

UNIVERSITY OF THE WITWATERSRAND



**FACULTY OF HEALTH SCIENCES
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TITLE

**EXCLUSIVE BREASTFEEDING KNOWLEDGE, PERCEPTIONS, AND PRACTICES OF
MOTHERS OF HIV-EXPOSED INFANTS IN ELDORET, KENYA**

By

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Research report submitted for the degree of Master of Public Health (MPH), field of Social and Behaviour Change Communication (SBCC), the University of the Witwatersrand, Johannesburg

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August 20, 2024

DECLARATION

I, Bosire, Violet Kerubo (student number 2549670), hereby certify that, with the exception of clearly marked and recognized instances, the work I have submitted for examination for this particular degree is entirely original and unassisted. This work has never before been turned in for a degree or test at the University of the Witwatersrand or any other. I have referenced other people's ideas and opinions in accordance with the rules.

Bosire, Violet Kerubo



Date: 20-08-2024

DEDICATION

I dedicate this research to my son Hans who has been patient and understanding throughout my study period. Additionally, I would like to express my gratitude to my family for their unwavering support and encouragement throughout this journey. Finally, I thank God for giving me the endurance, resilience, and knowledge needed to complete the project successfully.

ABSTRACT

Background

The World Health Organization (WHO) recommends exclusive breastfeeding (EBF) for the first six months in order to improve baby health outcomes. However, adherence to EBF is not optimal, especially among HIV-positive mothers in Sub-Saharan Africa (SSA), which impacts infant mortality rates. Remarkably, due to cultural preferences for mixed feeding and concerns about HIV transmission, only 59% of children born to HIV-positive mothers in Kenya are exclusively breastfed. The association of HIV with EBF poses difficulties, especially in resource-constrained settings, where safe and affordable infant feeding options are limited. Therefore, this study aimed to explore EBF knowledge, perceptions, and practices among HIV-positive mothers with HIV-exposed infants younger than six months at the Moi Teaching and Referral Hospital in Eldoret, Kenya.

Methods

This exploratory qualitative study involved in-depth interviews with HIV-positive breastfeeding mothers with infants younger than six months who were purposively recruited from various post-natal clinics at the Moi Teaching and Referral Hospital. Interviews were conducted with a total of 27 consenting mothers who met the inclusion criteria in November 2023. Every interview was audio recorded then transcribed directly from Kiswahili into English. The data was analyzed thematically with the support of MAXQDA 2022.

Results

Mothers reported different feeding practices based on characteristics such as mode of delivery and number of children. Actual feeding practices were influenced by mixed maternal attitudes resulted from competing knowledge(s) with mothers receiving conflicting information on EBF from biomedical, social, and personal sources. Also, tough economic realities, stigma, and the type of support they receive while breastfeeding influenced their feeding practices. Feeding decisions were greatly influenced by cultural norms and beliefs associated with breastfeeding HIV-exposed infants thus influencing the duration of breastfeeding. The clinic set-up played a vital role in

supporting mothers while breastfeeding, although the environment resulted in accidental disclosure of their HIV status.

Conclusion

This study highlights the many challenges faced by HIV-positive mothers while feeding their babies, shedding light on some factors that impact these practices. Even while mothers are aware of EBF recommendations, the reality of varying practices highlights the necessity of support that considers individual circumstances. The results highlight the need for a thorough and compassionate strategy combining healthcare, social awareness, and tailored advice to enable HIV-positive mothers to make decisions that are best for the health and well-being of themselves and their babies.

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LIST OF ABBREVIATIONS

ANC – Ante-natal clinic

AMPATH - Academic Model Providing Access to Healthcare

EBF – Exclusive breastfeeding

HAART - Highly Active Anti-Retroviral Therapy

HIV – Human Immunodeficiency Virus

HREC - Human Research Ethics Committee

IERC – Institutional Ethics Review Committee

LMIC – Low and middle-income countries

MCH – Maternal and child health

MTCT – Mother-to-child transmission

MTRH – Moi Teaching and Referral Hospital

MMUST – Masinde Muliro University of Science and Technology

PMTCT – Prevention of mother-to-child transmission

PNC – Post-natal clinic

SSA – sub-Saharan Africa

USAID – United States Agency for International Development

WHO – World Health Organization

DEFINITION OF TERMS

Exclusive breastfeeding - infant feeding by providing breastmilk alone for the first six months of life without providing other liquids or solid foods (1).

HIV-exposed infants - babies born by HIV-positive mothers and who are exposed to the HIV virus (2).

Colostrum - the nutrient-rich first milk produced by the mother after childbirth (3).

Prelacteal feeds - anything given to a newborn before breastfeeding is established, other than breast milk (3).

CHAPTER 1: INTRODUCTION AND LITERATURE REVIEW

1.1 Background

The research is introduced in this chapter by providing contextual knowledge of the burden of public health related to sub-optimal infant feeding globally, in sub-Saharan Africa (SSA), and in relation to Kenya. The sections that follow outline the background of the research, the socio-ecological model (SEM), literature review, problem statement, justification of the study, the research question, broad aim of the study, and the specific objectives.

1.1.1 Infant feeding from a global perspective

Globally, infant feeding practices vary widely, often influenced by geographical location, cultural norms, economic factors, and level of education (4). The World Health Organization (WHO) defines exclusive breastfeeding (EBF) as infant feeding by providing breastmilk alone for the first six months of life without providing other liquids or solid foods (1). In many parts of the world, breastfeeding is considered the gold standard, supplying the best nourishment and immune-boosting advantages during the first six months of life while continued breastfeeding for 12 months or longer is also recommended (5,6).

Breast milk provides the optimal nutrition required during early childhood development and ensures proper growth and nutrition for infants (1). EBF is recommended by WHO because breast milk is associated with less diarrhoea, constipation, gastroenteritis, gastroesophageal reflux, and lower infant mortality rates (1,7). Establishing breastfeeding within one hour after delivery and EBF is encouraged to ensure that the baby receives adequate colostrum and breast milk, which reduces the chances of acquiring new-born related infections (7,8). EBF in women with Human Immunodeficiency Virus (HIV) who are breastfeeding provides a double shield for their babies as a way of ensuring that infants receive the best nutrients from their mother's breast milk (7,8). Although HIV transmission can occur via breastmilk, the way to prevent it is by giving the mother suppressive antiretroviral therapy while practicing EBF to ensure the prevention of mother-to-child transmission (PMTCT) of HIV (7,8). Globally, EBF has significantly reduced the percentage of children who die below two years by 13.8% between 1990 and 2018 (9,10).

While breastfeeding is universally recognized as the optimal start for infants (6,11), the rates and duration of breastfeeding differ widely across regions (5). In high-income countries, women have presented a relatively high tendency towards practising formula feeding for their infants (12). Factors promoting this trend include maternal characteristics such as employment status, limited paid maternity leave, and lifestyle preferences (12). Besides, breastfeeding mothers in these high-income countries are influenced by aggressive marketing by infant formula milk companies, which often provide accessibility to these alternatives (12). In contrast, in low-and middle-income countries (LMIC), where access to clean water and affordable formula may be limited, breastfeeding is often the prevalent mode of infant feeding (13).

Global implementation of EBF remains a challenge (9). Studies have postulated that 45% of maternal and child deaths worldwide are due to inadequate nutritional attainment, while 11% of child deaths are related to suboptimal breastfeeding annually (14). A multi-site study conducted in Bangladesh, India, Nepal, Pakistan, Brazil, Peru, South Africa, and Tanzania showed that in six out of eight study regions included, less than 60% of infants were exclusively breastfed for one month after birth (3). Consequently, the inability to practice EBF as recommended by the WHO has resulted in increasing cases of child morbidity and mortality worldwide and in countries in sub-Saharan Africa (SSA) (10,15). Ogbo et al., reported that 42% of infant mortality in SSA countries is attributable to diarrhoea-related infections, some of which could be prevented through EBF (15).

1.1.2 Infant feeding in sub-Saharan Africa

In SSA countries, how infants are fed is profoundly influenced by cultural norms, beliefs and traditions, socioeconomic factors, and the health conditions of a breastfeeding mother, such as being HIV-positive (16). Most infants born in the SSA region are breastfed in the first hour following delivery (17). Early initiation of breastfeeding and optimal infant feeding habits for newborns is associated with 70% reduced infant mortality rates in SSA (17). Despite the demonstrated improvement in childhood survival in SSA, more efforts are needed to enhance better health for children (17). Although countries, including those in the SSA region, have made progress in implementing interventions that support EBF, there are still notable gaps in adherence to the WHO's recommendations for EBF practices (15,18). These gaps are related to mothers' level of education, inadequate nutrition counselling, socio-cultural norms and

practices, unsupportive workplaces, poor access to healthy foods, and limited access to healthcare services (3,9).

HIV presents additional considerations. Regarding HIV, the concerns of breastfeeding mothers about HIV transmission to their infants, fear of stigmatization from immediate and extended family members, friends, the community, and attitudes towards breastfeeding of HIV-exposed infants, all impede adherence to infant feeding recommendations (1,18,19). Additionally, mixed communication by health workers in the past about PMTCT, including conflicting advice on breastfeeding practices for HIV-positive mothers, has led to confusion and uncertainty among mothers, further complicating their decision-making process regarding infant feeding (20). When HIV-positive breastfeeding mothers are confronted with multiple and often overlapping factors, they can easily resort to mixed feeding practices, which can be a setback for preventing HIV infection in infants and young children (18,19). Mixed feeding practices have been reported to hinder EBF uptake in many SSA countries (16,21).

1.1.3 Infant feeding in Kenya

Malnutrition associated with sub-optimal breastfeeding practices is widely reported in the country especially among children born and raised in urban informal settlements (22). Similar to other SSA countries, studies conducted in Kenya have reported that breastfeeding mothers are influenced to practice different infant feeding methods due to intertwined factors (16,21). Maruge and colleagues documented that infant feeding norms in Kenya are greatly influenced by elements at the child level like the child's sex, maternal influences including ethnicity, and education level, and more structural factors, such as inadequate sanitation, inability to obtain domestic water in addition to not having access to medical care (22). With only a third of children being breastfed exclusively in the country, about 40% of infants are not breastfed in the first hour following delivery, and 15% stop breastfeeding after one year altogether (22). In addition, mixed infant feeding is common, especially in poor households in both urban and rural areas (16). Evidence from research shows that women prefer mixed feeding compared to EBF due to beliefs relating to the perceived size of the child- where a bigger or 'fat' or 'plump' child is valued and considered a sign of a healthy baby, and a successful mother (16,23). Other reasons include cultural beliefs about the mother's insufficient breast milk, which is strongly associated with the belief that a baby cries because they cannot be filled up by breast milk alone (24).

HIV-positive mothers' inadequate breastfeeding practices have been linked to increased infant mortality from diarrhea and respiratory infections which can be attributed to these low rates of EBF practice (16). According to Samburu et al., only 59% of Kenyan infants born to mothers who are HIV-positive are optimally breastfed during the first six months (16). A comparable study conducted in the central part of Kenya, at Kiambu Level Four Hospital, revealed that 69.7% of HIV-exposed infants were initiated to breastfeeding within the first hour of birth, with breastfeeding being the predominant practice reported (25). However, once complementary foods were introduced, 39.1% of infants older than six months were immediately discontinued from breastfeeding due to concerns regarding mother-to-child transmission (MTCT) of HIV (25). Nevertheless, HIV-positive mothers depend on healthcare professionals to provide guidance and support in making the optimal choice for infant feeding for their babies (25).

1.1.4 Application of the socio-ecological model

In this study, we adopted and modified the socio-ecological model (SEM), which enables the identification of attributes across five levels, which are individual, interpersonal, community, organizational and policy (26), to understand breastfeeding behaviours amongst HIV-positive women from Eldoret town in Kenya. The components of the SEM are described in Fig. 1.

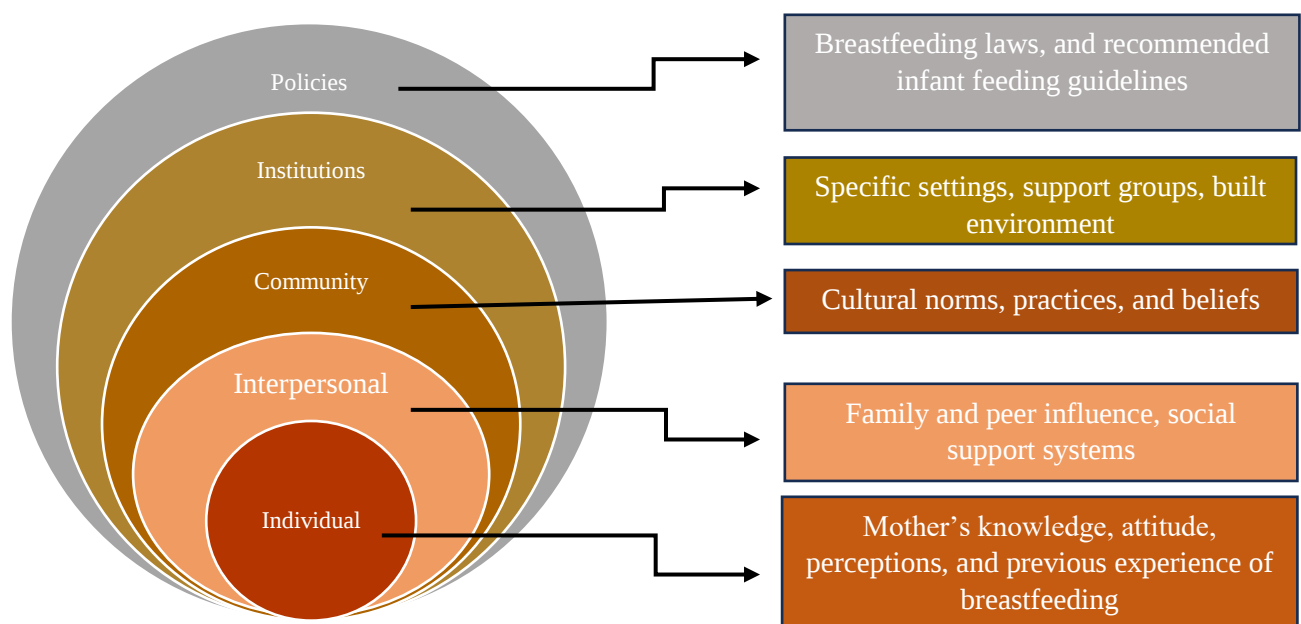


Figure 1. The socio-ecological model of factors that influence infant feeding for HIV-exposed infants in Kenya

At the individual level, maternal characteristics such as knowledge, attitude, perceptions towards breastfeeding and previous experience play a key role in shaping decisions and behaviour towards infant feeding. For example, Masaba et al., reported that mothers living in high socio-economic status, with high education level, and who are employed are knowledgeable about the recommended guidelines for infant feeding and they are more likely to practice EBF compared to mothers living in low socio-economic status and are not employed (27).

At the interpersonal level, relationships with family, friends, and other social support systems can influence women's decision to either practice EBF or not. The relationship between household members, including their spouse, mother-in-law, and extended family members is equally important in understanding the social support received by HIV-positive mothers while breastfeeding. Similar studies in South Africa and Kenya found out that breastfeeding mothers who received social support from their family members were more likely to adhere to the recommended infant feeding guidelines while adhering to the community's cultural norms, beliefs, and perceptions of HIV-exposed infants feeding practices (14,16). However lack of social support from family members, especially the household head (mostly the husband) to practice EBF was reported to affect family relationships among HIV-positive women living in Kilifi County, Kenya, hence hindering them from feeding their babies optimally (21).

