469). Administrative permission was obtained from MRRH. Written informed consent was obtained from all participants before enrolment. Participation was voluntary, confidentiality was maintained throughout the study, and participants were free to withdraw from the study at any time without penalty.

Results

Sociodemographic Characteristics of Study Participants

A total of 27 participants were included: 15 mothers who had completed the eMTCT cascade and 12 healthcare workers involved in eMTCT service delivery. Mothers varied in age, education, parity, employment, and infant HIV outcome, including both HIV-negative and HIV-positive infant outcomes.

Healthcare workers represented a multidisciplinary team, including midwives, nursing officers, resident and intern doctors, and an obstetrician, with varying training and experience (Table 1).

Table 1
Sociodemographic characteristics of study participants

Participant group	Characteristic	Category	N
Mothers (IDIs, n = 15)	Age	15–30 years	7
		> 30 years	8
	Education level	Primary	5
		Secondary	6
		Tertiary	4
	Parity	Primigravida	6
		Multigravida	9
	Employment status	Unemployed	9
		Employed	6
	Infant HIV outcome	HIV-negative	7
		HIV-positive	8
Healthcare workers (KIs, n = 12)	Education level	Certificate	2
		Diploma	5
		Degree	4
		Master's and above	1
	Professional cadre	Midwife	3
		Nursing officer	2
		Obstetrician	1
		Resident doctor	2
		Intern doctor	3
	Work experience	< 5 years	5
		≥ 5 years	7
Mothers (FGDs, n = 12)	Age	Below 30 years	6
		> 30 years	6
	Education level	Primary	4
		Secondary	5
		Tertiary	3

Participant group	Characteristic	Category	N
	Parity	Primigravida	5
		Multigravida	7
	Employment status	Unemployed	7
	Infant HIV outcome	Employed	5
		HIV-negative	6

Facilitators and Barriers to eMTCT at Masaka Regional Referral Hospital

Thematic analysis generated four overarching themes that influenced eMTCT service delivery and utilization: health system factors, maternal knowledge and behaviour, sociocultural influences, and structural barriers to access. Table 2 summarizes the key facilitators and barriers identified within each theme.

Table 2
Summary of facilitators and barriers to eMTCT at Masaka Regional Referral Hospital

Theme	Key Facilitators	Key Barriers
Health System Factors	↪ Integrated ANC, HIV testing and treatment services ↪ immediate ART initiation ↪ viral load monitoring ↪ early infant diagnosis; adherence support	↪ Stockouts of essential commodities (e.g., nevirapine) ↪ Understaffing ↪ inconsistent implementation due to frequent guideline changes
Maternal Knowledge and Behaviour	↪ Knowledge of HIV transmission and prevention ↪ understanding benefits of ART ↪ facility delivery ↪ adherence to treatment and infant prophylaxis	↪ Limited knowledge of Emtct ↪ delayed HIV testing ↪ unknown HIV status during pregnancy ↪ reliance on traditional birth attendants
Sociocultural Influences	↪ Male partner support ↪ disclosure of HIV status ↪ peer mother support ↪ Village Health Team (VHT) follow-up and community support	↪ HIV-related stigma ↪ fear of disclosure ↪ gender-based violence ↪ lack of partner support
Structural Barriers to Access	↪ Community HIV testing services ↪ outreach programs ↪ community-based follow-up mechanisms	↪ Transport costs ↪ food insecurity ↪ breastfeeding-related challenges ↪ poverty-related constraints

Theme 1: Health System Factors

Health system factors emerged as both important facilitators and barriers to effective eMTCT implementation. Participants described integrated maternal HIV services as the foundation of successful prevention efforts. The availability of ANC, routine HIV testing, immediate ART initiation, viral load monitoring, infant diagnosis services, and skilled facility delivery created opportunities for early identification of HIV-positive mothers and timely initiation of interventions that reduced the risk of mother-to-child transmission. Healthcare workers particularly emphasized the contribution of the test-and-treat strategy in ensuring that women entered HIV care promptly during pregnancy.

"Most of the mothers who are pregnant attend antenatal care and during their antenatal attendance we test them for HIV... once they are HIV positive, we usually start them on chronic HIV care so in that case the chances of transmission to the babies drastically reduce once the mothers have started on ART."
(KII_16_Health Worker)

Mothers similarly attributed HIV-free infant outcomes to adherence to medical advice received during pregnancy, including taking ART consistently and delivering in health facilities.

