

**KNOWLEDGE, ATTITUDES AND PRACTICES ON
INFANT FEEDING OPTIONS IN THE CONTEXT OF
PMTCT FOR POSTNATAL MOTHERS ATTENDING
MBAGATHI DISTRICT HOSPITAL, IN NAIROBI
COUNTY, KENYA**

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**Knowledge, Attitudes And Practices on Infant Feeding Options in the
Context of Pmtct for Postnatal Mothers Attending Mbagathi District
Hospital, in Nairobi County, Kenya**

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**A Thesis Submitted in Partial Fulfillment for the Degree of Master of
Science in Public Health in the Jomo Kenyatta University of
Agriculture and Technology**

2019

DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

Signature.....

Date.....

Jacqueline Alando Amolo

This thesis has been submitted for examination with our approval as the University supervisors.

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Signature.....

Date.....

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KEMRI, Kenya

DEDICATION

To my dad Mr. Amolo who urged and inspired me to aim high and my mum Mrs. Amolo whom I always get my strength and motivation from, my siblings for their physical, social, psychological support and encouragement during the study period. Dear ones, you made this work possible.

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LIST OF ABBREVIATIONS AND ACRONYMS

AFASS	Acceptable, Feasible, Affordable, Sustainable and Safe
AIDS	Acquired Immune Deficiency Syndrome
AOR	Adjusted Odds Ratios
CCC	Comprehensive Care Clinic
EBF	Exclusive Breastfeeding
GSIIYCF	Global Strategy on Infant and Young Child Feeding
HIV	Human Immunodeficiency Virus
IDI	In-depth Interview
IFO	Infant Feeding Options
IYCF	Infant and Young Child Feeding
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KAP	Knowledge, Attitude and Practice
KEMRI	Kenya Medical Research Institute
KI	Key Informant
KII	Key Informant Interview
MCH	Maternal and Child Health

MDH	Mbagathi District Hospital
MOH	Ministry of Health
MTCT	Mother to Child Transmission
NASCOP	National AIDS and STI Control Program
OPD	Outpatient Department
PMTCT	Prevention of Mother to Child Transmission of HIV
RIFO	Recommended Infant Feeding Options
SI	Structured Interview
UNAIDS	United Nations Programme on HIV and AIDS
UNICEF	United Nations Children’s Emergency Fund
WHO	World Health Organization

DEFINITION OF TERMS

Attitude	refers to the way postnatal mothers feel and think about recommended infant feeding options and their opinion about providing nutrition care to infants in the context of HIV.
Knowledge	refers to the theoretical and practical understanding of WHO recommended infant feeding options information by the postnatal mother.
Commercial infant formula	refers to a breast milk substitute formulated industrially in accordance with applicable Codex Alimentarius standards to satisfy the nutritional requirements of infants during the first months of life up to the introduction of complementary foods.
Complementary feeding	refers to when breast milk is no longer sufficient to meet nutrition requirements for infants thus other foods liquids, semi solids and solids are introduced to the infant, along with breast milk.
Complementary food	refers to any solid, semi-solid or soft food, whether manufactured or locally prepared, suitable as a complement to breast milk or to infant formula, when either becomes insufficient to satisfy the nutritional requirements of the infant.

Exclusive breastfeeding	refers to feeding an infant with breast milk only for six months without any additional liquids or solids apart from prescribed medicine.
Exclusive replacement feeding	refers to giving infant approved commercial infant formula milk for six months without introducing breast milk or any other liquids and solids apart from prescribed medicine.
Prevention of Mother to Child Transmission	refers to the prevention of vertical transmission of HIV to an infant by using the WHO recommended infant feeding practices.

ABSTRACT

Effective infant feeding makes an important contribution to good nutrition, health status, survival and development of children with effects reflecting up to adulthood. Among many cultures and diverse populations traditionally, infants are fed breast milk which is nutritionally balanced and provides immunity against diseases. However breast milk can transmit Human Immunodeficiency Virus (HIV) from the mother to child and this poses a public health dilemma. A lot has already been done in HIV including mother to child transmission (MTCT) though there still remains a gap in knowledge and attitude of postnatal mothers on the World Health Organization (WHO) recommended infant feeding options (RIFO). The study was designed to determine the factors associated with knowledge, attitude and practice of postnatal mothers attending Mbagathi District Hospital on RIFO for HIV positive mothers. The study was carried out in Nairobi district between April and June 2011. This was a cross-sectional hospital based study that utilized both quantitative and qualitative methods. A total of 384 postnatal mothers with children 0-24 months attending the hospitals maternal, child health and nutrition clinics during the study period who consented to participate in the study were interviewed. Systematic sampling was used to select the participants. Data was collected using structured interview tool which focused on assessing the postnatal's mothers socio demographic profiles, their knowledge, attitude and practice in relation to RIFO. In-depth interviews to postnatal mothers and key informant interviews to health care providers were used to collect qualitative data. Quantitative data was entered, analyzed using Statistical Package for Social Sciences (SPSS Version 16.0) software while transcripts from interviews were manually analysed based on themes developed from the study objectives. Overall 45.6% of the respondents were adequately knowledgeable of the RIFO for HIV positive mothers, 83.9% had a positive attitude towards the RIFO for HIV positive mothers and 73.2% had good practice with regard to infant feeding. The predictors of adequate knowledge of recommended feeding for infants were number of births ($p < 0.001$) and level of education attained ($p < 0.001$) while predictors of positive attitude towards recommended feeding for infants born to HIV positive mothers were religion ($p = 0.010$) and education ($p = 0.013$). Out of the seven socio-demographic characteristics number of births was the only characteristic having an association with current feeding practice ($p = 0.015$). The study showed that the knowledge of the postnatal mothers on RIFO was below average. They had a positive attitude towards the WHO RIFO and their feeding practices complied with the WHO RIFO. Education proved to be proxy for adequate knowledge and positive attitude towards RIFO set by WHO. In conclusion, more than half of the postnatal mothers were inadequately knowledgeable of the RIFO for HIV positive mothers. The postnatal mothers embraced well the RIFO guidelines by WHO in terms of attitude and practice. Among the younger mothers the findings showed that they were not much concerned with the RIFO. The younger mothers need health education to understand and embrace knowledge of the RIFO in both HIV positive and HIV negative.