The third level is the community factors which entails cultural norms, beliefs, and practices which can also influence women's perceptions towards practicing EBF. As evidenced by Nyoni and colleagues, breastfeeding is deeply ingrained as a cultural norm and is often viewed as essential for infant health and bonding between mother and child (28). Moreover, cultural beliefs and practices have been reported to also intersect with HIV-related stigma, leading to conflicting attitudes towards breastfeeding among HIV-positive mothers (28). Similar studies conducted in Kenya have provided evidence that cultural norms and practices including mixed infant feeding, and beliefs that HIV-exposed infants are a bad omen and a curse to society have affected breastfeeding practices by HIV-positive mothers (21,27). This belief that HIV-exposed infants are a bad omen and a curse has led to increased stigma surrounding breastfeeding these babies, causing HIV-positive mothers to fear discrimination and ostracism from their communities if they openly breastfeed (21,23,27).

The fourth level is the institutional level which includes organizations and systems such as healthcare facilities. Institutions have specific settings, support groups, and environments that

shape women's behaviours and interactions hence impacting their perceptions and attitudes towards EBF. Tran and colleagues found that availability of support groups such as peer counsellors and lactation support influence breastfeeding mothers to adhere to EBF (29). Nkrumah and colleagues reported that institutional support for breastfeeding in Ghana motivated employed women to practice EBF due to an established environment for breastfeeding, paid maternity leave, flexible work schedule, and breastfeeding breaks (30).

Lastly, the fifth level includes policies, laws, and recommended infant feeding guidelines, which can also be enablers or barriers to practising EBF amongst women in Kenya. Evidence from Kenya shows that some HIV-positive breastfeeding mothers have expressed their concerns about adhering to the recommended guidelines to practice EBF for six months (16,21). For example, HIV-positive breastfeeding mothers from Baringo County, Kenya were reported to perceive the regulation as a barrier to practising other infant feeding methods that are culturally accepted and don't necessarily require them to practice EBF (16). Also, the same mothers and those in Kilifi County raised concerns over the changing infant feeding policies which results in conflicting and confusing information about what should be adhered to (16,21). Nevertheless, breastfeeding policies have enabled HIV-positive breastfeeding mothers in Baringo County to raise healthy children who are not infected with the virus (16).

1.2 LITERATURE REVIEW

1.2.1 Knowledge, perceptions, and attitude towards exclusive breastfeeding among HIV-positive mothers

The global promotion of EBF guidelines for HIV-exposed infants centres significantly on the dissemination of knowledge through diverse pathways including healthcare facilities, particularly during antenatal care (ANC), the community, peers, and mass media (21,31). A socio-ecological review by Busza and colleagues found that community-based initiatives play a crucial role, where women form support groups and outreach programs that provide a platform for sharing experiences and disseminating knowledge among mothers facing similar circumstances to support them to adhere to breastfeeding guidelines (31). Additionally, mass media, including television, radio, phone messages, and print materials, contribute to public awareness campaigns, reaching a broad audience with information about feeding methods for newborns exposed to HIV (32,33).

In SSA, where the knowledge of breastfeeding is closely tied to attitudes toward infant feeding practices, regional variations in awareness among HIV-positive mothers have been observed (16,34). Notably, countries like Namibia and South Africa demonstrate relatively high levels of knowledge (77.2% and 80.9% respectively) (11,34), with 64.9% of women in South Africa expressing awareness of the importance of practicing EBF, irrespective of their HIV status (34). However, in East African nations like Tanzania, Uganda, and Ethiopia, studies reveal a concerning lack of sufficient knowledge among breastfeeding mothers regarding the advantages of EBF for HIV-exposed infants (35,36).

In the Kenyan context, despite awareness, there is evidence suggesting that the knowledge of the benefits of practicing EBF does not necessarily translate to behaviour (21). A mother's biological and behavioural factors have been reported to contribute to the type of infant feeding practices they choose to adopt (16). Although knowledge of the advantages of practicing EBF among HIV-exposed infants is well-known, only a fraction of HIV-exposed infants is reported to be exclusively breastfed in the country (16). According to Gewa and Chepkemboi, 72% of breastfeeding mothers acknowledged that children who are exclusively breastfed experience fewer illnesses, yet 34% of them believed that exclusively breastfed children become hungry quickly and do not add weight (37).

1.2.2 Current normative feeding practices of HIV-positive breastfeeding mothers

Infant feeding practices are profoundly shaped by social behaviours, cultural norms, and beliefs, presenting a diverse range of influences on breastfeeding mothers globally and in SSA (16,23,38,39). In Botswana and Zambia, HIV-positive breastfeeding mothers adopted mixed feeding practices post-hospital discharge, guided by the influence of immediate family members, including spouses and mothers-in-law (38,40). Similarly, South African women, both HIV-positive and negative, reported introducing formula milk, other liquids, and solid foods to their infants well before the recommended six months, influenced by cultural and familial factors (14,41).

In Kenya, breastfeeding practices for HIV-exposed infants are significantly constrained by deeply rooted social and cultural norms (16,23). Beliefs associating HIV transmission with extramarital affairs have led to lactating mothers refraining from breastfeeding due to societal perceptions of it being a bad omen (42). Cultural practices also dictate that women with multiple sexual partners discontinue breastfeeding until a ritual cleansing is performed to purify their breast milk and protect both mother and infant from perceived harm (42). Additionally, the gender of the infant plays a role, with boys breastfed for a shorter duration than girls, as boys are believed to weaken the health of the mother by consuming more breastmilk (39,42,43). Culturally approved mixed feeding practices, especially for male infants as early as four months, further illustrate the intricate intersection of social, gender and cultural factors influencing infant feeding decisions in Kenya (16,23,42).

1.2.3 Factors that promote or hinder exclusive breastfeeding of HIV-exposed Infants

Research conducted in the SSA region including Kenya has extensively explored the multifaceted factors that either promote or hinder the practice of EBF for infants exposed to HIV (20). Despite maternal awareness of the importance of adhering to EBF guidelines, various factors have been identified as critical in shaping decisions regarding infant feeding practices, as already alluded to in earlier explanation of the socio-ecological model. This literature is expanded upon here.

1.2.3.1 Policy factors

Breastfeeding laws, recommended guidelines, and policies are essential components of promoting optimal infant feeding practices and supporting breastfeeding mothers. Nabwera et al., reported that lack of proper policy implementation at healthcare facilities hinder mothers' ability to adhere to recommended infant feeding practices, including EBF (21). When mothers receive conflicting and confusing messages from health workers about infant feeding for their HIV-exposed infants they lack trust in received information, which influences their infant feeding decisions (20). For instance, the phasing out of free formula milk for HIV-exposed infants in South Africa caused confusion among HIV-positive breastfeeding mothers who received contradicting information from healthcare professionals in different healthcare facilities in the country (20).

In Kenya, in accordance with national guidelines, mothers should be evaluated for suitable antiretroviral therapy, and newborns should begin highly active anti-retroviral therapy (HAART) (19). However, insufficient training of healthcare professionals coupled with a lack of updates on recommended infant feeding practices, contributes to variations in information offered across different healthcare facilities (21). In regions like Kilifi and Baringo Counties, a lack of information on changing policies such as EBF for six months and continued breastfeeding for two years or beyond negatively impacts the uptake of EBF practices among HIV-positive mothers (16,21). The lack of autonomy of healthcare professionals in delivering breastfeeding messages has led to the creation of confusing and conflicting information that hinders the implementation of EBF in Kenya (21). Finally, policies related to healthcare access aim to ensure that all individuals, regardless of their socio-economic status or geographical location, have access to essential healthcare services. In Kenya, unequal healthcare service delivery in resource-constrained settings has negatively impacted the promotion of EBF practices (21,44).

1.2.3.2 Institutional factors

The setup of health facilities significantly influences the practice of EBF among mothers irrespective of their HIV status (20). Facilities that prioritize breastfeeding-friendly environments by offering dedicated lactation support services and trained healthcare professionals promote EBF (20,45). A systematic review conducted in countries in East Africa reported that women delivering in such facilities often adopt breastfeeding due to the

knowledge acquired about the associated benefits of EBF (35). Breastfeeding women's adherence to the rules and regulations for HIV-exposed infants feeding has been demonstrated to be facilitated by appropriate guidance at the health institution level (16).

Conversely, health facilities that lack adequate resources, including trained staff and breastfeeding support services, may hinder the practice of EBF (16,27). In such settings, mothers may not receive proper guidance or support to initiate and maintain EBF (16,27). Breastfeeding mothers working in healthcare settings in Kenya reported that lack of built lactation environment within their workplaces discourage them from practising EBF (46). Similar results have been recorded in other LMICs, where working mothers who breastfed often have to introduce supplementary foods against their preference to breastfeed exclusively due to short maternity leave, long work shifts, and a lack of physical places to express or pump breastmilk (47).

1.2.3.3 Community factors

Cultural norms, beliefs, and practices have considerable influence on EBF rates within African communities. In Kenya, community factors extend beyond specific practices to encompass broader influences on breastfeeding behaviours. Distinctive cultural practices, like offering medicinal water or introducing specific foods early challenge adherence to the recommended guidelines for infant feeding (48,49). In East Africa, traditional beliefs often dictate early establishment of breastfeeding as well as the introduction of complementary foods soon after birth (35). Furthermore, cultural taboos surrounding colostrum lead to its disposal under the misconception that it is harmful or impure (35). Understanding community-specific norms is vital for tailoring interventions that respect cultural diversity while promoting the practice of EBF.

Despite the general acceptance of breastfeeding, variations arise when it comes to nursing HIV-exposed infants (27,50). For instance, a study in Nigeria revealed common practices such as feeding infants water to quench thirst and avoiding breastfeeding due to the perception that the mother's breast milk is contaminated with the virus (50). A similar study in Wajir County noted that among the Somali tribe, residing in a hot region, culturally practice feeding water to their infants, potentially affecting adherence to EBF for HIV-exposed infants (48). Similar findings have also been reported in Kilifi County by HIV-positive breastfeeding mothers who give medicinal water to their infants as a required cultural practice (49), while in the Maasai

community, unique practices including feeding infants with fatty concoction laced with ghee and a cultural practice to feed babies with blood, animal's milk, and bitter herbs after two weeks of delivery (51). When mothers adhere to these cultural practices and mix feeds for their infants, then the rate of adhering to the recommended guidelines for infant feeding is compromised (27,51).

1.2.3.4 Interpersonal factors

As alluded to earlier, the dynamics of interpersonal relationships play a pivotal role in shaping EBF practices, particularly within the context of HIV. Furthermore, family culture and practices have a notable influence on decisions made by breastfeeding mothers, with both immediate and extended family members significantly impacting their choice of infant feeding methods, as reported in studies (16,21). In the Kenyan context, HIV-positive breastfeeding mothers have been reported to be swayed by the perspectives of their grandmothers and husbands, leading them to deviate from recommended guidelines for infant feeding (20). A similar phenomenon has been observed in South Africa, where breastfeeding mothers adhere to practices influenced by their grandmothers (12), regardless of HIV status.

Samburu and colleagues explored the impact of disclosing one's HIV status on breastfeeding decisions in a Kenyan community, revealing that failure to disclose challenges mothers to adhere to EBF, while disclosure often results in denial, stigma, and isolation from family and other community members (16). Their study also highlighted that the likelihood of practicing EBF is minimal when a mother's HIV status is disclosed, depending on the type of support they receive from their immediate social circles. Likewise, a study conducted in another region in Kenya documented instances where disclosure has led to negative consequences such as denial, stigma, and isolation from family members, friends, and neighbours, all of which have adverse effects on breastfeeding practices (21). When mothers conceal their HIV status, it impacts their ability to adhere to recommended EBF guidelines (52).

1.2.3.5 Individual factors

Individual level factors exert a significant influence on the practice of EBF among mothers living with HIV. Lactating women's previous positive breastfeeding experiences, their self-efficacy to breastfeed, and the presence of social support networks have all been identified as positive influencers on their breastfeeding practices (16,21). Conversely, numerous challenges at the individual level, such as socioeconomic factors, including poverty and food insecurity,

hinder the practice of EBF (35). In South Africa, for instance, HIV-positive breastfeeding mothers reported that the lack of employment opportunities and food insecurity served as obstacles to exclusively breastfeeding their children (41). Similarly, a study in Nigeria revealed that mothers hesitated to adhere to medical advice promoting EBF, fearing potential excommunication from their families (50).

Additionally, regional disparities and cultural nuances within countries contribute to variations in individual factors influencing infant feeding practices (16). In Kenya, for instance, urban areas like Nairobi have witnessed sub-optimal infant feeding practices among mothers, attributed to inadequate knowledge about infant feeding, myths, misconceptions, and the challenges associated with single motherhood (27). With regional disparities reported in Kenya, employment status emerged as a significant factor affecting breastfeeding practices among mothers living in Nairobi region, with both employed and unemployed mothers facing unique challenges (27). For instance, while 79% of nurses reported not fully breastfeeding due to short maternity leave, unemployed mothers expressed concerns about food insecurity and perceived insufficiency of breast milk for their infants (27).

1.3 Statement of the Problem

Globally, less than 41% of infants under six months are exclusively breastfed, with even lower rates in Africa, where only 37% of infants were reported to be exclusively breastfed in 2017 (27). The intersection of EBF and HIV adds a layer of complexity, particularly in resource constrained settings, where safe and affordable infant feeding options are limited, exacerbating the impact of poverty on feeding decisions (16). The dilemma is further compounded by conflicting information on recommended infant feeding guidelines provided by different healthcare professionals and the lack of safe spaces to deliver sensitive EBF promotion messages (39). Moreover, HIV-positive mothers face additional challenges, such as concerns about transmitting HIV to their infants, experiencing stigma, and navigating societal attitudes toward breastfeeding HIV-exposed infants (16,21,23).

1.4 Justification

The consistently low levels of EBF worldwide, including both developed and developing countries emphasize the long-lasting challenges in promoting this vital infant feeding practice. Despite existing studies that document factors influencing women's decisions to exclusively breastfeed, there is a notable gap in evidence, particularly among HIV-positive mothers in SSA

countries, including Kenya. The absence of studies examining HIV-positive breastfeeding mothers' EBF knowledge, perceptions, and practices in Eldoret highlights a critical need for targeted research. Addressing this gap is essential for developing tailored interventions and support mechanisms to improve EBF rates among mothers living with HIV in the region, considering the unique challenges they face in balancing optimal infant nutrition with HIV related considerations.

1.5 Research question

What are the infant feeding experiences of women living with HIV in Eldoret Kenya?

1.6 Broad aim of the study

The research aimed to explore EBF knowledge, perceptions, and practices among HIV-positive mothers with HIV-exposed infants younger than six months at the Moi Teaching and Referral Hospital in Eldoret, Kenya.

1.7 Specific objectives

- I. To explore HIV-positive mothers' EBF knowledge, perceptions, and attitudes in Eldoret, Kenya.
- II. To describe the current normative feeding practices of HIV-positive mothers with infants younger than six months in Eldoret, Kenya.
- III. To examine factors that promote or hinder exclusive breastfeeding among HIV-positive mothers in Eldoret, Kenya.