"They told me not to deliver from the village but rather come to the hospital. I delivered my baby well without HIV." (IDI_08_Mother)

Beyond service availability, participants highlighted the importance of supportive service delivery processes such as viral load monitoring, early infant diagnosis, appointment reminders, and adherence counselling. These processes were viewed as critical in maintaining retention in care and ensuring continuity of treatment throughout pregnancy and breastfeeding.

"I know that in order not to infect your child with HIV, you must deliver from the hospital." (IDI_07_Mother)

However, several health-system challenges undermined service delivery. Stockouts of essential commodities, particularly nevirapine prophylaxis, were described as serious disruptions that threatened infant protection during the immediate postnatal period. Healthcare workers also reported staffing shortages that constrained the time available for counselling and individualized follow-up, while frequent revisions to eMTCT guidelines created inconsistencies in service implementation.

"Sometimes we have stockouts of Nevirapine. Currently, we do not have Nevirapine." (KII_01_Health Worker)

"You get mixed information. The department on the other side is doing this, and this one is doing another. You are implementing the new guideline, and others are still implementing the old guideline."
(FGD_01_Health Workers)

Theme 2: Maternal Knowledge and Behaviour

Maternal knowledge and behaviour played a central role in shaping engagement with eMTCT services. Participants consistently linked knowledge of HIV transmission and prevention to positive health-seeking behaviours, including timely antenatal attendance, facility delivery, ART adherence, and appropriate infant feeding practices. Mothers who understood the benefits of ART and the mechanisms through which HIV could be transmitted to their infants appeared more motivated to comply with treatment and prevention recommendations. One mother described how adherence to counselling messages influenced her actions throughout pregnancy and breastfeeding:

"I took my medicine well and took it on time. I did not use the herb bath. I gave them the syrup, and they turned out to be HIV negative." (IDI_06_Mother)

In contrast, inadequate knowledge emerged as an important barrier to effective eMTCT uptake. Some pregnant mothers with HIV reported delivering their babies with the help of traditional birth attendants, while others remained unaware of their HIV status until late in pregnancy or after delivery.

"I went to the traditional birth attendant, but by the time I reached, she was not available, so I supported myself, and maybe in the due course, the child got infected with HIV." (IDI_02_Mother_Positive infant Masaka)

Healthcare workers explained that delayed testing and limited awareness often prevented timely initiation of preventive interventions, increasing the risk of transmission. Healthcare workers further observed that limited knowledge sometimes contributed to reliance on traditional birth attendants, where access to HIV prevention services and infant prophylaxis was unavailable.

Theme 3: Sociocultural Influences

Sociocultural influences were identified as key determinants of engagement with eMTCT services, shaping women's access to and continued use of HIV care. Participants described family, partner, and community relationships as either facilitating or constraining service utilization. In supportive contexts, these relationships strengthened disclosure, adherence, and retention in care, whereas in less supportive environments, stigma and negative social consequences undermined sustained engagement.

Male partner involvement emerged as a major facilitator of eMTCT uptake and adherence. Women who disclosed their HIV status to supportive partners reported receiving emotional encouragement, financial and transport assistance, escort to health facilities, and reminders to take medication. This practical and emotional support reduced barriers to care and promoted consistent adherence to treatment.

"My husband always supports me because he knows that I am HIV positive, he escorts me to go to the health facility, he has been there for me." (IDI_01_Mother)

Similarly, peer mothers and Village Health Team (VHT) members played a complementary supportive role by providing psychosocial support, health education, appointment reminders, and follow-up for mothers who missed clinic visits. These actors were viewed as important links between households and health facilities, strengthening continuity of care.

"We try to do more for these clients, we try to encourage them to take their drugs timely and educate them on what they should do to keep their babies HIV negative" (KII_03_Health Worker_Masaka)

Mother quote

In contrast, HIV-related stigma remained pervasive and often disrupted engagement with eMTCT services. Whereas supportive environments enabled disclosure and adherence, stigmatizing contexts led to concealment of status, fear of being seen taking medication, and interruptions in treatment. Concerns about relationship breakdown, discrimination, and social isolation further discouraged consistent care-seeking.