CHAPTER ONE

INTRODUCTION

1.1 Background information

Infant feeding is one of the most important practices influencing child survival and development and is also recognized as a critical component of care and support during the prenatal period for women (MOH, 2008). The discovery that Human Immunodeficiency Virus (HIV) can be transmitted through breast milk has precipitated a public health dilemma. This is particularly in countries where HIV affects significant proportions of the population and where breastfeeding is the cultural norm. Without intervention to prevent mother to child transmission, 30-45% of infants born to HIV positive mothers in developing countries become infected during pregnancy, delivery and or breastfeeding (De Kock *et al.*, 2000).

Breastfeeding has been recommended by World Health Organization (WHO) and United Nations Children's Emergency Fund (UNICEF) as the exclusive source of nutrition for infants during the first six months of life. Infants should start breastfeeding within one hour of life, be exclusively breastfed for six months, with timely initiation of adequate, safe and proper complementary foods while continuing breastfeeding for two years or beyond (UNAIDS/ UNICEF/ WHO, 1998). In the context of HIV, infant feeding guidelines recommend that HIV infected mothers be counseled about the risks of breast milk in transmission of HIV. The mothers should then choose from the following options for feeding (1) exclusively breastfeed for six months and abrupt cessation (2) replacement feeding with commercial infant formula if acceptable, feasible, affordable, sustainable and safe (AFASS) (3) replacement with home modified formula if AFASS (NAS COP, 2002).

An estimated 700,000 children were infected with HIV in 2003 (UNAIDS, 2005). About 44 % of this transmission is through breastfeeding (Nduati *et al.*, 2000). A woman infected with HIV can transmit the virus to her child during pregnancy, labour or delivery, or through breastfeeding. A mother who has recently been infected with HIV has a higher chance of transmitting the virus to the baby through breastfeeding. The longer a child is breastfed by a HIV infected mother, the higher the child's risk of HIV infection. In countries where breastfeeding continues to the second year, 30-50% of all mother to child transmission (MTCT) is estimated to occur through this route (De Cock *et al.*, 2000). Infants who breastfeed for six months face a lesser risk of HIV infection than those who breastfeed for two years in situations where the mothers are HIV positive (UNICEF, 2002).

Breastfeeding is the best and safest way of feeding infants but the emergence of HIV has complicated this picture because the virus can be transmitted through breast milk. Exclusive breastfeeding (EBF) for up to six months is associated with a 3-4 fold decreased risk of HIV transmission as compared to mixed feeding (giving an infant under six months breast milk or approved replacement feeds with additional liquids and solids). It is believed that mixed feeding in the first six months carries a greater risk of transmission because the other liquids and foods given to the infant alongside the breast milk can damage the already delicate and permeable gut wall of the small infant and allow more viruses to be transmitted. Mixed feeding also increases the risks of contamination and child morbidity and mortality rates (UNICEF, 2005). Neither exclusive breastfeeding nor exclusive non-breastfeeding is norm in most African settings (Thairu *et al.*, 2005). Mixed feeding is the predominant method of infant feeding (Nduati *et al.*, 2000).

Given the risk of HIV transmission associated with breastfeeding current international guidelines on infant feeding advocate for only using replacement feeding when AFASS taking into account local environment, individual woman situation and risks of replacement feeding (WHO, 2007). Unfortunately mixed feeding is still the norm for many infants less than six months old in many countries with high HIV prevalence. Thus HIV transmission through breastfeeding can be reduced if HIV positive women breastfeed exclusively for six months rather than practising mixed feeding (UNICEF, 2009). HIV infected and affected women face difficult choices about how to feed their infants. As a consequence of negative community attitude and social stigma, women face a very difficult decision about whether to disclose their HIV positive status to their family members and friends. This in turn affects their infant feeding practices (Latham *et al.*, 2000).

Studies have shown that age, family and culture influence recommended infant feeding options (RIFO). The older people at home usually wish to see the baby eating every time, believing that if the baby is crying it should be given something to eat (Thairu *et al.*, 2005). On the other hand, adolescent mothers frequently receive advice from their families to practice mixed feeding and may hesitate to contradict families' opinions regarding infant feeding, especially if they are financially and emotionally dependent upon the family. Some mothers may also be inexperienced and insecure about their own beliefs and therefore turn to their families, particularly their mothers and grandmothers, for parenting help (Bentley *et al.*, 1999).

In as much as there is an option of replacement feeding with commercial infant formula, poor economic status poses a challenge in decision making with regards to infant feeding by HIV positive mothers. Some of the infected mothers and their husbands may not afford formula milk. Breastfeeding is highly valued and in many areas of sub-

Saharan Africa, it is culturally normative. Women know that breast milk has the potential to infect their child with HIV; they also know that breast milk protects children and is superior to formula. Thus, in as much as they are HIV positive they will insist on breastfeeding to meet their cultural norms (Thairu, *et al.*, 2005). Community views concerning the dangers of HIV transmission through breastfeeding and the discrimination associated with not breastfeeding make it difficult for HIV positive mothers to initiate and maintain optimal infant feeding practices. Safe infant feeding in the context of HIV requires communication between parents and the whole family, as well as thorough, intensive community education, counseling and support (Chopra and Rollins, 2008).

Since the adoption of WHO infant feeding guidelines in HIV into mother and child health services in Kenya there is paucity of information (little has been done) with respect to assessing the implications in terms of knowledge, attitude and practice of postnatal mothers on infant feeding in the context of HIV. This study attempted to contribute to the determinance of knowledge levels, attitude, and practice and identified factors that influenced their KAP in this area in Nairobi. It is hoped that this study findings will help to guide healthcare workers in health facilities and provide insights for further research that address pertinent issues often neglected in WHO RIFO intervention strategies.

1.2 Problem statement

Breastfeeding remains a common practice in parts of the world where the burden of HIV is highest and very few alternative feeding options exist. The infant feeding options recommended for the HIV positive mothers are neither completely effective nor completely acceptable since the preference of breastfeeding varies within populations, as well as across socio-economic and cultural groups. Some suggested infant feeding

options in theory have lots of merit but not much has been done to determine their practical feasibility in African society. Without proper knowledge of the recommended WHO infant feeding options the rate of transmission will increase since the mothers don't have information of how they should feed infants to prevent HIV transmission in cases where a mother is positive. It may also lead to wrong guidance from mother to mother or not stopping a mother who is HIV positive and is feeding an infant in the wrong way since the one observing is not knowledgeable.