1.8 Chapter conclusion

This chapter outlined the background and context for the research, detailing the aim and the objectives. As this report is being submitted in a manuscript-ready format, the following chapter is structured as a comprehensive study, beginning with an expanded background that integrates relevant literature. It then delves into the research methodology, explaining the design, data collection, and analysis techniques. The chapter also presents the study's results, followed by a thorough discussion that interprets the findings in relation to existing knowledge, and concludes with practical recommendations and implications for future research.

CHAPTER 2: MANUSCRIPT: INTERNATIONAL BREASTFEEDING JOURNAL

Manuscript Preamble

This chapter adheres to the author guidelines of the International Breastfeeding Journal (see Appendix 1). Acronyms are re-introduced, as though this was a stand-alone manuscript. However, the manuscript's spelling and referencing style (Vancouver) for this report adhere to the specifications of the University of the Witwatersrand. A numbering system has also been adopted to support examination. These aspects will be modified to meet the specific requirements of the journal before submission.

“Breastfeeding is difficult”: a qualitative exploration of exclusive breastfeeding among HIV-positive mothers in Eldoret, Kenya

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2.0 Abstract [355]

Background

Exclusive breastfeeding (EBF) is considered the gold standard of infant feeding because it provides optimal nutrition and immunity benefits to an infant for the first six months. Globally, infant feeding practices vary widely, influenced by geographic location, culture, economics, and education. Breastfeeding among mothers with Human Immunodeficiency Virus (HIV) provides a double shield for their babies. However, mixed infant feeding practices, influenced by cultural norms, contribute greatly to low EBF rates among this population. The intersection of EBF and HIV presents challenges, particularly in resource-constrained settings. This study aimed to explore EBF knowledge, perceptions, and practices among HIV-positive mothers with HIV-exposed infants younger than six months at the Moi Teaching and Referral Hospital in Eldoret, Kenya.

Methods

In this exploratory qualitative study, the first author conducted interviews with 27 purposively sampled HIV-positive mothers with infants under the age of six months who were receiving HIV services at a hospital. She transcribed audio recordings directly from Kiswahili into English. The data was analyzed thematically using MAXQDA 2022 by both authors.

Results

Mothers acknowledged the importance of practising EBF. However, the initiation of breastfeeding, was influenced by factors such as mode of delivery and the number of children. Competing knowledge(s) with mothers receiving conflicting information on EBF from biomedical, social, and personal sources, as well as tough economic realities, and stigma associated with breastfeeding HIV-exposed infants contributed to varied practices. Additionally, mixed maternal attitudes towards EBF complicated feeding decisions. Structurally, the clinic set-up played a crucial role in providing support to mothers, yet in some cases led to unintentional HIV disclosure.

Conclusion

Creating an empathetic and supportive community for HIV-positive mothers opting to breastfeed is necessary to improve EBF uptake. Although progress has been made to implement EBF guidelines, building individual confidence and a supportive environment, both within

health facilities and in communities, is paramount for these mothers. This includes dispelling community misconceptions about HIV and breastfeeding. This study serves as a call to action, urging collective efforts in fostering a transformative environment for the well-being of HIV-positive mothers and their infants.

Keywords

Exclusive breastfeeding (EBF), Infant feeding, HIV-exposed infants, HIV-positive breastfeeding mothers, Breastfeeding knowledge, Kenya

2.1 Background

Exclusive breastfeeding (EBF) for the first six months of life is a vital recommendation by the World Health Organization (WHO) to enhance neonatal health and reduce infant mortality (1,7). Despite the known benefits, such as a 13.8% reduction in the death rate of children under two years from 1990 to 2018, global adoption of EBF remains a significant challenge (9). Sub-optimal breastfeeding practices contribute to 45% of maternal and child deaths globally, with 11% of child deaths annually related to inadequate breastfeeding (14). Supporting and promoting EBF practices is crucial for protecting infants' health and reducing mortality rates, making it a priority in enhancing maternal and child health outcomes across the globe.

Sub-Saharan Africa (SSA), in particular, presents complex intertwined factors influencing EBF practices. Cultural norms, socioeconomic variables, and the health condition of the mother, including Human Immunodeficiency Virus (HIV) status, play key roles (16). In SSA, the majority of infants are breastfed promptly after birth, correlating with a 70% decrease in infant mortality (17). Nonetheless, significant differences remain when comparing actual breastfeeding practices to WHO's recommendations, with underperforming adherence due to issues like poor maternal education, nutritional counselling, and healthcare accessibility (3,9).

Kenya reflects the struggles faced across SSA, with studies highlighting various influences prompting a variation from EBF among breastfeeding mothers (16,21). Prominent among these is the cultural preference for mixed feeding, motivated by beliefs surrounding the gender and size of the child and the perception of inadequate breastmilk (16,21). Such beliefs, particularly prevalent in lower-income households, are intensified by concerns of HIV transmission and stigma, ultimately leading to a mere 59% of Kenyan infants born to HIV-positive mothers being optimally breastfed (16,22).

Interventions targeted at boosting EBF practices hold substantial potential for health improvements, especially among HIV-positive mothers. These include educational programs aimed at dispelling myths and misconceptions surrounding HIV transmission through breastfeeding, providing psychosocial support to alleviate stigma and discrimination, ensuring access to antiretroviral therapy (ART) to reduce the risk of mother-to-child transmission (MTCT) of HIV, and creating enabling environments in healthcare facilities and communities for breastfeeding support (22,53). Multiple interventions have been implemented in Kenya and other countries to support EBF practices, such as training healthcare providers on breastfeeding

counselling, establishing mother support groups, and integrating breastfeeding promotion into maternal and child health services (27). A study conducted by Kimani-Murage et al. in urban informal settlements in Nairobi evaluated the effectiveness of peer counseling interventions in promoting EBF (42). Their study demonstrated that peer counseling significantly improved the rates of EBF, highlighting the importance of community-based support mechanisms. However, further efforts are needed to address the complex barriers faced by mothers in adopting this recommended practice, including addressing systemic challenges such as inadequate healthcare infrastructure, promoting supportive workplace policies for breastfeeding mothers, and engaging communities to shift cultural norms and beliefs regarding infant feeding practices (22).

The aim of this study was to explore EBF knowledge, perceptions, and practices among HIV-positive mothers with HIV-exposed infants younger than six months. The specific objectives were to explore HIV-positive mothers' EBF knowledge, perceptions, and attitudes, to describe normative feeding practices, and to examine factors that promote or hinder EBF among HIV-positive mothers in Eldoret, Kenya.

2.2 Methods

We applied an exploratory qualitative study design through in-depth interviews with HIV-positive mothers with infants under the age of six months to achieve the study aim and objectives.

2.2.1 Study setting

This study was conducted at the Moi Teaching and Referral Hospital (MTRH) located in Eldoret town, Kenya. MTRH was established in 1917 and commenced its operations with a 60-bed capacity, primarily addressing the healthcare needs of Africans (54). It first operated as a District Hospital until obtaining referral status in 1998 (54,55). MTRH is now a multi-specialty international teaching and referral hospital located in Eldoret Town, Uasin Gishu County, some 310 kilometers northwest of Nairobi (54). With a population of over 24 million, it serves regions in Kenya, parts of Eastern Uganda, South Sudan, Northern Tanzania, and the Democratic Republic of the Congo (54). Notably, approximately 51.3% of the population in Uasin Gishu County live below the Kenyan poverty line (56). As of 2020, Eldoret had a population of 411,000 with a 6% overall HIV prevalence; of this percentage, 15% were females

(57). MTRH is a mother-baby friendly accredited hospital and the headquarters of the Academic Model Providing Access to Healthcare (AMPATH), which is a USAID-funded HIV care and treatment program (54). Since its foundation in 2001, AMPATH has enrolled over 250,000 patients living with HIV across western Kenya and the neighbouring countries of Eastern Uganda and South Sudan (54,58). In addition, AMPATH has provided free HAART to its patients since its inception (59).

2.2.2 Study population and sample

The study participants were HIV-positive mothers who visited MTRH postnatal clinics, who were 18 years and above, with infants between one to six months. Mothers who breastfed their infants were included in the study. All participants had to speak either Kiswahili or English to participate.

The first author used purposive sampling to recruit 27 mothers from the Maternal and Child Health well-being clinic, the New-born Unit (NBU) and the Shoe4Africa Children's Hospital in MTRH in November 2023. A screening questionnaire was used to ensure that the inclusion criteria were achieved. Mothers were approached during their clinic visits and the first author provided them with the information about the study. Those who met the inclusion criteria and were willing to participate in the study were provided with a serial number to ensure confidentiality and anonymity of their identity. Recruitment of a diverse range of mothers was sought to address the credibility of our analysis, including variations in feeding practices and socio-demographics.

2.2.3 Data collection

Prior to data collection, the first author drafted the interview guides (both in Kiswahili and English). The last author reviewed the English version for any assumptions or leading questions and the guide was revised accordingly.

Prior to the main study, in November 2023, a pilot study was conducted with two participants to test the interview guide and refine the questions for clarity and relevance. The pilot helped ensure that the research tools were effective in obtaining the necessary data and informed adjustments to the methodology. Following the pilot, the first author conducted 27 IDIs with consenting mothers on the same day as their visit in a private room at the hospital or an alternative secure place within the hospital preferred by the mother. The study utilized a semi-

structured interview guide specifically tailored for the study, which explored questions about their breastfeeding experiences (see Appendix 2 and 3). Most of the participants preferred to use Kiswahili language, while a few used a mixture of Kiswahili and English. The interviews took between 30 to 45 minutes to complete. The first author spent about 30 minutes after each interview to draft field notes which would help her in remembering each participant and to contribute to the overall data analysis and interpretation.

2.2.4 Data management

All interviews were audio-recorded and backed up as a digital file in the first author's computer. Drafted field notes were stored in a folder specifically designed for this research. After data collection, all data (including consent forms) were stored in a lockable drawer in the first author's office at her workplace. Audio files were labelled using unique serial numbers that were only known by the first author. The first author translated all interviews directly from Kiswahili into English as part of the transcription process. All transcripts were stored in a secured and protected data file on password protected computer, Google drive, and encrypted back up on a hard drive. A comprehensive audit trail was maintained, recording all stages of the research process to ensure dependability.

2.2.5 Data analysis

The authors adopted thematic analysis (60) to identify and interpret patterns and themes in the data set leading her to new insights and understanding of the data. This approach unfolded in a systematic manner, with the first author initially undertaking a comprehensive coding process to identify recurring codes and themes. MAXQDA 2022 software was used to support the analytic process.

The first author read all the transcripts repeatedly, employing an inductive approach which helped her to develop provisional analytic categories from the data; she also integrated a deductive approach, based on the broad aim and specific objectives of the study (61,62). She then used the earlier categories to develop and define a codebook which was reviewed by the second author. Following a mutually agreed upon review and revision of the codes, the authors defined terms, talked about the codebook, and suggested further codes. The first author then used the updated codebook, with an iterative procedure, to review every transcript.

The first author uploaded all transcripts onto MAXQDA 2022 where she applied codes to important text passages in the transcripts. Iteratively, the first author worked with the second author to discuss the major themes that were highlighted. Main themes and sub-themes were discussed and presented. Any disparities that were found were resolved through discussion. The first author then went ahead and classified the data differently before summarizing the results into main themes and subthemes. As a further step to address the trustworthiness and credibility of the data, verbatim quotes were selected to substantiate key findings, with additional information about the study participants to enable a more nuanced interpretation.

2.2.6 Reflexivity

The first author conducted this study as part of her MPH research while being a full-time public health postgraduate student. The author is a Kenyan citizen who speaks and writes fluent Kiswahili. She previously worked as a certified and registered nutritionist in the same setting where the study was conducted. As such, she understands the complexities involved in maternal and child health, particularly regarding nutrition and infant feeding practices. Her positionality on the topic of EBF among HIV-positive women is informed by a commitment to understanding and addressing the complex intersection of cultural norms, healthcare policies, and individual experiences shaping infant feeding behaviours in this population. She conducted 27 interviews with HIV-positive mothers, with only two eligible mothers declining to be interviewed.

The second author, an American by birth, supervised the research from her base in South Africa, offering an outsider perspective from the Kenyan context. She is an experienced public health researcher who conducted her own PhD on breastfeeding among HIV positive and HIV negative women in South Africa. She is also a mother who struggled to exclusively breastfeed two children for the full six months and empathises with women who are unable to achieve WHO recommendations.

2.2.7 Ethical considerations

Ethical approval was acquired from the University of the Witwatersrand, the Human Research Ethics Committee (HREC) and from MTRH and Moi University Institutional Research and Ethics Committee (IREC). Participants signed study participation consent forms and audio-recording consent forms prior to data collection. All the data were kept confidential by

assigning the participants unique serial numbers, with data stored in files in a protected computer folder.

This study anticipated no major risk to the participants except potential discomfort in discussing a particularly stressful topic. Participants were free not to answer any question that they found stressful. They could also withdraw from the study and were reassured that this would not affect them in the program that they were enrolled at MTRH. Of the eligible volunteers, one opted not to take part in the research due to her religious beliefs while another one declined to have her information recorded. Nobody withdrew from the study after consent.

2.3 Results

In this section, the participants' sociodemographic information and themes are presented. The identified themes are organized into six distinct categories exploring HIV-positive mothers' infant feeding practices and what influences their decision.

2.3.1 Sociodemographic information

Table 1 shows the sociodemographic characteristics of the participants. A total of 27 HIV-positive breastfeeding mothers were interviewed. The mothers were between the ages of 20 and 57 years old, with the majority being between 30 and 39 years (51.9%), while the youngest was 20 years and the oldest was 57 years old. Most of the mothers were educated to secondary or high school level (44.4%), with a few having attended a college or university (22.2%). The majority of mothers were unemployed and full-time housewives (70.4%) while a quarter reported that they were informally employed i.e., self-employed, or casual labourers (25.9%). Only one gave birth at home, with the remaining 96.3% of mothers giving birth at the hospital. Two-thirds (66.7%) reported EBF at the time of the interview, with the remainder practicing mixed feeding.

Table 1 Socio-demographic characteristics of the participants

Characteristic	Category (n=27)	Number	%
Age	20 – 29	9	33.3
	30 – 39	14	51.9
	40 and above	4	14.8
Marital status	Married	14	51.9

	Single (never married)	11	40.7
	Widowed	2	7.4
Number of children	One child	5	18.5
	1 – 3 children	16	59.3
	>3	6	22.2
Age of infants at the time of the interview	1 – 3 months	7	25.9
	4 – 6 months	20	74.1
Highest level of education	Primary	9	33.3
	Secondary	12	44.4
	College/university	6	22.2
Employment status	Housewife	19	70.4
	Informally employed	7	25.9
	Formally employed	1	3.7
Place of delivery	Hospital	26	96.3
	Home	1	3.7
Mode of delivery	Normal (vaginal)	20	74.1
	Caesarean section	7	25.9
Feeding practices	EBF	18	66.7
	Mixed feeding	9	33.3

2.3.2 Key identified themes and sub-themes

Figure 2 presents the main themes and sub-themes identified in this study. The main themes include: 1) normative feeding practices, 2) mixed maternal attitudes 3) competing knowledge(s), 4) social support 5) tough economic realities, and 6) Stigma.