"Stigma is also a big issue. I have heard an experience of the mother who was given ART ... she never took the medicine. She discloses this after the baby has sero-converted because she was protecting her marriage." (FGD_02_Health Workers)

In a similar vein, gender-based violence compounded these challenges. While some women experienced support within relationships, others faced threats, abandonment, or loss of child custody following disclosure of their HIV status. This fear of negative consequences limited openness and reduced engagement with eMTCT services.

Theme 4: Structural Barriers to Access

Structural factors were consistently described as major influences on mothers' ability to access and sustain engagement with eMTCT services, often constraining utilization regardless of knowledge or motivation. Participants highlighted how poverty-related challenges, health system limitations, and household-level deprivation interacted to affect attendance, adherence, and continuity of care throughout pregnancy and breastfeeding.

On one hand, community-based HIV testing and outreach services were described as important enablers of access, particularly in reducing geographical and logistical barriers. By bringing services closer to communities, outreach activities improved linkage to care for pregnant women who might otherwise have remained unreached and supported early initiation of eMTCT interventions.

"There should be someone in the community that these people approach in case of any problem. This person should be their peer and they could be in a position to support them." (FGD_02_Health Workers)

On the other hand, persistent poverty and transport costs significantly undermined access to services. While outreach efforts improved reach, many women still struggled to attend repeated antenatal visits, ART refills, viral load monitoring, and infant follow-up due to inability to afford transport. Missed appointments were commonly attributed to these financial constraints.

"Yes, I cannot get transport to take me to the health facility at the time of delivery. That is the challenge I have." (IDI_01_Mother)

Food insecurity similarly acted as a strong barrier. Whereas adequate nutrition supported ART adherence, lack of food led some mothers to delay or skip medication due to concerns about taking drugs on an empty stomach. Healthcare workers further observed that poverty and poor nutrition often compounded other vulnerabilities, weakening adherence and retention in care.

"The problem was lack of food... I decided to stop the medicine although I did not inform the health workers." (IDI_10_ Mother)

In a similar way, breastfeeding-related challenges reflected the influence of constrained living conditions on eMTCT adherence. Participants reported difficulties maintaining recommended infant feeding practices, concerns about infant oral sores, and reliance on mixed feeding in resource-limited

households. These practices were perceived to increase the risk of postnatal transmission and complicate adherence to prevention guidance.

"The baby bit my breast, and I did not know. It was at night. I realized the baby was breastfeeding and the breast was painning me. In the morning I brought the baby to the hospital and when they tested the baby, they found it had HIV." (IDI_08_ Mother)

Discussion

This study identified interacting health system, individual, sociocultural, and structural factors that influenced eMTCT service delivery and utilisation at a rural referral hospital in Uganda. The findings suggest that successful eMTCT depends on more than the availability of HIV services; the combined influence of health system readiness, maternal capability, social support, and socioeconomic conditions sustain engagement across the continuum of care.

Integrated maternal HIV services emerged as the principal facilitator of eMTCT. Participants described ANC as the gateway to HIV testing, immediate ART initiation, adherence counselling, viral load monitoring, and early infant diagnosis, enabling timely interventions throughout pregnancy and breastfeeding. These findings are consistent with studies from Uganda and other sub-Saharan African countries demonstrating that integrated ANC and HIV services improve ART uptake, retention in care, and reduce vertical HIV transmission [8, 12]. Together, these findings underscore that continuity of integrated service delivery, rather than isolated interventions, is fundamental to achieving eMTCT targets.

Maternal knowledge was closely linked to positive health-seeking behaviours, including early ANC attendance, ART adherence, facility delivery, and appropriate infant feeding, while inadequate knowledge contributed to delayed HIV diagnosis and continued reliance on traditional birth attendants. Similar findings have been reported in Uganda, Kenya, and other African settings, where maternal understanding of HIV prevention predicts uptake and completion of eMTCT services [6, 13, 14]. This suggests that counselling should be viewed as a continuous intervention throughout pregnancy and breastfeeding to reinforce behaviours that minimize the risk of mother-to-child transmission.