A study done in Western Kenya by Wachira found that HIV positive mothers did not practice EBF (Wachira *et al.*, 2009). Mixed feeding is a common practice in many households for infants under six months. In Kenya, an estimated 190,131 children (0-14 years) were living with HIV, with an estimation of 11,210 new child infections in 2013, most of which were probably a result of MTCT (NACC, 2014). Infection rate of 11,210 per annum is still high. This may lead to more infants becoming infected with HIV further resulting to more cases of infant mortality or higher HIV prevalence among under fives. Majority of the studies done have focused on knowledge, attitude and practice of HIV positive mothers as a whole while this study focuses on all postnatal mothers despite their HIV status, on the RIFO prescribed by WHO.

1.3 Justification of the study

The study was to gather information about what the postnatal's (despite their HIV status) knew about RIFO, their mindset and what they actually did with regard to WHO RIFO. Successful control of HIV transmission depends on positive change of habits or way of life of a group of people, community or an individual. The tendency to behave in a certain way is based on knowledge and information gained from health education. A positive change in attitude through proper knowledge may lead to positive change in behaviors and actions. When the postnatal mothers are knowledgeable, with the right

attitude on RIFO in the context of HIV it will interest them to extend the right information and direction to others. This adds up to the whole community being well informed on the RIFO thereby reducing the rate of MTCT through breastfeeding. This study will help in formulation of new strategies to improve provision of MTCT services in various populations.

Despite this situation, there is limited documented evidence on general postnatal mothers' knowledge and attitude on RIFO for HIV positive mothers, their infant feeding practice and use of WHO RIFO guidelines. This information will be vital to relevant stakeholders and will help curb mother to child HIV transmission.

1.4 Research questions

The following research questions guided this study:

1. What is the level of knowledge of the postnatal mothers attending Mbagathi District Hospital (MDH) on recommended infant feeding options for HIV positive mothers?
2. What is the attitude of postnatal mothers attending MDH on recommended infant feeding options for HIV positive mothers?
3. What are the feeding practices of postnatal mothers attending MDH on recommended infant feeding options?
4. What are the socio-demographic factors associated with the knowledge, attitude and practices of postnatal mothers attending MDH on recommended infant feeding options for HIV positive mothers?

1.5 Null Hypothesis

The socio demographic factors do not determine the knowledge, attitude and practice of postnatal mothers attending MDH on infant feeding options for the HIV positive mothers.

1.6 Objectives

1.6.1 General Objective

To determine the knowledge, attitude and infant feeding practices of mothers attending postnatal clinic at Mbagathi District Hospital on infant feeding options recommended for HIV positive mothers.

1.6.2 Specific Objectives

This study was guided by the following specific objectives:

1. To determine the knowledge of postnatal mothers attending MDH on recommended infant feeding options for HIV positive mothers.
2. To determine the attitude of postnatal mothers attending MDH on recommended infant feeding options for HIV positive mothers.
3. To determine infant feeding practices of postnatal mothers attending MDH on recommended infant feeding options.
4. To determine factors associated with the knowledge, attitude and practices of postnatal mothers attending MDH on recommended infant feeding options for HIV positive mothers.

1.7 Conceptual framework on KAP of infant feeding options

Several factors play a role in influencing KAP of postnatal mothers on infant feeding options for HIV positive mothers. Figure 1.1 gives an overview of the main themes in this study; Knowledge, Attitude and Practice of infant feeding options.