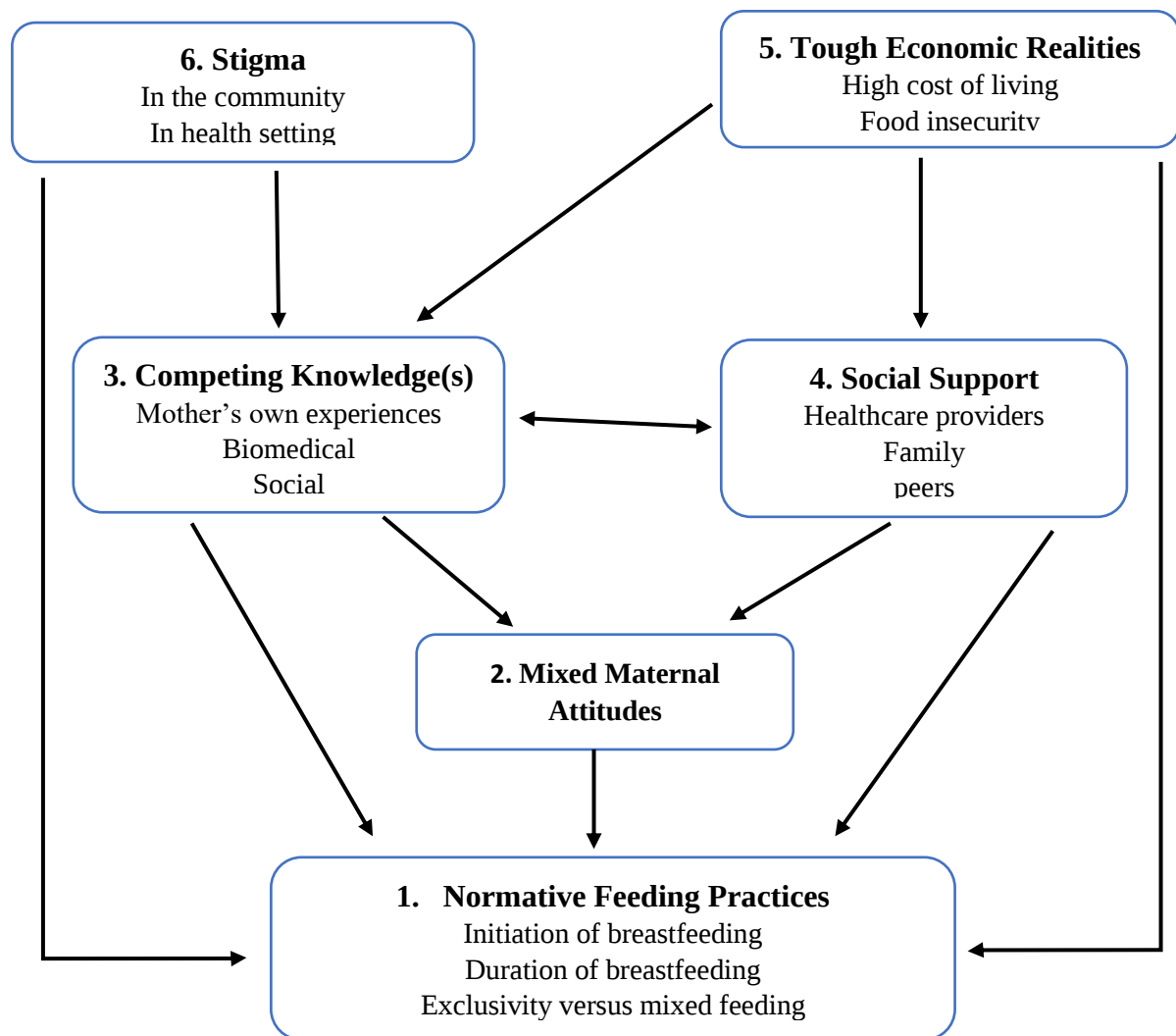


Figure 2 Study themes and sub-themes

2.3.2.1 Normative feeding practices

As can be seen in Table 1, mothers described variations in how they fed their infants, from EBF to mixed feeding. Regardless of actual practices, there was a common sentiment expressed by the mothers that EBF is perceived as a difficult task. There were three critical aspects of feeding that mothers talked about in interviews in relation to their infant feeding practices - initiation, duration of breastfeeding and exclusive feeding – which is how these results are shared.

- **Initiation of breastfeeding**

The initiation of breastfeeding among the participating mothers, all HIV positive, showcased a dynamic interaction of factors, including HIV status, place, and mode of delivery, which resulted in varied practices. The initiation process was notably influenced by these factors, as

expressed by participants. They illustrated the immediate integration of medication alongside breastfeeding practices tailored to each mother's unique situation. One mother narrated, *"Immediately after delivery, my baby was given his medication and then I breastfed him."* (38, married, six children, infant age 3 months).

Another explained,

"I knew my HIV status, but I did not know what will happen to my baby because I delivered at home...when I delivered, I gave my baby that medication [Zidovudine syrup] before we went to the hospital." (46, single, five children, infant age 5 months)

For mothers who underwent caesarean section (CS) deliveries, their initiation of breastfeeding often faced delays compared to those who delivered normally. This was due to the recovery period. A mother shared,

"It took me almost three hours to breastfeed her. This is because, after my CS I was left to recover completely from the anaesthesia I had been injected while being operated." (39, married, two children, infant age 4 months)

Reported insufficient breastmilk at birth emerged as a critical factor that influenced some mothers' decisions regarding initiation of breastfeeding. Additionally, mothers perceived the inadequacy of their breastmilk as a significant trigger to introduce alternative feeds, including formula milk. *"Because I did not have any breastmilk, my baby was given NAN for almost three days."* (34, single, two children, infant age 5 months)

First-time mothers' anxiety and frustration while initiating breastfeeding were commonly reported, with a recurring challenge being the perception of insufficient breastmilk supply. *"I didn't have any breastmilk production and to make it worse, this is my first child. So, it gave me a challenge."* (26, single, one child, infant age 2 months)

- **Duration of breastfeeding**

The study also provided insights into the duration of breastfeeding among participating mothers. Mothers reported variations in their breastfeeding duration, with some influenced by personal preferences and others influenced by the baby's needs and associated benefits of prolonged breastfeeding.

"Currently I am still breastfeeding because I have enough breastmilk. I prefer to breastfeed her exclusively because she gets full from my breastmilk and her weight is

adding gradually, which is a good thing for her.” (29, single, two children, infant age 4 months)

“I will breastfeed her exclusively for six months... Breastmilk helps to protect a baby against infections and diseases. Also, breastmilk has all the nutrients a baby wants; water and vitamins.” (33, married, three children, infant age 4 months)

Despite early initiation of breastfeeding and establishment of breastmilk supply by mothers in this study, they cited that their intentions and likelihood to sustain EBF for the recommended duration was challenged by the baby’s excessive crying and low weight gain. One mother said,

‘I just didn’t like the way she cries a lot, which made her not to add weight altogether. I felt like my baby was not breastfeeding enough to be full and so I decided to supplement her against the doctor’s advice.’ (36, married, three children, infant age 5 months)

Another mother narrated how meeting her baby’s persistent desire for breastfeeding was affecting her confidence to prolong practising EBF. *“Even with this current baby, sometimes he is not satisfied with my breastmilk. He wants to suckle all the time.” (26, married, three children, infant age 2 months)*. Although she was struggling with concerns about her breastmilk production, an experience which also affected her previous children, the desire for her current infant to continue breastfeeding indicated that the baby is seeking more nourishment and comfort from the mother who is still breastfeeding exclusively.

The impact of stress was evident among mothers in this study, who revealed the interconnection between maternal mental well-being and breastfeeding duration. The stories of the mothers brought to light the frequently difficult choices they had to make, balancing external stresses with their commitment to the recommended duration of EBF. One mother disclosed, *“I went through a lot of stress which made my breastmilk disappear completely.” (24, married, two children, infant age 3 months)*

Another mother expressed her intention to shorten her breastfeeding period due to the current stress she was going through looking for a casual job to support her family. *“Anytime from now. I was just waiting for him to finish two months then I start introducing different foods to him.” (32, married, three children, infant age 3 months)* Her narration reflects the complicated nature of decision-making where maternal well-being, influenced by various stressors, becomes a critical factor in determining the duration of practising EBF.

- **Exclusivity versus mixed feeding**

The study uncovered a diverse range of perspectives on exclusivity versus mixed feeding, shedding light on the complex interplay of cultural influences, knowledge gaps regarding HIV and breastfeeding, and individual experiences shaping maternal decisions in infant feeding practices. There were those who adhered to EBF, based on knowledge and experience, evident in the following quote.

“I breastfeed exclusively because of my HIV status and that is the only method we are taught to practice. So, I have practiced exclusive breastfeeding before, and both my children tested negative.” (33, married, three children, infant age 5 months)

However, a common opinion among the mothers was that navigating these decisions involved difficult considerations beyond the challenging nature of EBF, encompassing historical beliefs, socio-economic conditions, and varied cultural norms that collectively influenced their approaches to infant nutrition.

“According to our African traditions, I know some people feed their babies with porridge and cow’s milk when they are still young.” (24, married, two children, infant age 3 months)

As shown in Table 1, mixed feeding practices were common. As will be expanded upon in other themes, this was influenced by factors such as traditional norms and practices, and perceptions of the baby’s nutritional needs. One mother acknowledged practicing mixed feeding due to cultural norms, before she knew her HIV status:

“To be honest, I mixed feeds. It was not my wish at all. At that time, I had not been tested for my HIV status. So, I fed her the normal way we feed children according to our culture. I gave her water, milk, porridge, and other light foods and breastfeeding at the same time”. (33, married, two children, infant age 4 months)

One older mother shared a unique experience, recounting a period when HIV-positive breastfeeding mothers were advised against breastfeeding due to the risk of HIV virus transmission to the child. Her narration reflected evolving medical guidance and highlighting the historical context of infant feeding practices in the face of HIV.

“I have only breastfed this one. I fed formula milk to my previous children because by that time, we were not allowed to breastfeed. Those children who were breastfed were

being infected with the virus. So, at AMPATH, they used to issue formula milk to all breastfeeding mothers who were HIV-positive for six months. That was our exclusive formula feeding for the first six months and then we were allowed to start weaning on the seventh month. So, this is my first child I am breastfeeding.” (42, widowed, three children, infant age 6 months)

Another mother of the same age strongly stated concerns about the practice of mixed feeding, emphasizing its potential negative impact on a baby’s health. The mother portrayed her relative experience of raising her five out of eight children being HIV-exposed and described that mixing different types of feeds before the recommended age introduced complications and health issues.

“It is not good to mix feeds for babies under the age of six months. If you mix feeds for your baby, the health of that baby will not be good. That baby will always be sick because of that.” (42, widowed, eight children, infant age 4 months)

2.3.2.2 Competing knowledge(s)

Competing knowledge(s) regarding HIV-exposed infant feeding was a significant theme in this study. The mothers exhibited a solid grasp of EBF guidelines, emphasizing the importance of giving newborns breast milk exclusively for their first six months of existence. However, mothers disclosed that they were navigating conflicting types of information about infant feeding including biomedical, social, and their own personal experiences, as illustrated in Figure 2. The mothers emphasized how this competing knowledge(s) played a key role in shaping their decisions concerning their actual infant feeding practices. Below are excerpts from their narratives, providing insight into the dynamic interplay of competing knowledge(s) and the impact on maternal decision-making.

- **Biomedical knowledge**

Mothers reported that their decisions regarding infant feeding are significantly influenced by the biomedical advice they receive at healthcare institutions. Besides, the mothers revealed how their practices were impacted by the emphasis on EBF for the first six months, which is frequently based on biological guidelines. One mother reflected,

“I know that in our HIV status, we only give breastmilk, and we are not allowed to give water or anything else. But after a child turns six months, you are allowed to give porridge and milk.” (46, single, five children, infant age 6 months)

Likewise, mothers acknowledged and noted that the healthcare professionals taught and encouraged breastfeeding practices for mothers living with HIV, reiterating, and echoing the biomedical knowledge they had previously acquired. The mothers reported feeling positive about the information they were given by the medical professionals, which demonstrated their confidence in the instructions, particularly those pertaining to the advantages of feeding an infant exposed to HIV.

“They also educated us freshly married young girls that all children are breastfed despite their parent’s HIV status. And it is an added advantage for a HIV-exposed baby to be breastfed fully because breastmilk makes them stronger.” (33, married, three children, infant age 5 months)

- **Social knowledge**

In addition to biomedical knowledge, mothers who participated in the study reported receiving conflicting information about HIV-exposed infant feeding from their neighbours, and peers. As mothers navigated through the complexity of child feeding methods, it became clear how much value they attached to peer- and community-based suggestions. A few women reported that their decisions were significantly influenced by the information that was circulated around their social groups.

Mothers said that the information they received from their neighbours and other community members often conflicted with medical advice. One mother, for example, described how the customs and beliefs of her society around baby feeding interfered with the way she planned to feed her baby. She lamented,

‘I can say that my first child I was influenced by my neighbours and other people who said that it is not compulsory for a child to complete six months to introduce foods. They gave me a lot of pressure to give foods to my child before she finished six months.’ (32, married, three children, infant age 2 months)

Mothers also reported that peer experiences and influences had a big impact on how they perceived and made decisions about baby feeding methods. Some women said that the information they received from their peers regarding a newborn feeding led to different views

about the best ways to feed babies, opinions that were in line with cultural traditions and beliefs. A mother who was newly diagnosed with HIV after giving birth to her second baby described how her friends encouraged her to practice mixed feeding which was against the biomedical knowledge she had been taught.

“The most common thing they say is, ‘feed that baby with porridge.’ Others will testify that, ‘I fed my baby with ugali after one month and he grew up to be a strong boy. Did he die because of food, no. So, go ahead and feed yours as well’” (24, married, two children, infant age 3 months)

There were mothers in the study who did not perceive anything naturally wrong with practicing mixed infant feeding. Despite the recommended guideline for EBF, some mothers expressed that introducing complementary foods alongside breastfeeding was a common and acceptable practice.

“Although it is not right to give other foods to a young baby, but those babies just grow up well like other children. The only difference they have is that those babies who have been fed earlier tend to be overweight, which is not right.” (37, single, six children, infant age 4 months)

Another mother cited reasons related to her previous infant feeding experience saying, *“To be honest, if it was not for this HIV status, I don’t see any harm in feeding my baby because I did it with the first one and she grew up well.” (34, single, two children, infant age 5 months)*

- **Mothers’ own experiences**

As has already been alluded to, mothers stated that their present ways of breastfeeding were influenced by their previous experiences. Positive experiences of raising HIV-negative babies were shared, impacting mother’s confidence in adhering to HIV-exposed infant feeding guidelines. The shared narratives emphasized the positive outcomes associated with EBF, fostering a sense of assurance and motivation among these mothers to continue prioritizing breastmilk as the primary source of nutrition for their infants.