The study further demonstrated that the social environment could either strengthen or undermine engagement in eMTCT services. Male partner involvement, disclosure, peer mothers, and Village Health Teams facilitated adherence and retention by providing emotional, financial, and practical support, whereas stigma, fear of disclosure, and gender-based violence disrupted treatment and continuity of care. These findings corroborate evidence from sub-Saharan Africa showing that supportive social networks improve eMTCT outcomes, while stigma and intimate partner violence remain major barriers to ART adherence and retention [15, 16]. They underscore the need for family- and community-centred interventions that simultaneously promote male involvement and address HIV-related stigma.

Despite the availability of integrated services, health system and socioeconomic barriers continued to limit program effectiveness. Medicine stockouts, staffing shortages, and frequent guideline changes constrained service delivery, while transport costs, food insecurity, and poverty prevented many women from maintaining regular clinic attendance and lifelong ART. Comparable challenges have been reported across low-resource settings, where health system weaknesses and socioeconomic deprivation continue to compromise eMTCT outcomes despite expanding service coverage [17–19]. These findings imply that achieving elimination targets will require strengthening health systems alongside interventions that reduce financial and geographic barriers to care.

Overall, the findings demonstrate that eMTCT outcomes are determined by the interaction of health system performance, maternal capability, social opportunity, and structural context, consistent with the COM-B framework. Strengthening one component alone is unlikely to eliminate vertical HIV transmission if barriers persist in other domains. Comprehensive interventions that integrate high-quality clinical services with sustained counselling, community support, stigma reduction, and strategies to address socioeconomic barriers are therefore likely to have the greatest impact on accelerating progress towards the elimination of paediatric HIV in Uganda.

Strengths and limitations

This study provides important qualitative insights into the multilevel factors influencing eMTCT service delivery and utilization in a high HIV-burden setting in Uganda. By incorporating the perspectives of both mothers and healthcare workers, it offers a comprehensive understanding of the behavioural, health system, and contextual factors shaping engagement across the eMTCT cascade. The COM-B framework strengthened interpretation, while triangulation of data sources enhanced credibility and trustworthiness.

The findings should, however, be interpreted in light of several limitations. As a single-site qualitative study, the results may not be transferable to lower-level facilities, private healthcare settings, or other geographical contexts, and reliance on self-reported experiences may have introduced social desirability and recall bias. Nevertheless, purposive sampling, triangulation, and thematic saturation increase confidence that the findings reflect key factors influencing eMTCT implementation within the study setting.

Conclusions

Successful eMTCT of HIV requires interventions that address the interconnected health system, behavioural, sociocultural, and structural factors influencing women's engagement across the continuum of care. While integrated maternal HIV services, continuous counselling, and community support facilitate uptake and retention, persistent health system constraints, stigma, and socioeconomic barriers continue to limit program effectiveness. Applying behaviour-informed approaches such as the COM-B framework may help guide the design of integrated interventions that strengthen health systems, foster

supportive social environments, and address structural barriers. Such comprehensive strategies are essential for accelerating progress towards the elimination of paediatric HIV in Uganda and similar high-burden settings.

Abbreviations

ANC

Antenatal care

ART

Antiretroviral therapy

COM-B

Capability, Opportunity, Motivation – Behaviour model

DHIS2

District Health Information System 2

EID

Early infant diagnosis

eMTCT

Elimination of mother-to-child transmission

FGD

Focus group discussion

GBV

Gender-based violence

HTS

HIV testing services

IDI

In-depth interview

KII

Key informant interview

MTCT

Mother-to-child transmission

PCR

Polymerase chain reaction

PMTCT

Prevention of mother-to-child transmission

PNC

Postnatal care

TBA

Traditional birth attendant

VHT

Village health team

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the School of Medicine Research and Ethics Committee (SOMREC), Makerere University (Reference No. MAK-SOMREC-2022-469). Administrative clearance was granted by Masaka Regional Referral Hospital. Written informed consent was obtained from all participants. Written informed consent to participate was additionally obtained from that participant's parent(s) or legal guardian(s) of participants below 18 years.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and analyzed during the current study are not publicly available due to confidentiality constraints but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

Research reported in this publication was supported by the Fogarty International Center and the National Institute of Mental Health of the National Institutes of Health under Award Number D43TW010037. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Authors' contributions

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All authors read and approved the final manuscript.

Acknowledgements

The authors extend their sincere gratitude to the healthcare workers and mothers who participated in this study for sharing their valuable experiences and insights. We also appreciate the research assistants for their tireless efforts in data collection and study coordination.

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