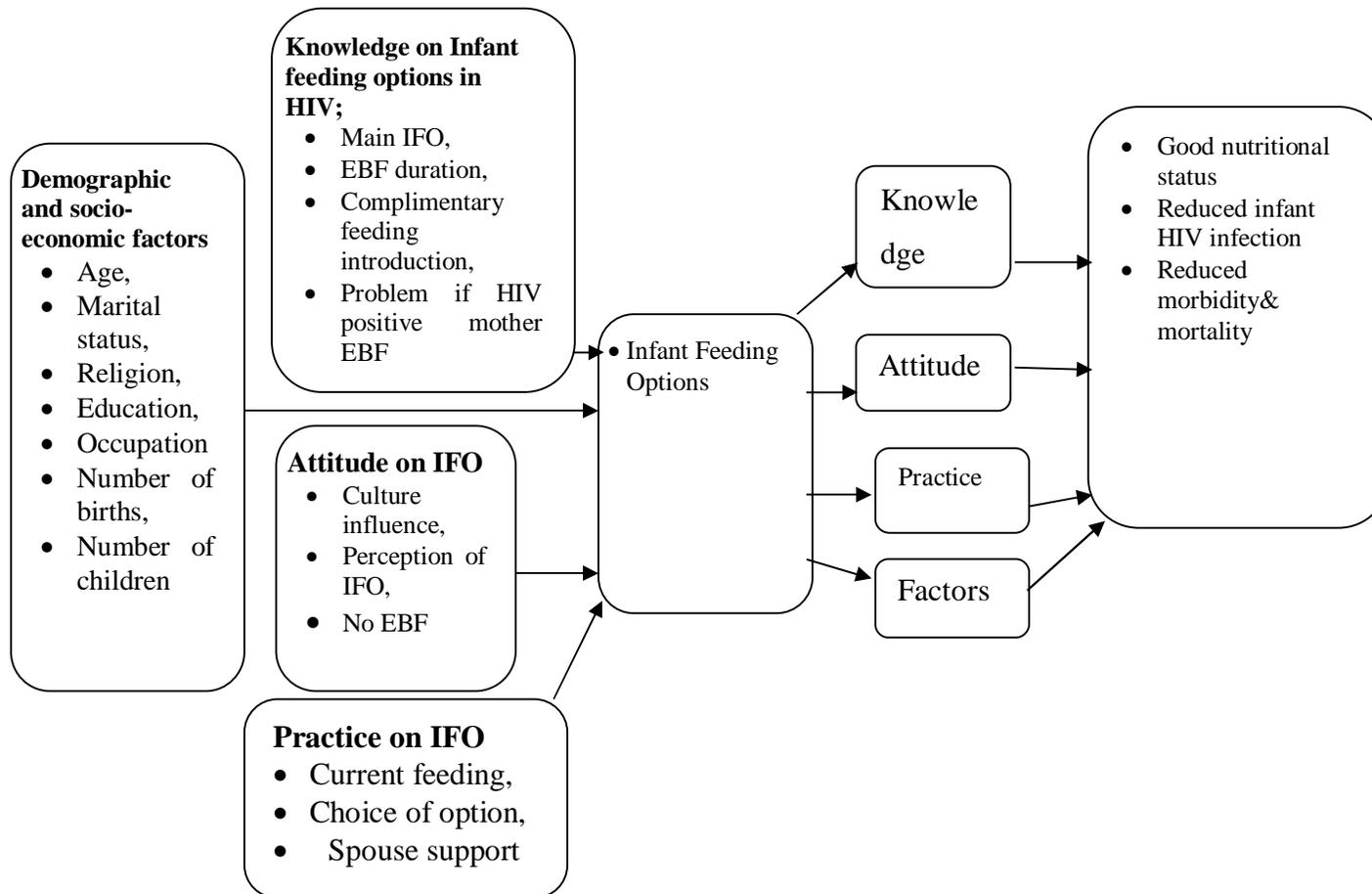


Figure 1.1: Conceptual framework on KAP of infant feeding options

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The HIV/AIDS pandemic continues to take a heavy toll among the world's population. Sub-Saharan Africa is the worst affected region where women bear a disproportionate burden of HIV infection as compared to men. Not only are women more likely to be infected with HIV, but they are also more likely to be the ones caring for people infected with HIV as a family member or health provider (Raisler & Cohn, 2005).

The epidemic killed 2.2 million people in 2005, the deaths reduced to 1.8 million in 2010 and 34million were living with HIV. Around 390,000 children aged under 15 became infected with HIV in 2010 (UNAIDS, 2011). New infection rates among children have fallen by 58% since 2001. Globally, 240,000 [210,000-280,000] children became newly infected with HIV in 2013 down from 580,000 [530,000-640,000] in 2001. In sub-Saharan Africa there were 210,000 new child infections in 2013 (UNAIDS Communication & Global Advocacy, 2014).

Kenya is the fourth largest HIV epidemic in the world. In 2012, an estimate 1.6 million people were living with HIV, and roughly 57,000 people died from acquired immune deficiency syndrome (AIDS) related illnesses (UNAIDS 2013). According to USAID, orphans due to the epidemic in 2012 were 1.1 million (USAID, 2013). In adults living with HIV, women represent 58% of prevalent infections. The large number of sexually acquired HIV infections among women has given rise to substantial transmission to newborns, with an estimated 12,894 children in Kenya becoming newly infected in 2011 (NACC/NASCOP, 2012).

Almost all of these infections occur in low and middle income countries, and more than 90% are the result of MTCT during pregnancy, labour and delivery, or breastfeeding (UN, 2001). Without interventions, there is a 20-45% chance that a baby born to an HIV infected mother will become infected (De Cock *et al.*, 2000).

2.2 HIV transmission through breastfeeding

An estimated 430 000 children were newly infected with HIV in 2008, over 90% of them through MTCT. Without treatment, about half of these infected children will die before their second birthday. In settings where prolonged breastfeeding is the norm and interventions for preventing MTCT are not widely available, about 20% – 45% percent of HIV infected mothers pass on HIV to their infants (WHO, 2010). Mother to child transmission is by far the largest source of HIV infection in children under the age of 15 with 90% of the cases infected during pregnancy, birth or breastfeeding (Kapoor *et al.*, 2004; Grooves, 2004; Weinberg, 2000). In the absence of any intervention MTCT of HIV occurs in about one third of children, it occurs 5%-10% during pregnancy, 10%-20% in labor and 5%-20% during breastfeeding (De Cock *et al.*, 2000; Raisler and Cohn, 2005). Majority (63%) of children born to HIV infected mothers are uninfected. About 10-20% of the babies acquire the virus from their mothers during breastfeeding for the first 24 months (Elizabeth and Piwoz, 2001 and 2002). However, the risk may increase depending on certain situations related to the mother, the baby and the virus (Elizabeth and Piwoz, 2001; Ioannidis *et al.*, 2001).

Mother to child transmission of HIV can be largely eliminated. Prevention of mother to child transmission (PMTCT) is an approach towards mitigating the transmission of HIV/AIDS from mothers to their infants. It focuses on the reduction of transmission of the virus to the baby in the uterus, during delivery and during breastfeeding by instituting optimal delivery practices and proper infant feeding practices. Numerous

clinical trials over the past decade have demonstrated that it is possible to reduce the MTCT risk to less than 2% (Chaisilwattana, 2002; Connor *et al.*, 1994; Guay *et al.*, 1999; Petra study, 2002; Wade *et al.*, 1998).

In developed and high income countries, MTCT has been reduced thanks to a combination of modern antiviral therapy and avoidance of breastfeeding. Several studies have shown that formula feeding in resource poor settings increases infant mortality due to infectious diseases. This is especially critical in the first six months of life (Fowler *et al.*, 1999). The most common mode of feeding in these areas is mixed breastfeeding (supplement in addition to breast feeding during the first six months). It is associated with increased morbidity and mortality as well as the highest rates of vertical transmission of HIV (Bland *et al.*, 2002). In industrialized nations the risk of MTCT tends to be lower (15–25%) than that in the developing world (25–45%) (WHO, 1998). This difference is largely due to transmission through breastfeeding by HIV infected women in the developing world, although other confounding variables undoubtedly play an additional role (Cohn *et al.*, 2000; WHO, 1998).

Case reports of HIV transmission by breastfeeding in the developing world were published beginning in the late 1980s (Ruff *et al.*, 1992; Stiehm *et al.*, 1991). A study from Malawi demonstrated for the first time that increased breast milk viral load, as well as increased maternal plasma viral load, was associated with HIV transmission (Semba *et al.*, 1999). Several studies indicate that the timing of mother to child transmission by breastfeeding depends on when the mother acquires her HIV infection (Dunn *et al.*, 1992; WHO, 1998). Mothers who are infected just before delivery or during the period of breastfeeding itself have a higher rate of transmission than those mothers infected way before pregnancy, presumably because of a greater degree of viremia among the former group (Dunn *et al.*, 1992; WHO, 1998).