“When I breastfed my first child and later, she tested HIV-negative, I believed that although I am HIV-positive, I can protect people who are dear to me, and they will not be infected. With that assurance, I breastfeed without any fear because I know my children will be HIV-negative. Also, immediately after childbirth, they are given their

medication which reduces the risk of being infected.” (29, single, two children, infant age 3 months)

2.3.2.3 Stigma

Stigma, competing knowledge(s), and normative feeding practices were found to be deeply intertwined aspects that collectively influenced the experiences of participating mothers in their infant feeding journeys. They expressed how the stigma surrounding HIV profoundly affected their breastfeeding behaviours, leading to emotional distress and challenges in adhering to recommended practices. These mothers shared instances of facing harsh treatment while breastfeeding or caring for their children due to societal stigma, which significantly influences their decisions and experiences. Despite understanding the importance of breastfeeding, they reported feeling isolated and discriminated against, hindering their ability to breastfeed effectively.

- **Stigma in the community**

Mothers said that one of the main causes of the stigma they face in their communities is the widespread perception that breastfeeding transfers HIV to the baby. One participant expressed the general opinion stating, *“...they always say it is infected with the virus and if you breastfeed your baby, she will also be infected.”* (22, single, one child, infant age 4 months) Another mother shared a similar feeling recounting, *“I have even heard someone say that our breastmilk is full of the virus and if we feed our babies, we are feeding them the virus.”* (42, widowed, three children, infant age 6 months)

According to some mothers, stigmatization by society causes isolation because relatives and even neighbours avoid interacting with HIV-positive women and their breastfeeding infants. Some women hid their HIV status out of fear of criticism and unfavourable conversations, which prevented them from getting the support they may have otherwise received in the society at large. A few mothers even resorted to mixed infant feeding to avoid judgment, believing that EBF would raise suspicions and questions about their HIV status.

“I remember when I was newly diagnosed and I was very sick, I was stigmatized by the way I was treated by my own family [sorry for that] ...they even didn’t allow me to sleep in the same house with them. They took my bedding to a separate house and isolated my utensils. I was literary treated like a dog.” (42, widowed, eight children, infant age 4 months)

The established community belief, as articulated by mothers, is that the act of breastfeeding by an HIV-positive mother inevitably stigmatizes her as well as her infant as they are assumed to also be HIV-infected. One mother explained,

"The obvious saying out here is that when a HIV-positive mother breastfeeds her baby, that baby is automatically infected. Just because a woman is HIV-positive, her babies will be branded HIV infected." (36, married, three children, infant age 4 months)

- **Stigma in health setting**

Health facilities were another key site of perceived stigmatization. Participants raised concerns about the shared space at the postnatal clinic at MTRH, where HIV-positive breastfeeding mothers are attended to. Despite the cultural norm of breastfeeding anywhere without fear or shame, due to their HIV status these mothers expressed the need for a more confidential and private space.

"The only thing I am worried about sometimes is this space for HIV-positive mothers. I feel it is not proper to mix HIV-negative and HIV-positive breastfeeding mothers at the same clinic. I know some of the mothers already know that those ones who go to that private space are HIV-positive. My suggestion regarding this is that they should create this private space somewhere else." (26, married, three children, infant age 2 months)

The shared space increased the mothers' sense of vulnerability, as they described feelings of fear, anxiety, and concern about encountering familiar people who might not be aware of their HIV status.

"I know people do meet but with this situation, it's tough [laughing] ...when I think of ever meeting with someone, I always feel so scared that I can lack the energy to even move...because if I meet with someone I know especially on that private space, I might collapse! I don't know what I can do to be honest." (33, married, three children, infant age 5 months)

As a result of the shared space at the postnatal clinic, some mothers described how lack of privacy in the current clinic results in unintentional disclosure of their HIV status. The mothers further cited that the risk of unintentional disclosure could result in potential judgment from other people especially the HIV-negative mothers present in the same venue.

“Although it is not possible to make us equal, at least the hospital should consider creating separate spaces for us if it is possible. We should not be mingling with HIV-negative mothers in the same space and then leaving to be attended to in this partitioned space. I think we should have our own space where we walk to directly and be attended to without worrying about who is watching which side you are heading to and coming from.” (36, married, three children, infant age 3 months)

One concerning incident was shared by a mother who experienced the disclosure of her HIV status by a healthcare provider at the health facility without her consent. Despite the incident not significantly impacting her breastfeeding practices, she expressed disappointment in the unexpected breach of confidentiality by a trusted healthcare provider.

“...there is one nurse at this clinic whom I will not share her name, but she bad mouthed me in the neighbourhood where we live. But I pretended as if I did not hear what she said. It was so funny because whoever she disclosed my status to came to confirm from me saying nurse so and so said you always attend HIV-positive mother’s clinic at MTRH.” (27, married, six children, infant age 2 months)

2.3.2.4 Social support

Another important theme that stood out in this study was social support. Mothers provided examples of the supportive and interconnected networks they come across in their infant feeding journey. Even though these mothers reported the struggles and challenges they experience while breastfeeding their babies, they commonly acknowledged receiving social support from their friends and family. Beyond the challenging nature of EBF, managing these choices required careful consideration of historical perspectives, socio-economic conditions, and diverse cultural norms that all impacted their views on infant nutrition as well as those of the healthcare professionals.

- **Family support**

Mothers overwhelmingly recognized the critical role that social support, especially from family, plays in helping them cope with the difficulties brought on by their HIV status. Spouses in particular, were highlighted as key figures in providing not only emotional support but also meeting basic family needs and desires. The mothers expressed gratitude for the understanding and assistance they received from their partners, emphasizing the importance of a supportive

marital relationship in navigating the complexities of living with HIV and breastfeeding their babies.

“My husband is very supportive. He always reminds me to take my medication on time not forgetting the baby. He is very strict when it comes to medication because he is HIV-negative while, I am positive.” (39, married, two children, infant age 5 months)

“My husband gives me support in terms of bringing food home to feed my other children. I always feel that this is a very big support that a breastfeeding mother wants. It is not a norm for every husband to provide for his family especially when the wife is breastfeeding. So, I appreciate his support so much.” (32, married, three children, infant age 2 months)

- **Peer support**

Mothers talked about how crucial it is to have friends who are supportive of them when they are breastfeeding. In this instance, a mother narrated how her close friend supported her: *“but there is this good friend of mine who knows my status and she always encourage me when I feel low or if I need someone to talk to, then I am open to her.” (39, married, two children, infant age 5 months)*

In other instances, mothers mentioned that although some neighbours influenced them negatively, as discussed earlier, they appreciated the neighbours that support them while nursing their young babies. One mother explained how her neighbours demonstrated tangible support by assisting her to deliver at home. She recounted the compassion she received from her social circle, emphasizing the positive impact of a supportive community for pregnant and breastfeeding mothers.

- **Healthcare providers**

Overall, the mothers expressed gratitude for the social support they received from healthcare providers, which included encouragement, counselling, proactive follow-up for upcoming clinic appointments, and even financial support when mothers faced challenges.

“When we come for our children’s clinic and there is a personal challenge someone is going through like stress, the doctors are always ready and willing to counsel us which is such a big kind of support. In addition, when a mother is challenged to attend clinics due to financial constraints, the hospital sometimes follows-up and ensures they send

the mother something small to facilitate her transport to the hospital.” (32, married, three children, infant age 5 months)

Mothers described the comfort and confidence they felt in turning to the healthcare providers in that health facility for help when facing challenges. Their appreciation signified a strong sense of confidence and trust in the hospital’s ability to offer them assistance and care. One key area of appreciation was the role the hospital plays in making ARVs easily accessible, among other services.

“I can say that we are supported at the hospital by receiving our medications, we also receive guiding and counselling, and the services here are professional.” (33, married, three children, infant age 5 months)

2.3.2.5 Tough economic realities

Throughout interviews, mothers broadly elaborated on the ways in which tough economic realities, encompassing factors like the high cost of living and food insecurity, not only shaped their own diets but also deeply impacted their infant feeding behaviours.

- **High Cost of Living**

Most mothers in this study faced financial challenges, compounded by their unemployment status as illustrated in Table 1. The impact of this economic strain on breastfeeding practices was evident, with mothers expressing challenges associated with lack of funds and the demanding nature of high living costs. One mother lamented, *“Life has been tough with the high cost of living which demands a lot than I can afford.” (36, single, six children, infant age 4 months).*

Yet another mother expressed distress over her lack of formal employment and its impact on her ability to be with her baby, stating,

“According to this tough economy we are living in, you cannot sit every day in the house without doing something to earn you a living. This life will force you to seek casual jobs and you cannot go everywhere with the baby.” (26, married, three children, infant age 2 months)

- **Food insecurity**

A major issue highlighted by mothers was the interconnection between food insecurity and breastmilk production. Acknowledging the role of sufficient nutrition for breastfeeding mothers, the participants outlined how challenges caused by lack of food negatively affected their desire to breastfeed.

“My breastfeeding experience has not been easy due to lack of food. I remember visiting my neighbours during mealtime just to eat with them or drink tea at their house to help me with breastmilk.” (42, widowed, eight children, infant age 4 months)

“Sometimes we lack food to eat at home...this situation obviously affects my breastmilk production. If I don’t have access to enough food, then I should not expect to have enough breastmilk for my baby.” (36, married, three children, infant age 3 months)

2.3.2.6 Mixed maternal attitudes

Analysed together, we found that different attitudes regarding EBF were influenced by the other themes of conflicting knowledge(s), socioeconomic conditions, and the mother’s personal breastfeeding experiences. Some mothers maintained a positive attitude towards EBF emphasizing the importance of adhering to infant feeding guidelines.

“If a breastfeeding mother adheres to the given instructions, then nothing bad will happen to their children. I have seen so many HIV-positive women raising HIV-negative children out here.” (39, married, two children, infant age 5 months)

“If mothers know the importance of breastmilk, then they will breastfeed exclusively. For instance, I have breastfed fully all my children, and I can testify that they rarely get sick. So, breastmilk is very important for any child’s growth.” (38, married, six children, infant age 4 months)

Conversely, some mothers held more ambivalent attitudes towards EBF, citing the challenges associated with the practice. Concerns about insufficient breastmilk and the difficulty of sustaining EBF for the recommended period were factors influencing their perspectives. Despite accepting the situation, these mothers expressed the practical difficulties they faced in adhering to EBF guidelines. One mother explained,

“It is difficult to breastfeed a baby for a whole six months...what if someone doesn't have enough breastmilk? To be honest that practice is difficult.” (33, married, three children, infant age 5 months)

Other mothers' attitudes towards EBF were more pragmatic in nature. For instance, one mother emphasised the need for empathy and individualized support in reference to the trust relationship between mothers and health workers. She noted,

“Sometimes doctors should not force breastfeeding mothers to adhere to the recommended guidelines if they are not ready. They should always have consideration by allowing a mother to decide what she wants to practice. In addition, forcing a mother to practice EBF might not be helpful because this mother will not be honest when asked what she is feeding her baby.” (42, widowed, three children, infant age 6 months)

2.4 Discussion

The study found evidence that HIV-positive breastfeeding mothers are knowledgeable about EBF and the recommended guidelines for infant feeding under the age of six months old. Even so, mothers had different attitudes towards practicing EBF and different infant feeding practices. Key findings including tough economic conditions, fear and misconceptions about HIV transmission, stigma associated with breastfeeding HIV-exposed infants, breach of confidentiality in healthcare settings, and cultural practices and beliefs stood out strongly in this study. These findings highlight the multifaceted challenges faced by HIV-positive breastfeeding mothers in adhering to EBF guidelines and navigating the complexities of infant feeding. It is essential to delve deeper into these findings to understand their implications for policy, healthcare practices, and interventions aimed at supporting HIV-positive breastfeeding mothers in optimizing infant feeding practices while addressing the barriers they encounter.

2.4.1 Tough economic conditions

Food insecurity was found to be the most common challenge reported among the participants, highlighting the relationship between nutrition and breastmilk production. Seemingly, with lack of adequate intake of a balanced and a nutritious meal, these mothers reported insufficient breastmilk, thus not being able to feed their babies optimally. Mothers residing in marginalized communities, like Langas, one of Kenya's largest informal settlements (57), were found to face challenges in accessing clean water and food, a finding consistent with other reported studies which also noted comparable obstacles (53,63,64). This struggle to obtain essential resources highlights the widespread nature of food insecurity and its adverse impact on breastfeeding practices. Other studies in SSA have also found that food insecurity is one of the main factors impeding the uptake of EBF, as supported by literature from the region (64).

The study revealed significant challenges related to employment among the participating mothers, with unemployment exacerbating their already fragile financial situations. Many mothers expressed distress over their inability to secure formal employment, citing the demanding nature of high living costs and the imperative to seek casual jobs to make ends meet. This economic strain not only affected their ability to provide for their families but also hindered their capacity to engage in optimal infant feeding practices, as the need to work outside the home limited their time with their babies. Some mothers felt that lack of income generating activities and being full-time housewives contribute to their lack of food. This is in

line with Barasa et al., who reported that lack of employment has been associated with inadequate food in households where a mother is breastfeeding exclusively (27). Conversely, HIV-positive breastfeeding Haitian mothers who lived in extreme poverty were found to have increased breastfeeding practices because they believed that was the ‘last resort EBF’ for their babies (65). Despite the employment hardships they faced as HIV-positive breastfeeding mothers, they expressed their ability to maintain EBF practices. It is important to recognize that many of these challenges are common to all mothers and should be addressed through strategies that benefit women irrespective of their HIV status.

2.4.2 Fear of HIV transmission

Mother’s fear of infecting their babies with HIV was an important concern in this study, as it has been for similar studies in SSA. Despite being equipped with the relevant knowledge and updated guidelines about infant feeding, they were still anxious about practicing EBF for fear of HIV transmission. Corresponding to this, Modjadji et al., in their recent study in South Africa reported that mothers feared infecting their babies with HIV and the study suggested that counselling messages need to address the fears and assure mothers of the effectiveness of ART in preventing transmission of HIV to the baby (52). Also, according to Remmert and colleagues, HIV-positive mothers’ fear of transmitting the virus to their infants led to failure to breastfeed infants fully, often due to reasons such as employment or educational commitments or medical complications like breast sores, has resulted in suboptimal infant feeding practices (66). A recent study on the use of the Dapivirine vaginal ring and daily oral Pre-exposure Prophylaxis (PrEP) during breastfeeding in South Africa, Malawi, Zimbabwe, and Uganda found that although breastfeeding mothers had high self-efficacy to using the vaginal ring and PrEP, they feared infecting their babies through breastfeeding (67).

Despite the fact that mothers in this current study reported a myriad of fears while nursing their babies, they demonstrated incredible resilience and adaptability. Their stories of successfully breastfeeding their previous children and maintaining a positive outlook despite adversity was inspiring. This was reminiscent of another recent study of an infant feeding intervention trial among women living with HIV in western Kenya; the women who participated in the trial reported successful raising of HIV-negative babies through the support they received during face-to-face and frequent early postpartum sessions (53). These narratives can serve as powerful tools in combating fear, stigma, and discrimination and fostering a more supportive environment.