2.3 Knowledge, attitude, and practice on infant feeding options

Knowledge of HIV and IFO, an understanding of how it may be transmitted through breast milk, attitude and practice of IFO are essential to MTCT risk reduction, although they are often insufficient on their own to prevent transmission. In a randomly selected sample of 889 mothers Hailu, (2005) used both quantitative and qualitative methods to assess the KAP among mothers of IFO recommended for HIV positive women. Results of the study found that only 30.5% of women in Jimma, Ethiopia had sufficient knowledge of IFO recommended for HIV positive women. Most (95.3%) of the mothers were found to have unfavorable attitude towards the IFO recommended to HIV positive mothers. The author acknowledged that most of the mothers had insufficient knowledge about and unfavorable attitude towards the IFO recommended to HIV positive women.

Igbokwe et al. (2016) found the knowledge on currently recommended infant feeding options for HIV positive mothers was generally poor as only 60 (26.7%) and 82 (36.4%) of the rural and urban respondents respectively had good knowledge. A study in Nigeria investigating the knowledge and perception of antenatal mothers regarding PMTCT found that most (79.6%) mentioned knowledge of infant formula. Only 14 (3.5%) were knowledgeable of exclusive breastfeeding for the first three to six months of the infant's life (Owoaje *et al.*, 2012).

Another study by Kuzma in Papua New Guinea examined KAP among mothers. The majority of mothers (87.9%, n = 123) regarded breastfeeding as good, giving various reasons for their attitude. Relating to this 48% mentioned it was healthy for children while the ones who saw it beneficial to the mother (reduces breast tightness and pain) were 63% (Kuzma, 2013). Fardness et al. (2009) did contrasting surveys of infant feeding practices among HIV positive mothers on one hand and the general population mothers on the other, a number of issues arose. The first and most worrying was the fact

that in several aspects of infant feeding, the HIV positive mothers seemed to choose the least good option more frequently than the general population. Among the infants below six months of age, HIV positive mothers chose mixed breastfeeding more often than the general population. They were less likely to breastfeed their infants exclusively.

Abiona et al. (2006) investigated the acceptability, feasibility and affordability of infant feeding options for HIV infected women. The study employed a descriptive study design. They found that the majority of mothers, fathers and grandmothers who participated in the FGDs could define the term 'exclusive breastfeeding' correctly. However, in this community and in southwest Nigeria, exclusive breastfeeding was not a common practice. Most infants were given water from birth partly due to cultural perceptions that infants need water to survive. This cultural practice was deeply engrained.

Iloff *et al* (2005) showed the cumulative risk of HIV transmission at six months being 1.31% and 4.4% for exclusively breastfed babies and babies who received mixed breastfeeding respectively, and 6.94% and 13.92% at eighteen months. These were significant differences. Mixed feeding is not recommended because studies suggest it carries a higher risk than exclusive breastfeeding. This is because mixed feeding damages the epithelial lining of the baby's stomach and intestine and thus makes it easier for HIV in breast milk to infect the baby. Unfortunately mixed feeding is more common in Africa compared to exclusive breastfeeding or exclusive replacement feeding posing a risk of HIV transmission in the context of HIV (Doherty *et al.*, 2006). In other parts of Africa, giving infants water to supplement breast milk has posed a challenge to the promotion of exclusive breastfeeding. To ensure that HIV positive mothers who choose to breastfeed do so exclusively, beliefs and attitudes in relation to giving infants water need to be addressed.

A study done by Thairu found out that socio-economic circumstances influence decision making on IFO thus contributing to HIV transmission (Thairu *et al.*, 2005). One woman who had chosen breastfeeding explained that she was not working and did not have the money to buy infant formula. The study further indicated that social stigma affected women's decisions. This appears to be particularly acute for young women. This was consistent with South Africa reports which suggested that young people had a harder time accepting their status and were more likely to be in denial for a longer time compared to older adults (Campbell and MacPhail, 2002; Eaton *et al.*, 2003).

Adolescent mothers frequently reported that they received advice from their families to practice mixed feeding. Though there was paucity of data on how adolescent mothers in sub-Saharan Africa negotiate conflicting advice from their families and healthcare providers. It is likely that as with adolescents everywhere, they may have hesitated to contradict families' opinions regarding infant feeding especially if they were financially and emotionally dependent upon them. As described by Bentley, adolescents may also be inexperienced and insecure about their own beliefs and logically turn to their families, particularly their mothers and grandmothers, for parenting help. Even when adolescent mothers express disagreement, families may insist on their own decisions or less frequently implement their preferred feeding practices without the mother's consent. Accommodating the family's wishes may be an adaptive coping strategy as adolescent mothers struggle with the enormous challenge of parenting in the midst of their personal development (Bentley *et al.*, 1999).

2.4 Infant feeding options

World Health Organization recommends that infants start breastfeeding within one hour of life, are exclusively breastfed for six months, with timely initiation of adequate and safe complimentary foods while continuing breastfeeding for two years or beyond. The

Global Strategy on Infant and Young Child Feeding (GSIYCF) recommends the optimal feeding pattern for survival in the general population is EBF for the first six months of life. Thereafter complementary feeding from six months, continued breastfeeding for up to two years and beyond plus maternal nutrition and support (WHO, GSIYCF, 2003). World Health Organization recommends that infants born to HIV positive mothers receive either EBF or replacement feeding when AFASS followed by early weaning. Beyond the clinical and epidemiological debate, it remains unclear how acceptable and feasible the two options are for rural populations in sub-Saharan Africa (WHO, 2003).

World Health Organization (2001) infant feeding guidelines recommended that HIV positive mothers be counseled about the benefits of breast feeding versus risks of MTCT and that replacement feeding presents risks to an infant's health and survival. The AFASS criteria (WHO *et al.*, 2003) was introduced in an attempt to bring the local context of infant feeding and circumstances of the individual mother into the decision making process. The feeding options recommended for HIV infected mothers in the 2001 guidelines consisted of the following options EBF with rapid cessation at six months, replacement feeding with commercial infant formula, replacement feeding with modified animal milk; cow, goat or camel (if AFASS), expressed heat treated breast milk and wet nursing by a HIV negative mother (Appendix VI). The latter two receive less attention due to their perceived local inapplicability (NASCOP, 2002).

2.4.1 Breastfeeding practices

Nearly all infants in developing countries are initially breastfed and most continue until at least six months of age but often into the second year. Breast feeding infants has been found to provide physiological benefits to the infant as well as physical, psychological and pragmatic benefits to the mother. Some of these advantages appear to be short term, whereas others become more evident over longer periods of time (Buckley and Charles,

2006). In the absence of the possibility of transmissible infections such as HIV, breast milk is clearly the best food for infants.

Continued breastfeeding (beyond six months) is common in sub-Saharan Africa and Asia, but much less so elsewhere. Up to 94% of infants in the world are estimated to have ever been breastfed, 79% continue to one year and 52% to two years, with estimated median duration of breastfeeding of 21 months. Overall, globally an estimated 41% of infants less than four months of age and 25% under six months are exclusively breastfed. In sub-Saharan Africa 23% of infants less than six months of age are exclusively breastfed (WHO, 2003). Health benefits of breastfeeding can be grouped into two:

2.4.1.1 Maternal health benefits

A large research literature suggests that women who breastfeed experience an array of health benefits. Initiation of breastfeeding immediately after delivery stimulates the release of oxytocin, a hormone that helps to contract the uterus, expel the placenta, and reduce postpartum bleeding (Negishi et al., 1999). In the longer term, mothers who breastfeed tend to be at lower risk of premenopausal breast cancer and ovarian cancer later in life (Bernier et al., 2000). Breastfeeding helps women return to their pre pregnancy weight faster and lowers rates of obesity (Garza & Rasmussen, 2000; Kramer & Kakuma, 2004). Breastfeeding also delays the return of fertility, thus reducing exposure to the maternal health risks associated with short birth intervals. Healthy birth spacing is associated with improved birth outcomes and maternal recovery following birth. A woman who exclusively or almost exclusively breastfeeds her infant during the first six months of life, and has not resumed menstruation has a less than 2% risk of becoming pregnant (Labbok *et al.*, 1994; Tommaselli *et al.*, 2000). These and more advantages of breast feeding have led to widespread recommendations to promote nearly

universal breastfeeding (Lawrence, 1997; WHO, 1998). However, such policies may need reevaluation in the era of HIV infection (Goldman, 2000; Lawrence, 1997; Heymann and Phuong, 1999).

2.4.1.2 Child health benefits

The evidence is conclusive that breast milk is the best nutrition you can offer your newborn. Breastfeeding offers tremendous benefits to both mother and child. It is specially designed to cater for all your child's health and also nutritional needs in the first six months of life. For maximum benefits, breastfeeding should be initiated soon after the birth of your child and should be maintained exclusively for six months, until weaning is initiated.

2.4.1.2.1 Protection against infections and diseases

One of the top benefits of breastfeeding is that a child's immune system is sped up by getting antibodies from the mother through the breast milk. As a result they build up immunity to many of the medical ailments she has been exposed to. This improves child survival by protecting against diarrhoeal, pneumonia and other potentially fatal infections. Breast milk contains a wealth of immunologic factors, including antibodies, lysozyme, lactoferrin, neutrophils, macrophages, and lymphocytes (Lawrence, 1999). These humoral and cellular immunoactive substances are associated with significant protection from gastrointestinal infections, lower respiratory infections, otitis media, and meningitis (Lawrence, 1997; 1999; WHO, 1998). Infant and child mortality is several folds lower among breastfed infants than among bottle fed infants in both the developing world and industrialized nations (Lawrence, 1997; WHO, 1998). Another important benefit of breastfeeding in developing nations is reduced exposure to water borne pathogens in areas of poor sanitation (WHO, 1998). In poor environment with shortages

of fuel, clean water, utensils, and storage facilities, it is extremely difficult to prepare a hygienic bottle feed and yet breast milk is always fresh, perfectly clean, just the right temperature and is the healthy choice. The bottle, water, milk, or hands may be contaminated, and germs quickly multiply in a prepared formula/food if it is not kept in a refrigerator.

2.4.1.2.2 Nutritional benefits

Breast milk is the natural first food for babies providing all the energy and nutrients that the infant needs for the first months of life thus enhancing quality of life (Thairu *et al.*, 2005). It continues to provide up to half or more of a child's nutritional needs during the second half of the first year and up to one-third during the second year of life. It provides complete nutrition for the infant for at least four and usually six months and can provide a significant fraction of nutritional needs over the next six months of life (Lawrence, 1997; WHO, 1998). It has four main components water, fat, protein, and sugar.

2.4.2 Exclusive breastfeeding

Exclusive breastfeeding means that the mother feeds the infant only breast milk for the first six months (WHO 2003). It is recommended for HIV infected mothers for the first six months of life unless replacement feeding is AFASS for them and their infants. Infants who are fed only on breast milk through the first six months of life are likely to have fewer diarrheal, respiratory, and ear infections. A breastfeeding infant to a HIV positive mother remains at risk of acquiring the HIV virus throughout the breastfeeding period (WHO, 2006). Despite continued debate on safety of exclusive breastfeeding among HIV positive mothers, there is evidence that EBF decreases chances of HIV transmission in exposed infants. In the developing world, EBF is the best option geared

at prevention of HIV transmission and early mortality due to malnutrition, diarrheal conditions in exposure to unsafe water use and poor sanitation in the preparation of replacement feeds. For this reason, HIV positive mothers in resource constrained areas are advised to practice EBF under the prophylaxis of ARV during this period. This is to lower the chances of transmitting HIV to the infant by reducing the viral load of the mother and promoting optimum health of the mother during this period (WHO, 2010).

2.4.3 Replacement feeding

Commercial infant formula; this means that the mother or caregiver feeds the infant with commercial infant formula and no breast milk. Infant formula is breast milk substitute formulated industrially that should be in accordance with applicable Codex Alimentarius standards [developed by the joint FAO/WHO Food Standards Programme] (WHO, 2006). It is bio-chemically the most suitable replacement feed for the new born. Its formulation is based on modified cow's milk. Soy protein has been found to be closest in nutrient composition to breast milk (Leshabari *et al.*, 2006). It is usually adequately fortified with micronutrients including iron. Replacement feeding should aim to provide the entire infant's nutritional requirements as completely as possible. The infant should be replacement fed exclusively (no mixing of commercial infant formula with breastfeeding). Mother has to have access to a reliable and affordable supply of adequate quantities of nutritionally appropriate commercial infant formula for at least six months (WHO, 2003).

Home modified animal milk; Mother or caregiver modifies animal milk (fresh animal milk, full cream, pasteurized or powdered milk, evaporated milk, or ultra high temperature (UHT) milk) and feeds the infant. Infant receives no breast milk. This mother or caregiver should follow preparation, mixing guidelines for home modified animal milk. This is when supplies of animal milk are reliable and family can afford to

buy about half a liter per day for at least six months. Replacement feeding represents a risk to infant's health and survival by creating a risk of infections and malnutrition hence both replacement feeding options should meet the AFASS criteria (WHO, 2003).