2.4.3 Cultural practices and beliefs that result in misconceptions about HIV transmission

From the discussion on fear of HIV transmission, it is evident that cultural practices and beliefs play a significant role in shaping maternal perceptions and behaviours regarding infant feeding. Misconceptions persist in the communities about breastfeeding by HIV-positive mothers, with a belief that all HIV-positive mothers will transmit the virus to their infants through breastmilk. In spite of the fact that HIV transmission through breastmilk is still a possibility, taking ART significantly lowers this risk (8). Although mothers in this study presented a positive perception towards EBF, they were still confused with the conflicting information they received from the healthcare providers, friends, family, and the society at large. When confronted with the misconception that their breastmilk is infecting their infants, they do not know what information to trust. Mutawulira and colleagues reported that 96.4% of mothers who participated in their study in Uganda believed that they could transmit HIV virus to their babies through breastmilk (68). Similarly, mothers from another study conducted in Kiambu level 4 hospital in Kenya reported their doubts in practicing breastfeeding due to fear of infecting their babies (43). Furthermore, the persistent misconceptions about HIV transmission through breastfeeding call for stronger educational and awareness campaigns to dispel these misconceptions. We must delve into innovative and effective ways to deliver accurate information to the communities.

2.4.4 Stigma associated with breastfeeding HIV-exposed infants

Globally, social stigma and discrimination have been reported to significantly affect 37.7 million people living with HIV (PLHIV), which impedes the rates of EBF among HIV-positive breastfeeding mothers (23,69). Mothers in this study faced significant social stigma and discrimination. This stigma often arises from misconceptions and misinformation about HIV transmission and can lead to social isolation and mental health distress for these mothers. The interviews revealed the experiences of these mothers that hold potential for a rich and meaningful discourse. Black American women have reported that stigmatization and sexualization has hinders their breastfeeding practices especially for the first three months post child delivery (29). While insufficient breast milk was identified as the major barrier to practising EBF in Tanzania (70), and breast problems in Nigeria (50), stigma has been found to be the most common barrier in Kenya (23).

The existence of social stigma and discrimination towards HIV-positive mothers is a recurrent theme that invites us to question the roots of these harmful attitudes and how we can collaboratively work towards eliminating them. While it may initially appear that stigma and social support are broader issues, they are fundamentally linked to breastfeeding practices among HIV-positive mothers. Stigma, particularly in healthcare settings, directly affects mothers' decisions and confidence in practicing EBF. For instance, the fear of being judged or having their HIV status disclosed unintentionally can lead mothers to avoid breastfeeding in public or healthcare settings, or even to abandon EBF altogether. The experiences of stigma and the level of social support received play critical roles in shaping how these mothers navigate infant feeding, making these findings highly relevant to the study's focus on infant feeding practices. Sibanda and colleagues observed that low rates to PMTCT services were most likely to occur due to stigma and discrimination experienced by breastfeeding mothers as well as loss to follow-up on HIV-exposed infants (71). Furthermore, mothers in this current study revealed that the community and even healthcare professionals sometimes disclosing their HIV status without their consent is contributing to the high rates of stigma in the society; the same finding has been proved by different studies in Africa (23,71).

2.4.5 Breach of confidentiality in healthcare settings

The breaching of confidentiality in a healthcare setting is another concern. The interviews revealed that healthcare settings can sometimes pose challenges linked to breaches of patient confidentiality. Due to the fear of their HIV status being revealed, breastfeeding mothers expressed their lack of trust towards the healthcare providers which poses more questions about the information they receive to practice EBF. The finding of this study is consistent with studies conducted in Ghana (45), and Zimbabwe (20) respectively, where healthcare providers were found not to exercise empathy and privacy while attending to HIV-positive breastfeeding mothers while other patients were listening. Sibanda and colleagues in their systematic review and meta-analysis reported similar findings that loss to follow-up on HIV-positive breastfeeding mothers was significantly influenced by involuntary disclosure of their HIV status (71). Consequently, the unintentional exposure of breastfeeding mothers' HIV status greatly compromises their intentions and willingness to continue breastfeeding exclusively due to the fear of being judged and stigmatized altogether. This highlights the importance of training healthcare professionals on ethical practices and implementing stringent policies to safeguard the privacy of patients.

2.4.6 Mixed maternal attitudes towards breastfeeding

The study findings revealed the various maternal attitudes towards EBF, echoing the intricate dynamics observed in mixed infant feeding practices. While some mothers expressed a strong commitment to EBF, citing its health benefits and their own positive experiences; others, however, displayed reservations due to challenges such as insufficient breastmilk or the perceived difficulty of sustaining EBF for the recommended duration. This result concurred with that of Northern Ethiopia, where it was reported that 69.4% of HIV-positive mothers had a positive attitude towards EBF (72). Furthermore, conflicting information about infant feeding from various sources, including medical professionals, cultural traditions, and individual beliefs, added to the broad spectrum of maternal attitudes on breastfeeding. This spectrum of attitudes mirrored the broader landscape of mixed infant feeding, where mothers navigated between breastfeeding and supplementing with other liquids, often influenced by cultural norms and personal circumstances. This finding was supported by a study conducted at Kiambu Level Four Hospital in Kenya, which reported that 18.2% of HIV-positive mothers participating in that research practiced mixed infant feeding (25).

2.5 Study strengths and limitations

The study employed IDIs for qualitative data collection, offering a robust methodology to explore the complexities of maternal experiences in breastfeeding. Conducted at AMPATH's headquarters, which caters to diverse communities in western Kenya, the interviews captured insights from participants belonging to various ethnic backgrounds. This approach fostered a culturally sensitive and inclusive dialogue, allowing mothers to articulate their experiences in their own language, facilitated by participants who shared similar maternal identities. As a result, the transcripts yielded rich and nuanced narratives, offering detailed accounts of the participants' breastfeeding journeys during the critical phase when they were still breastfeeding young infants.

However, no study is without limitations. Breastfeeding in the context of HIV is a sensitive topic and it revealed different behaviours among HIV-positive breastfeeding mothers; this might have resulted in social desirability bias and non-response. Non-response was minimized by extensive preparation and a thorough explanation of the research project and purposive sampling of participants. The use of IDI and careful phrasing of the questions reduced the potential for social desirability bias, evidenced by a third of mothers sharing that they were

mixed feeding their infants. In addition, the study recruited from one hospital setting. Mothers who were not attending their post-natal clinics were not included. Therefore, findings may not be transferable for other HIV-positive breastfeeding mothers in Kenya, particularly those not enrolled in care.

2.6 Conclusion

In conclusion, this study underscores the importance of nurturing an empathetic and supportive community for HIV-positive mothers who choose to breastfeed. Our findings revealed candid insights into their journeys, highlighting the strength and resilience forged amid societal stigma and personal struggles. It's clear that while progress has been made, additional work is needed to dispel the misconceptions surrounding HIV and breastfeeding. Family members and support networks, religious or cultural groups as well as the health facilities need to foster an environment where these mothers feel confident and supported in their decisions about their health and their children's well-being. As we move forward, we must prioritize education and advocacy, ensuring that healthcare providers, communities, and individuals alike are equipped with the right knowledge and understanding about HIV. To achieve this, collaborative efforts are needed from the various stakeholders. Only then can we dismantle the barriers of prejudice and discrimination hindering the path of these brave mothers and their children. Let this study serve as a call to action for us all to be part of this crucial transformation.

2.7 Recommendations

Based on the insights gleaned from this study, we recommend a comprehensive approach to supporting HIV-positive mothers. This should commence with a robust education and training program for healthcare providers, emphasizing empathy and confidentiality in their dealings with patients living with HIV. Such a program would address any existing biases, dispel misconceptions about HIV transmission, and promote a compassionate and understanding healthcare environment. In conjunction, there should be extensive community outreach programs aimed at combating stigma and promoting an environment of acceptance for HIV-positive individuals. These programs should be designed to inform and educate the public, correcting misunderstandings about HIV, and highlighting the experiences and challenges faced by HIV-positive mothers, particularly in relation to breastfeeding. While existing interventions have been implemented, this study is distinct in its focus on the lived experiences of mothers, context-specific challenges, and the evaluation of intervention gaps, particularly in the areas of stigma and confidentiality. These unique aspects will provide a deeper understanding of how to better support HIV-positive mothers in practicing EBF in Kenya. Furthermore, it would be beneficial to offer resources and support networks for HIV-positive

mothers, providing them with a platform to share experiences and seek advice. The establishment of such networks can contribute to breaking down feelings of isolation and foster a sense of community among HIV-positive mothers. Finally, continual research into the experiences of HIV-positive mothers is crucial to staying informed about their needs and challenges. Only through understanding can we truly create meaningful and effective support structures for these individuals.

2.8 Declarations

2.8.1 Ethics approval and consent to participate

The study received clearance from the University of the Witwatersrand, the Human Research Ethics Committee (HREC) M230819 MED23-08-008, Masinde Muliro University of Science and Technology Institutional Ethics Review Committee (IERC) in Kenya MMUST/IERC/188/2023, the Chief Executive Director (CEO) at MTRH, and from the MTRH and Moi University Institutional Research and Ethics Committee (IREC) FAN:0004578, affirming its adherence to ethical guidelines and standards for research involving human participants.

2.8.2 Consent for publication

Participants were fully informed of the intention to publish the research findings, and their explicit consent for publication was obtained.

2.8.3 Availability of data and materials

On request, the anonymized data and materials supporting the findings of the study will be made available, ensuring openness and accessibility for further studies.

2.8.4 Competing interests

The authors declared there are no competing interests for this study.

2.8.5 Funding

The research was not funded.

2.8.6 Authors' contribution

VB conceptualized the study, designed the study protocol, processed ethical approvals, conducted data collection, and developed the first draft of the manuscript. Both VB and SJ analyzed and interpreted the data. SJ supervised and guided the study from conceptualization to reviewing the final version of the manuscript.

2.8.7 Author's information

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CHAPTER 3: OVERALL DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

3.1 Discussion

The findings of this study offer valuable insights into the interplay of factors influencing infant feeding practices among HIV-positive mothers, describing the complex processes operating at various levels of the SEM. The SEM acknowledges the multidimensional nature of health behaviours and their interactions with various environmental influences. The study presents the opportunities and difficulties faced by HIV-positive mothers in navigating infant feeding practices by considering each of these factors systematically. Though the SEM was not used explicitly in the manuscript, it provides a useful framework for summarising key insights, by level.

At the individual level, mothers reported diverse experiences and challenges as they navigated the initiation and maintenance of EBF. These experiences were deeply influenced by mothers' perceptions of their breastmilk (in)adequacy, past breastfeeding encounters, and concerns regarding infant health. Anxiety stemming from doubts about producing enough breastmilk and meeting their infants' nutritional requirements prompted some mothers to introduce supplementary feeds earlier than recommended. Schuster and colleagues echoed comparable findings regarding breastfeeding mothers' concerns about their breastmilk production-when they feel their breastmilk supply is inadequate, they often turn to mixed feeding as an alternative (13). However, mothers grappling with stress, economic constraints, or stigma encounter strong barriers to sustaining EBF. This finding is consistent with a study conducted in South Africa where women living with HIV were reported to be less likely to practice breastfeeding due to their financial insecurity, as a result of their unemployment status (73).

The findings revealed that most mothers demonstrated a clear understanding of the importance of practising EBF as most of them cited the benefits of giving breastmilk alone for the first six months of life. A systematic review of studies in East Africa yielded comparable results, indicating that 97.6% of mothers possessed knowledge regarding EBF (35). However, EBF knowledge was influenced by the quality and accessibility of information provided by healthcare professionals, community, peer support networks, and mother's own experiences highlighting the conflicting nature of information sources and their impact on maternal

attitudes towards infant feeding practices. Despite the conflicting information, the mothers portrayed a positive attitude towards EBF, driven by their desire to provide the best nutrition and protection for their infants, despite the challenges posed by competing sources of knowledges. Additionally, the study also highlights the importance of maternal confidence in upholding EBF practices, resulting in more positive attitudes. Positive past experiences, such as successfully raising HIV-negative children through breastfeeding, serve as motivating factors for mothers striving to adhere to established guidelines. Samburu et al. reported similar findings in Baringo County, Kenya (16). The study clearly revealed how individual factors were influenced by those linked to the interpersonal level of the SEM, highlighting the significant influence of social support networks and familial dynamics on the breastfeeding practices of HIV-positive mothers. Support from partners, family members, and peers played a crucial role in either facilitating or hindering the participant's EBF behaviours. Mothers who received encouragement and practical assistance from their partners and families were more likely to adhere to EBF recommendations. According to Etawo and colleagues, 84% of women living HIV in Southwest Nigeria were influenced by their husbands to practice EBF (74). Conversely, mothers facing unsupportive attitudes from family members encountered barriers to EBF, often leading to early introduction of complementary foods or formula feeding. This highlights the importance of interpersonal relationships and support structures in shaping maternal feeding decisions and underscores the need for interventions that engage not only mothers but also their social networks to promote optimal breastfeeding practices.

The degree of support mothers experienced was related from cultural norms, practices, and stigma surrounding HIV and breastfeeding operating at the community level. For instance, deeply rooted traditional beliefs and societal customs surrounding infant feeding often conflicted with biomedical recommendations, leading to mixed feeding practices among some mothers. These cultural norms manifest as pressure to introduce complementary foods earlier than recommended, such as giving water, porridge, or cow's milk to infants, challenged the EBF guidelines endorsed by healthcare professionals. According to a previous study conducted in Egypt, 58% of infants receive prelacteal feeds as a cultural standard because it is believed that breastmilk alone is insufficient for an infant. (4). Similarly, in Kenya, another study indicated that prelacteal feedings are culturally accepted, and frequently given to newborns to soothe upset stomachs (50). Participating mothers in our study expressed being significantly influenced by culturally accepted practices, where prelacteal feeding is deeply ingrained, further complicating efforts to promote EBF. Moreover, numerous studies have demonstrated

that the stigma associated with HIV in the community has a substantial impact on breastfeeding practices among mothers living with HIV (23,33,75). True to the findings of this study, mothers narrated that stigma in the community profoundly affected their confidence in breastfeeding, leading to feelings of isolation and fear of social judgment.

At an institutional level, the study's findings highlight the critical role of healthcare facilities in shaping breastfeeding practices among HIV-positive mothers. Healthcare institutions serve as key sources of information, guidance, and support for mothers navigating the complexities of infant feeding, particularly in the context of HIV. The study reveals aspects of institutional support with healthcare providers offering valuable counselling and education on EBF, aligned with biomedical guidelines. HIV-positive breastfeeding mothers in KwaZulu-Natal, South Africa were reported to practice EBF due to the assured counselling sessions they attended at the healthcare facility (73). Similarly, this finding aligns with other Kenyan studies where mothers reported being motivated to practice EBF due to the motivational counselling they received during PMTCT clinic visits (16,21). However, mothers expressed discomfort with the shared space at the clinic, highlighting the need for a more confidential and private environment due to their HIV status. This shared space heightened feelings of vulnerability, fear, and anxiety, as mothers grappled with the possibility of encountering familiar individuals who were unaware of their HIV status. Consequently, the lack of privacy within the clinic exacerbated concerns about unintentional disclosure of HIV status, potentially leading to judgment from other attendees, particularly HIV-negative mothers. This findings are echoed by a research conducted in Western Kenya, where key informants and clinical officers involved in the study revealed that insufficient private clinical space led to breaches in the confidentiality of HIV-positive patients (76).