2.4.3.1 AFASS criteria for replacement feeding

The AFASS criteria for replacement feeding refers to such feeding being AFASS (WHO, 2003)

Acceptable: The mother perceives no barrier to choosing replacement feeding for cultural or social reasons or for fear of stigma and discrimination.

Feasible: The mother (or family) has adequate time, knowledge, skills, resources, and support to correctly prepare breast milk substitutes and feed the infant 8–12 times in 24 hours.

Affordable: The mother and family, with available community and or health system support, can pay for the costs associated with the purchase/production, preparation, storage, and use of replacement feeds without compromising the health and nutrition of the family. Costs include ingredients or commodities, fuel, clean water, and medical expenses that may result from unsafe preparation and feeding practices.

Sustainable: Continuous, uninterrupted supply and a dependable system for distribution of all ingredients and products needed to safely practice replacement feeding are available for as long as needed.

Safe: Replacement foods are correctly, hygienically stored, prepared and fed with clean hands using clean cups and utensils, not bottles or teats.

2.4.4 Expressed heat treated breast milk

In this option breast milk is expressed, heated safely and then fed to infant from a cup. Expressed breast milk is boiled and cooled immediately by standing the container in cold water and once the milk is ready it is used within an hour. Any milk left in the cup should be discarded after feeding the infant. Heat treated breast milk is nutritionally superior to other milks, but heat treatment reduces the levels of the anti-infective factors in the breast milk. Although highly motivated mothers may choose this method they need time, resources, and support to express and heat treat breast milk (WHO, 2003).

World Health Organization released “Rapid Advice” guidelines on HIV exposed infants that listed expressing and heat treating breast milk as a possible interim strategy in four situations. For low birth weight or sick infants unable to suckle, for mothers temporarily unable to breastfeed due to illness or mastitis, to assist mothers to stop breastfeeding and in situations where ARV are temporarily not available (WHO, 2009).

2.4.5 Wet nursing

Wet nursing is breastfeeding by a woman who is not the infant's mother. A wet nurse who is HIV negative can breastfeed exclusively. HIV positive mothers may want to try this option to reduce the risk of transmission from mother to child. There is a small chance that a HIV positive infant can pass the virus to a wet nurse if the infant has a sore in her/his mouth or the wet nurse has a breast condition. Mother and family may consider wet nursing only when:

- Wet nurse is offered HIV counseling, testing, voluntarily takes a test, and tests HIV negative.

- Wet nurse practices all optimal breastfeeding behaviors applying to HIV negative women or women of unknown status who practice EBF.
- Wet nurse is provided with information about practicing safe sex to ensure that she remains HIV negative while she breastfeeds the infant.
- Wet nurse can breastfeed infant frequently including at night and for as long as needed.
- Wet nurse has access to breastfeeding support to prevent and treat cracked or bleeding nipples, mastitis, abscess, or Candida (WHO, 2003).

Good counseling can help an HIV positive mother select and practice the safest infant feeding strategy for her individual situation. Ideally women should be counseled during pregnancy and after delivery to ensure they have adequate time to make informed infant feeding decisions.

2.5 WHO rapid advice and infant feeding guidelines

WHO launched the Rapid Advice to show that ART interventions for HIV infected mothers or HIV exposed infants can significantly reduce risk of HIV transmission through breastfeeding (WHO, 2009). This was also to build on the evidence of free infant HIV survival and on new research (Moland *et al.*, 2010). The Rapid Advice was quickly followed by the 2010 HIV and infant feeding guidelines (WHO 2010). The key principles related to postnatal HIV transmission are the following: balancing HIV prevention with protection from other causes of child mortality; informing mothers known to be HIV infected about infant feeding alternatives (individual rights should not be forfeited in the course of public health approaches); providing services to support mothers to appropriately feed their infants; avoiding harm to infant feeding practices in the general population (WHO, 2010). The concrete recommendations in these latest guidelines are the following (WHO *et al.*, 2010):

- Mothers known to be HIV infected should exclusively breastfeed their infants for the first six months of life, introducing appropriate complementary food thereafter, and continue breastfeeding for the first 12 months of life.
- Mothers who decide to stop breastfeeding should stop gradually within one month, stopping breastfeeding abruptly is not advisable.
- Mothers known to be HIV infected should only give commercial infant formula milk as a replacement feed to their HIV uninfected infants or infants who are of unknown status, when specific conditions are met (referred to as AFASS).
- Mothers known to be HIV infected should be provided with lifelong antiretroviral therapy or antiretroviral prophylaxis interventions.

2.6 Factors associated with HIV transmission in breastfeeding

In a community where breastfeeding is normative in the strongest sense of the word, choosing replacement feeding would have seemed abnormal, even prior to the advent of the HIV epidemic. There has been sufficient public discussion about transmission of the virus through breast milk and when a mother chooses to bottle feed it is tantamount to announcing that one is HIV positive. Several factors are associated with HIV transmission in breastfeeding and can be grouped into two (a) Maternal factors and (b) Infant factors.

2.6.1 Maternal factors

Maternal Sero-conversion during lactation: HIV maternal sero-conversion during pregnancy or while breastfeeding constitutes a high risk factor for transmission of the virus. It is higher than the risk factor among women who have been infected previous to breastfeeding. High levels of virus in plasma and also in breast milk are seen in primary HIV infection (Dunn *et al.*, 1992). In a study in Kenya, the relative risk of MTCT was

increased about six fold during primary infection of the mother (Embree *et al.*, 2000). Van de Perre et al. reported a transmission rate of 80% in women who seroconverted within three months postpartum compared with 40% of women who sero-converted within 4–21 months (Van de Perre *et al.*, 1991).

Clinical and/or immunological (CD4 cell count) disease progression (AIDS): This is maternal immune-suppression defined by low CD4 cell count, although strongly correlated with plasma RNA viral load. It is an independent risk factor for breastfeeding transmission in all studies with available information. Lower CD4+ counts are associated with a higher risk of MTCT, and higher CD4 counts are associated with a lower risk of MTCT. This association fits with the fact that low CD4 counts are associated with more advanced disease. Sicker mothers are more likely to transmit the virus than HIV infected mothers who are still clinically healthy (Temmerman *et al.*, 1995; Mayaux *et al.*, 1995).