At the policy level, the critical need for comprehensive reforms in healthcare policies concerning breastfeeding support for HIV-positive mothers is underscored by the findings of this study. The current breastfeeding policies in Kenya emphasize the importance of supporting HIV-positive mothers in adhering to recommended infant feeding practices while being sensitive to cultural presentations and practices (23). However, the findings of this study identified challenges including the lack of privacy and confidentiality in the healthcare facility, highlight significant deficiencies in current policy frameworks. To address these shortcomings, policies must prioritize the establishment of confidential spaces in postnatal clinics to safeguard the rights and dignity of mothers. Moreover, enhancing healthcare provider training to effectively tackle HIV-related stigma and prevent confidentiality breaches is imperative.

Additionally, integrating stigma-reduction strategies into broader health policies and programs is essential for creating a supportive environment conducive to breastfeeding

3.2 Conclusion

In conclusion, this study highlights various factors influencing EBF practices among HIV-positive mothers in Eldoret, Kenya. Despite considerable knowledge about the benefits of EBF and existing healthcare policies, mothers face significant challenges rooted in cultural norms, stigma, economic realities, and healthcare system shortcomings. These challenges emphasize the need for comprehensive interventions to support HIV-positive breastfeeding mothers and promote optimal infant feeding practices.

3.3 Recommendations

Based on the findings of this study, the following recommendations have been proposed to support HIV-positive mothers in their infant feeding journey.

- 1) Implementation of existing policy recommendations: Healthcare institutions should prioritize the adaptation of policies that emphasize the importance of EBF for HIV-positive mothers. These policies should integrate culturally sensitive approaches and address conflicting sources of knowledge to ensure accurate information dissemination. Moreover, policies should aim to resolve conflicting sources of knowledge by ensuring accurate information dissemination through comprehensive educational programs and training sessions for healthcare providers. Additionally, efforts should be made to involve community leaders and stakeholders in the policy-making process to enhance community buy-in and acceptance.
- 2) Programme recommendations: There is a critical need for targeted interventions aimed at reducing stigma surrounding HIV and breastfeeding, both within communities and healthcare settings. Programmes should focus on creating awareness and understanding about HIV transmission and breastfeeding, emphasizing the safety and benefits of EBF for HIV-positive mothers and their infants. Providing safe spaces and confidential support services within healthcare facilities and community centres can help alleviate the emotional distress faced by HIV-positive mothers, fostering a supportive environment conducive to optimal infant feeding practices. Furthermore, community-based interventions, such as peer support groups and educational workshops, should be

implemented to empower HIV-positive mothers and dispel myths and misconceptions surrounding HIV and breastfeeding.

- 3) Research recommendation: Future research efforts should focus on evaluating the effectiveness of interventions designed to reduce stigma surrounding HIV and breastfeeding. Thorough evaluation studies should assess the impact of various intervention strategies, such as educational campaigns, support groups, and community-based initiatives, on reducing stigma and improving infant feeding practices among HIV-positive mothers. Additionally, studies should explore the impact of fostering strong social support networks, including peer support groups and involvement of family members, on empowering HIV-positive mothers and promoting optimal infant feeding practices.

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Appendices

Appendix 1: Plagiarism declaration form



PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I Bosire, Violet Kerubo (Student number: 2549670) am a student registered for the degree of MPH in the academic year 2024.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature:  Date: 02-04-2024

Appendix 2: Interview guide (English)

INTERVIEW GUIDE (ENGLISH)

TITLE: Exclusive breastfeeding knowledge, perceptions, and practices of mothers of HIV-exposed infants in Eldoret, Kenya

Sociodemographic Background

1. What is your current age (in years).
2. What is your marital status?
 - a) Married
 - b) Single (never married)
 - c) Widowed
 - d) Divorced/separated.
3. How many children do you have?
4. Who lives in your household? (Select multiple)
 - a) Spouse/partner
 - b) Children
 - c) Parents
 - d) Extended family members/relatives
5. What is the highest level of education you've attained?
 - a) No School/ Primary
 - b) Secondary (completed/not completed)
 - c) Technical school
 - d) University
6. What is your type of employment?
 - a) Housewife
 - b) Self-employed
 - c) Casual labour
 - d) Permanent with pension
 - e) Contract
7. Which specific year did you give birth to your lastborn child?
8. Where did you deliver your baby (s)?
 - a) Hospital
 - b) At home
9. What type of delivery did you have?
 - a) Normal delivery
 - b) Caesarean section

Knowledge, perception, and practices of Exclusive Breastfeeding of HIV-exposed infants.

1. What is your understanding of Exclusive Breastfeeding?
Probe: What is the importance of EBF for HIV-exposed infants?
2. How long did it take you to feed your baby after delivery?
Probe: How soon they fed their baby(s), what they first fed their baby(s)?
3. What has been your experience of breastfeeding as a HIV-positive mother?
Probe: Begin from the establishment of breastfeeding at birth.
If the participant is a first-time mother or has experience from previous infants.
4. How are you currently feeding your baby(s)?
Probe: Feeding practices (breastfeeding exclusively, mixed feeding, or not breastfeeding at all). What do they think about different infant feeding methods?
5. What influenced you to choose the type of infant feeding you are currently practicing?
Probe: What they know about the importance of EBF, recommended guidelines for feeding HIV-exposed infants.
6. Where do you get information about feeding HIV-exposed infants?
Probe: Sources of information. How the received information influences their feeding practices.
7. What do you think about being told to breastfeed as a HIV-positive mother?
Probe: What do people say about breastfeeding HIV-exposed infants? How has it influenced your infant feeding decision?
8. What do you think about this clinic space where you attend postnatal clinics?
Probe: Safer spaces to be educated on recommended infant feeding.
Why did you choose to attend your postnatal clinics at the current healthcare facility?
9. How can HIV-positive breastfeeding mothers be supported while breastfeeding their infants?
10. If your suggestions were in place, how would your feeding decisions have been different?
11. Is there anything else you would like to share with me that I haven't discussed?

Thank you for your time that is the end of our interview!

Appendix 3: Mwongozo wa Mahojiano (Kiswahili)

MWONGOZO WA MAHOJIANO (KISWAHILI)

Kichwa: Maarifa, maoni, na mazoea ya akina mama kuhusu kunyonyesha watoto wachanga walio zaliwa na wazazi wenye virusi vya ukimwi/HIV katika mji wa Eldoret, Kenya

Asili ya Kijamii

1. Una umri wa miaka ngapi sasa.
2. Hali yako ya ndoa ni ipi?
 - a) Nimeolewa
 - b) Sijaolewa (hajawahi kuolewa)
 - c) Nimefiwa na mchumba wangu
 - d) Nimetengana na mchumba wangu
3. Una watoto wangapi?
4. Nani anaishi ndani ya nyumba yako? (Chagua nyingi)
 - a) Mchumba wangu
 - b) Wazazi
 - c) Watoto
 - d) Jamaa wa familia kwa jumla
5. Je! Ni kiwango gani cha juu cha elimu ambacho umekamilisha?
 - a) Sijasoma / Shule ya msingi
 - b) Sekondari (imekamilika / haijakamilika)
 - c) Shule ya ufundi
 - d) Chuo Kikuu
6. Je! Ni aina gani ya ajira unayo?
 - a) Mke wa nyumbani
 - b) Kujijiajiri
 - c) Kazi ya kawaida
 - d) Kudumu na pensheni
 - e) Mkataba
7. Je! Ni mwaka gani maalum ambao ulizaa mtoto wako wa mwisho?
8. Ulijifungulia wapi mtoto/watoto wako?
 - a) Hospitali
 - b) Nyumbani
9. Je! Ulijifungua kwa njia gani?
 - a) Njia ya kawaida
 - b) Njia ya upasuaji

Maarifa, maoni, na mazoea ya kunyonyesha watoto wachanga walio zaliwa na wazazi wenye virusi vya ukimwi/HIV

1. Je! Unafahamu nini kuhusu kunyonyeshwa kwa watoto wadogo?
Cgungunza: Kunyonyesha watoto walio zaliwa na mama mwenye virusi kuna umuhimu gani?
2. Ilichukua muda gani kulisha mtoto wako baada ya kujifungua?
Chungunza: Ni nini mtoto alilishwa kwanza.
3. Je! Ni nini uzoefu wako wa kunyonyesha kama mama aliye na virusi vya ukimwi/HIV?
Chungunza: Anza kutoka kwa uanzishaji wa kunyonyesha wakati wa kuzaliwa kwa mtoto. Ikiwa mshiriki ni mara yake ya kwanza kunyonyesha au ana uzoefu kutoka kwa watoto waliopita.
4. Je! Unalishaje mtoto wako sasa?
Chungunza: Aina tofauti za kulisha mtoto (kunyonyesha pekee, kulisha mchanganyiko, au kutonyonyesha hata kidogo). Wanafikiria nini juu ya njia tofauti za kulisha watoto wachanga.
5. Ni nini kilikushawishi kuchagua aina ya kulisha watoto wachanga ambao unalisha mtoto/watoto nayo kwa sasa?
Chungunza: Wanachojua juu ya umuhimu wa kunyonyesha, miongozo iliyopendekezwa ya kulisha watoto wachanga walio zaliwa na wazazi wenye virusi vya ukimwi/HIV.
6. Je! Unapata wapi habari juu ya kulisha watoto wachanga walio zaliwa na wazazi wenye virusi vya ukimwi/HIV?
Chungunza: Vyanzo vya habari. Jinsi habari iliyopokelewa inashawishi mazoea yao ya kulisha.
7. Je! Unafikiria nini juu ya kuambiwa kunyonyesha kama mama aliye na virusi vya ukimwi/HIV?
Chungunza: Je! Watu wanasema nini juu ya kunyonyesha watoto wachanga walio zaliwa na wazazi wenye virusi vya ukimwi/HIV? Imeshawishije uamuzi wako wa kulisha hao watoto wachanga?
8. Je! Maoni yako ni yepi kuhusu mpangilio wa kliniki hiki?
Chungunza: Mahali salama pa kuelimishwa kuhusu lishe bora ya watoto.
Kwa nini unapenda kuja kliniki katika hospitali hii?
9. Je! Mama walio na virusi vya ukimwi/HIV na wanaonyonyesha wanawezaje kuungwa mkono wakati wananyonyesha watoto wao?
Chungunza: Nafasi ya kibinafsi ya kuhudhuria kliniki za baada ya kujifungua na nafasi salama za kuelimishwa juu ya kulisha watoto wao wachanga.
10. Ikiwa maoni yako yangetiliwa mkazo, je, maamuzi yako ya kulisha mtoto/watoto walio zaliwa na wazazi wenye virusi vya ukimwi/HIV yangukuwa tofauti vipi?

11. Je! Kuna kitu kingine chochote ungependa kushiriki nami ambacho sijajadili?

Asante kwa wakati wako huu ndio mwisho wa mahojiano yetu!

Appendix 4: HREC (Medical) clearance certificate

UNIVERSITY OF THE
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JOHANNESBURG



R14/49 Miss Violet Kerubo Bosire

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL) CLEARANCE CERTIFICATE NO. M230819 MED23-08-008

NAME: Miss Violet Kerubo Bosire
(Principal Investigator)
DEPARTMENT: School of Public Health
Health and Society
Moi Teaching and Referral Hospital, Eldoret, Kenya

DEGREE: Master of Public Health

PROJECT TITLE: *Exclusive breastfeeding knowledge, perceptions, and practices of mothers of HIV-exposed infants in Eldoret, Kenya*

DATE CONSIDERED: 25/08/2023

DECISION: Approved unconditionally

CONDITIONS:

NOTE: If contact information regarding student study participants is required, please contact the Registrar's office -
Nicoleen.Potgieter@wits.ac.za

SUPERVISOR: Dr S. Nieuwoudt

APPROVED BY: _____
Professor Paul Ruff, Chairperson, HREC (Medical)

DATE OF APPROVAL: 10/11/2023 **EXPIRY DATE:** 09/11/2028

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report.** The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in **August** and will therefore be due in the month of **August** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

10/11/2023

Date

Appendix 5: MMUST IERC clearance certificate



MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
Tel: 056-31375
Fax: 056-30153
E-mail: ierc@mmust.ac.ke
Website: www.mmust.ac.ke
P. O. Box 190,
50100,
Kakamega,
KENYA

Institutional Scientific and Ethics Review Committee (ISERC)

REF: MMU/COR: 403012 Vol 6 (01)

Date: September 05th, 2023

To: Ms. Bosire, Violet Kerubo,

Dear Ms.

RE: EXCLUSIVE BREASTFEEDING KNOWLEDGE, PERCEPTIONS, AND PRACTICES OF MOTHERS OF HIV-EXPOSED INFANTS IN ELDORET, KENYA

This is to inform you that the *Masinde Muliro University of Science and Technology Institutional Scientific and Ethics Review Committee (MMUST-ISERC)* has reviewed and approved your above research proposal. Your application approval number is **MMUST/IERC/188/2023**. The approval covers for the period *September 05th, 2023 to September 05th, 2024*.

This approval is subject to compliance with the following requirements;

- i. Only approved documents including informed consents, study instruments, MTA will be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by **MMUST-ISERC**.
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **MMUST-ISERC** within 72 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to **MMUST-ISERC** within 72 hours
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days upon completion of the study to **MMUST-ISERC**.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke> and also obtain other clearances needed

Yours Sincerely,

A handwritten signature in black ink, appearing to be 'Gordon Nguka', written over a circular stamp that is partially obscured.

Prof. Gordon Nguka (PhD)
Chairperson, Institutional Scientific and Ethics Review Committee

Copy to:

- The Secretary, National Bio-Ethics Committee
- Vice Chancellor
- DVC (PR&I)

Appendix 6: MTRH CEO's approval letter



MOI TEACHING AND REFERRAL HOSPITAL

Telephone: (+254)-0532033471/2/3/4
Fax: 0532061749
Email: ceo@mtrh.go.ke/ceosoffice@mtrh.go.ke

NANDI ROAD
P.O. BOX 3-30100
ELDORET, KENYA

Ref: ELD/MTRH/R&P/10/2/V.2/2010

5th October, 2023

Violet Kerubo Bosire,
Faculty of Health Sciences
University of the Witwatersrand,
P.O. Box Wits2193, Private Bag,
JOHANNESBURG-SOUTHAFRICA.

EXCLUSIVE BREASTFEEDING KNOWLEDGE, PERCEPTIONS AND PRACTICES OF MOTHERS OF HIV-EXPOSED INFANTS IN ELDORET, KENYA

You have been authorised to conduct research within the jurisdiction of Moi Teaching and Referral Hospital (MTRH) and its satellites sites. You are required to strictly adhere to the regulations stated below in order to safeguard the safety and well-being of staff, patients and study participants seen at MTRH.

- 1 The study shall be under Moi Teaching and Referral Hospital regulation.
- 2 A copy of MTRH/MU-IREC approval shall be a prerequisite to conducting the study.
- 3 Studies intending to export human bio-specimens must provide a permit from MOH at the recommendation of NACOSTI for each shipment.
- 4 No data collection will be allowed without an approved consent form(s) to participants unless waiver of written consent has been granted by MTRH/MU-IREC.
- 5 Take note that data collected must be treated with due confidentiality and anonymity.

The continued permission to conduct research shall only be sustained subject to fulfilling all the requirements stated above.

The approval period is 5th October, 2023 – 4th October, 2024.

For
DR. WILSON K. ARUASA, MBS, EBS
CHIEF EXECUTIVE OFFICER

c.c. - Senior Director, Clinical Services
- Director, Nursing Services
- HOD, HRISM



All correspondences should be addressed to the Chief Executive Officer

Visit our Website: www.mtrh.go.ke

TO BE A GLOBAL LEADER IN THE PROVISION OF EXCEPTIONAL MULTI-SPECIALTY HEALTH CARE, TRAINING AND RESEARCH

Appendix 7: MTRH/MU IREC



MOI TEACHING AND REFERRAL HOSPITAL
P.O. BOX 3
ELDORET
Tel: 33471/2/3

Reference: IREC/675/2023
Approval Number: 0004578



MOI UNIVERSITY
COLLEGE OF HEALTH SCIENCES
P.O. BOX 4506
ELDORET
Tel: 33471/2/3
4th October, 2023

Violet Kerubo Bosire,
Faculty of Health Sciences,
University of the Witwatersrand,
P.O. Box Wits 2193, Private Bag,
JOHANNESBURG, SOUTH AFRICA.

Dear Ms. Bosire,

EXCLUSIVE BREASTFEEDING KNOWLEDGE, PERCEPTIONS AND PRACTICES OF MOTHERS OF HIV-EXPOSED INFANTS IN ELDORET, KENYA

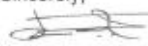
This is to inform you that **MTRH/MU-IREC** has reviewed and approved the above referenced research proposal. Your application approval number is **FAN: 0004578**. The approval period is **4th October, 2023- 3rd October, 2024**.

This approval is subject to compliance with the following requirements;

- i. Only approved documents including (informed consents, study instruments, Material Transfer Agreements (MTA) will be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by **MTRH/MU-IREC**.
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **MTRH/MU-IREC** within 72 hours of notification.
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to **MTRH/MU-IREC** within 72 hours.
- v. Clearance for export of biological specimens must be obtained from **MOH at the recommendation of NACOSTI** for each batch of shipment.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days upon completion of the study to **MTRH/ MU-IREC**.

Prior to commencing your study; you will be required to obtain a research license from the National Commission for Science, Technology and Innovation (NACOSTI) <https://oris.nacosti.go.ke> and other relevant clearances from study sites including a written approval from the CEO-MTRH which is mandatory for studies to be undertaken within the jurisdiction of Moi Teaching & Referral Hospital (MTRH) and its satellites sites.

Sincerely,


PROF. E. WERE
CHAIRMAN

INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

**INSTITUTIONAL RESEARCH &
ETHICS COMMITTEE**

04 OCT 2023

APPROVED

cc	CEO	-	MTRH	-	Dean	-	SOP	-	Dean	-	SOM
	Principal	-	CHS	-	Dean	-	SON	-	Dean	-	SOD

Appendix 8: Turn-it-in report

Bosire, Violet Kerubo MPH Research Report.docx

ORIGINALITY REPORT

8%

SIMILARITY INDEX

6%

INTERNET SOURCES

6%

PUBLICATIONS

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STUDENT PAPERS

PRIMARY SOURCES

1

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Internet Source

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www.frontiersin.org

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ir.mu.ac.ke:8080

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Appendix 9: International Breastfeeding Journal Guidelines for authors

Title page

The title page should:

- present a title that includes, if appropriate, the study design e.g.:
"A versus B in the treatment of C: a randomized controlled trial", "X is a risk factor for Y: a case control study", "What is the impact of factor X on subject Y: A systematic review"
- list the full names and institutional addresses for all authors
- indicate the corresponding author

Abstract

The Abstract should not exceed 350 words. Please minimize the use of abbreviations and do not cite references in the abstract. The abstract must include the following separate sections:

Background: the context and purpose of the study

Methods: how the study was performed and statistical tests used

Results: the main findings

Conclusions: brief summary and potential implications

Keywords

Three to ten keywords representing the main content of the article.

Background

The Background section should explain the background to the study, its aims, a summary of the existing literature and why this study was necessary or its contribution to the field.

Methods

The methods section should include:

- the aim, design and setting of the study
- the characteristics of participants or description of materials

- a clear description of all processes, interventions, and comparisons. Generic drug names should generally be used.
- the type of statistical analysis used, including a power calculation if appropriate

Results

This should include the findings of the study including, if appropriate, results of statistical analysis which must be included either in the text or as tables and figures.

Discussion

This section should discuss the implications of the findings in context of existing research and highlight limitations of the study.

Conclusions

This should state clearly the main conclusions and provide an explanation of the importance and relevance of the study reported.

List of abbreviations

If abbreviations are used in the text, they should be defined in the text at first use, and a list of abbreviations should be provided.

Declarations

All manuscripts must contain the following sections under the heading 'Declarations':

Ethics approval and consent to participate: Manuscripts reporting studies involving human participants, human data or human tissue must:

- include a statement on ethics approval and consent (even where the need for approval was waived)
- include the name of the ethics committee that approved the study and the committee's reference number if appropriate

Consent for publication

If your manuscript contains any individual person's data in any form (including any individual details, images or videos), consent for publication must be obtained from that person, or in the

case of children, their parent or legal guardian. All presentations of case reports must have consent for publication.

You can use your institutional consent form or our consent form if you prefer. You should not send the form to us on submission, but we may request to see a copy at any stage (including after publication).

Availability of data and materials

All manuscripts must include an ‘Availability of data and materials’ statement. Data availability statements should include information on where data supporting the results reported in the article can be found including, where applicable, hyperlinks to publicly archived datasets analysed or generated during the study. By data we mean the minimal dataset that would be necessary to interpret, replicate and build upon the findings reported in the article. We recognise it is not always possible to share research data publicly, for instance when individual privacy could be compromised, and in such instances data availability should still be stated in the manuscript along with any conditions for access.

Data availability statements can take one of the following forms (or a combination of more than one if required for multiple datasets):

- The datasets generated and/or analysed during the current study are available in the [NAME] repository, [PERSISTENT WEB LINK TO DATASETS]
- The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.
- All data generated or analysed during this study are included in this published article [and its supplementary information files].
- The datasets generated and/or analysed during the current study are not publicly available due [REASON WHY DATA ARE NOT PUBLIC] but are available from the corresponding author on reasonable request.
- Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.
- The data that support the findings of this study are available from [third party name] but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of [third party name].

- Not applicable. If your manuscript does not contain any data, please state 'Not applicable' in this section.

More examples of template data availability statements, which include examples of openly available and restricted access datasets, are available [here](#).

Competing interests

All financial and non-financial competing interests must be declared in this section.

Funding

All sources of funding for the research reported should be declared. If the funder has a specific role in the conceptualization, design, data collection, analysis, decision to publish, or preparation of the manuscript, this should be declared.

Authors' contributions

The individual contributions of authors to the manuscript should be specified in this section. Guidance and criteria for authorship can be found in our editorial policies.

Please use initials to refer to each author's contribution in this section, for example: "FC analyzed and interpreted the patient data regarding the hematological disease and the transplant. RH performed the histological examination of the kidney, and was a major contributor in writing the manuscript. All authors read and approved the final manuscript."

Authors' information

This section is optional.

You may choose to use this section to include any relevant information about the author(s) that may aid the reader's interpretation of the article, and understand the standpoint of the author(s). This may include details about the authors' qualifications, current positions they hold at institutions or societies, or any other relevant background information. Please refer to authors using their initials. Note this section should not be used to describe any competing interests.

Footnotes

Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not

contain any figures or tables. Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

References

Vancouver reference style

Appendix 10: Approval of the study Title from the faculty committee



Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Mrs Sandra Benn
E-mail: sandra.benn@wits.ac.za

08 August 2023
Person No: 2549670
PAG

Ms VK Bosire
DHL 30100, +254 703 151 458
Kenya
30100
Kenya

Dear Ms Violet Bosire

Master of Public Health: Approval of Title

We have pleasure in advising that your proposal entitled *Exclusive breastfeeding knowledge, perceptions, and practices of mothers of HIV-exposed infants in Eldoret, Kenya* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

A handwritten signature in black ink, appearing to read "S. Benn", with a horizontal line underneath.

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

Appendix 11: Research Study Information Sheet

INFORMATION SHEET

TITLE: Exclusive breastfeeding knowledge, perceptions, and practices of mothers of HIV-exposed infants in Eldoret, Kenya

Permission to Take Part in the Study

My name is Violet Bosire a master's student at the University of the Witwatersrand, Johannesburg, South Africa. I will be conducting a research study to explore exclusive breastfeeding knowledge, perceptions, and practices of mothers of HIV-exposed infants in Eldoret, Kenya. This research will be a fulfilment of my master's degree requirement.

Purpose of the Research

How an infant is fed can have a significant influence on how he or she develops. Global research suggests that mothers living with HIV have to consider additional factors related to infant feeding decisions. Little is known about breastfeeding practices among HIV-positive mothers with HIV-exposed infants in Eldoret town. Therefore, this exploratory qualitative study will use in-depth interviews to understand HIV-positive mothers' knowledge, perceptions, and practices of infant feeding. The in-depth interviews will take approximately 30 - 60 minutes based on participant's availability and interest to sharing their perspectives and experiences about HIV-exposed infant feeding.

Why am I being invited to participate in the research study?

You are invited to take part in the research study because you are 18 years old and above, you have an infant/baby who is 6 months old or below and is HIV-exposed, you attend mother and child clinics at Moi Teaching and Referral Hospital (MTRH), and you live in Eldoret town (or nearby estates).

What should I know about a research study?

- Someone will explain this research study to you.
- Whether or not you take part is up to you.
- You can choose not to take part.
- You can agree to take part and later change your mind.
- Your decision will not be held against you.
- You can ask all the questions you want before you decide.

What will happen with the information you will share?

The information you provide us will not be shared with anyone outside of the research team. In a few years, we will publish the data we collected, but we will not publish any information that can reveal your identity. People will not be able to link the information with you or anyone in your household. All data collected and recorded in the course of the study will be securely retained for two years if a scientific publication arises from the study and six years if there is no publication.

What will happen if you agree to participate?

The interview will be audio-recorded, and the recordings will be safely stored to protect your privacy. Your name will not be used in the recording. This information sheet is designed to tell you everything you need to understand before you decide to consent (agree) to be in the study or not to be in the study. If you decide to take part and you change your mind later and withdraw from the research study, it is entirely your choice. The decision to join or not join the research study will not cause you to lose any benefits.

If you agree to participate in the study, you may be offered health education information about breastfeeding and HIV at the end. In addition, you may be referred to a nutritionist on duty for counselling on HIV-exposed infant feeding recommendations or the head nurse or psychologists for to discuss adherence to antiretroviral therapy. Acceptance of the health education and/or referrals would be completely up to you.

Will participation in this study cost you anything?

Participation in this study will not cost you anything other than your time and there is no risk to you because you participate in the study. However, if you choose to discontinue answering the questions, you are free to do so. However, should you feel distressed, you will be referred to psychologists or team lead nurse on duty for confidential counselling. Referrals will be offered on fully voluntary basis. As these rotate, no specific names will be provided.

Will you gain any benefits?

There are no direct benefits for you. But your feedback from the interview will be used to improve our understanding of the knowledge, perceptions, and practices of breastfeeding among HIV-positive mothers in Eldoret town. Participants who may prefer being interviewed on a different day or venue will be reimbursed Ksh. 1000 to cover transport costs to attend the interview. In addition, other possible benefits include feeling good sharing your experiences and story of breastfeeding.]

Withdrawal of Participation:

Participating in the interview is voluntary, and you may leave the study at any time without penalty. This decision will not affect you in any way or how you live in Eldoret town. You may also refuse to answer any questions that you do not want to during the interview.

Your questions:

You can ask all questions and you will be answered before you decide to participate.

For further information about the study, you may contact the Principal Investigator at violetbosire1@students.wits.ac.za or +254 703 151 458 / +27 68 663 8203.

If you want any information regarding your rights as a research participant, or complaints regarding this research study, you may contact Prof Paul Ruff, Chairperson of the University of the Witwatersrand, Human Research Ethics Committee (HREC), which is an independent committee established to help protect the rights of research participants at +27 (011) 717 2301 or paul.ruff@wits.ac.za. The telephone numbers for the Committee secretariat are +27 (011) 717 2700/1234 and the e-mail addresses are Zanele.ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Appendix 12: Consent Form

INTERVIEW CONSENT FORM

1. I have been given a Participant Information Sheet which explains the nature and processes involved in this study.
2. I have read and understood what the study entails.
3. I was given time to ask any questions and clarifications before the interview started.
4. I understand that there will be no immediate benefits to me if I agree to participate in the study. My participation will not cost me anything but my time. If I agree to participate in the study on a different day, I will be reimbursed Ksh. 1000 for transport.
5. I understand that, even if I initially consent to take part in the study, I may withdraw at any time and am not required to give any reasons. If that happens, any data collected about me for the purposes of the study will immediately be destroyed, unless I give consent for it to be retained.
6. All data collected in the course of the study will be securely retained for two years if a scientific publication arises from the study and six years if there is no publication.
7. I have been given a range of contact details, listed below. If I require further information or become concerned about any aspect of this study, I am free to speak to any of these contacts.

Contact details:

Violet Bosire, Principal Investigator, Telephone number +254 703 151 458 / +27 68 663 8203, Email violetbosire1@students.wits.ac.za

Prof Paul Ruff, Chairperson of the University of the Witwatersrand, Human Research Ethics Committee (HREC), Telephone number +27 (011) 717 2301 or email paul.ruff@wits.ac.za

Ms. Z Ndlovu or Mr. Rhulani Mkansi, Committee Secretariat, telephone nos.: 011 717 2700 or 1234, or by e-mail at: Zanele.ndlovu@wits.ac.za or Rhulani.mkansi@wits.ac.za

_____ Name of participant (OPTIONAL)	_____ Date	_____ Signature
I certify that the participant has provided her verbal consent for this study.		
_____ Name of witness	_____ Date	_____ Signature

Appendix 13: Audio consent form

CONSENT FORM FOR AUDIO RECORDING OF STUDY PARTICIPATION

TITLE: Exclusive breastfeeding knowledge, perceptions, and practices of mothers of HIV-exposed infants in Eldoret, Kenya

I hereby consent to audio recording of the interview.

I understand that:

- ✓ The recording will be stored in a secure location (password protected secure cloud storage) with restricted access to the researchers,
- ✓ The recording will be transcribed professionally and any information that could identify me will be removed,
- ✓ All data collected in the course of the study will be securely retained for two years if a scientific publication arises from the study and six years if there is no publication,
- ✓ Anyone wishing to access this information in the future will first have to obtain the approval of the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg.
- ✓ Direct quotes from my interview, without any information that could identify me, may be cited in the research report or other write-ups of research.

Contact details:

Violet Bosire, Principal Investigator, Telephone number +254 703 151 458 / +27 68 663 8203, Email violetbosire1@students.wits.ac.za

Prof Paul Ruff, Chairperson of the University of the Witwatersrand, Human Research Ethics Committee (HREC), Telephone number +27 (011) 717 2301 or email paul.ruff@wits.ac.za

Ms. Z Ndlovu or Mr. Rhulani Mkansi, Committee Secretariat, telephone nos.: 011 717 2700 or 1234, or by e-mail at: Zanele.ndlovu@wits.ac.za or Rhulani.mkansi@wits.ac.za

Name of participant (OPTIONAL)

Date

Signature

Name of witness

Date

Signature