Breast health: Breast health has also been associated with the risk of transmission through breastfeeding. Clinical and Subclinical mastitis, breast abscess, cracked or bleeding nipples or fissures are relatively common in HIV positive. In Kenya, clinical mastitis was detected in 7– 11% of HIV positive mothers (John et al. 2001). The estimated prevalence of subclinical mastitis elsewhere, defined by elevated levels of sodium and/or potassium, in studies of HIV infected mothers six to fourteen weeks after delivery ranged from 11 to 16% (Semba *et al.*, 1999).

RNA viral load in plasma and breast milk: There is a direct relationship between maternal viral load and perinatal transmission risk. Increased maternal RNA viral load in plasma and breast milk are both strongly associated with increased risk of transmission through breastfeeding. Like low CD4 counts, high viral loads tend to be associated with

more advanced disease (Semba *et al.*, 1999). However, transmission is rare in mothers with undetectable viral load (WHO, 2007).

2.6.2 Infant factors

Duration of breastfeeding: An infant continues to be exposed to the risk of HIV transmission for as long as he or she is breastfed. The longer the duration of breastfeeding, the longer the infant is exposed to the risk of HIV infection.

Pattern of infant feeding (EBF versus mixed feeding): Mixed feeding than EBF is a contributor to MTCT. This is feeding an infant both breast milk and other non-breast milk liquids or solids, it carries a greater risk of HIV transmission in the first six months. These other liquids and foods given to the infant alongside the breast milk can damage the already delicate and permeable gut wall of the small infant and allow more viruses to be transmitted (Coutsoudis *et al.*, 1999). It has also been hypothesized that the intestinal permeability of the young infant may be affected by mode of feeding, with infants who receive only breast milk having a less permeable and therefore healthier lining of the gut than those who also receive other foods (WHO, 2007).

Infant oral thrush: The presence of infections such as oral or esophageal candidiasis which break down the infant's protective gastrointestinal mucosal barrier may be associated with an increased risk of transmission through breastfeeding. However, the direction of any causality is difficult to establish since early HIV infection may also be associated with thrush (Embree *et al.*, 2000).

CHAPTER THREE

METHODOLOGY

3.1 Study site

The study was conducted in Mbagathi District Hospital which was the largest district hospital in Nairobi County before devolution. It is located in Dagoretti District approximately six kilometers from Nairobi city centre and about one kilometer away from Kibera slum. It is the only public hospital easily accessible and affordable to people from the low income backgrounds of Kibera and its environs due to its relatively low cost of services compared to other health facilities. It started functioning as an independent general hospital in July 1995 with an aim of decongesting Kenyatta National Hospital which is the national referral hospital. It serves as a referral hospital for the health centers and dispensaries in Nairobi County serving a population of about three million people. The Maternal Child Health (MCH) clinic provides preventive services to both mothers and children under five years old. The services include antenatal services, child welfare, and family planning services while Nutrition clinic (NC) provides nutrition intervention services to malnourished infants and children.

3.2 Study design

A cross-sectional hospital based study was undertaken to assess the knowledge, attitude and practice of postnatal mothers attending MDH on infant feeding options for HIV positive mothers in two departments MCH and NC.

3.3 Study Variables

The dependent variable in the study were knowledge of infant feeding options recommended to HIV positive mothers, attitude towards infant feeding options recommended to HIV positive mothers and practices of postnatal mothers on WHO RIFO guidelines. The independent variables were socio-demographic characteristics (age, religion, marital status, level of education, occupation, no. of births and no. of children).

3.4 Study population

The study population consisted of postnatal mothers attending postnatal clinic at MDH between April and June 2011. These postnatal mothers come to the clinic for routine checkup of their infants. However, on these occasions they are also provided with health and nutrition education on various issues including breastfeeding, nutrition, sanitation, communicable diseases, HIV/ AIDS and infant feeding. This is done by health workers from the various departments which interact with the MCH department.

3.4.1 Inclusion criteria

The study included the following participants;

- Postnatal mothers/ caregiver attending MDH during the study period.
- Postnatal mothers/ caregiver with infants aged 0-24 months
- Postnatal mothers/caregiver who consented to participate in the study.

3.4.2 Exclusion criteria

The following subjects were excluded;

- Postnatal mothers/caregiver who were too sick to participate or with sick infants. All suffering from any illness.
- Postnatal mother/ caregiver who were mentally ill
- Postnatal mothers/ caregiver with infants older than 24 months

3.5 Sample size determination

The required sample size was calculated using a statistical formula for estimating population sample size and therefore samples to be used for the study calculated at 95% confidence interval. Knowledge, Attitude and Practice of postnatal mothers on infant feeding options available for HIV positive was not known and was assumed to be 50%.

$$n = Z^2 \times P (1 - P) / d^2 \quad (\text{Fischer et al., 1998})$$

Description:

n= required sample size (if target population is greater than 10,000)

z= confidence interval at 95% (standard value of 1.96)

p = proportion of mothers with knowledge on IFO (0.5)

(Taken as 50% since there is no data available on prevalence of knowledge on IFO).

d = level of precision at 5% (standard value of 0.05).

$$\begin{aligned}
 n &= \frac{1.96^2 \times [0.5 \times (1 - 0.5)]}{0.05^2} \\
 &= \frac{3.8416 \times 0.25}{0.0025} \\
 &= 384.16 \quad n = 384
 \end{aligned}$$

Key informants (KI) were drawn from the selected health facility; 1Nurse, 1Nutritionist and 1HIV counselor, fifteen postnatal mothers were also interviewed as KI.

3.6 Sampling procedure

Systematic random sampling of postnatal mothers was used to recruit participants into the study. Data of previous attendance indicated approximately 15 postnatal mothers attended the clinic per day. The first mother to attend everyday was interviewed thereafter every second postnatal mother till the sample size of 384 was attained. The study period was 52 days. The sampling interval was selected as follows:

Where: Sampling interval (K) = Sampling frame (N)/ Sample size (n)

$$K = \frac{780}{384} = 2$$

Therefore, every 2nd respondent was selected for the interview.

3.7 Study procedure

The selected mothers were approached during clinic days for consent and subsequent interviews. This was done after they were through with postnatal services at the clinic. They were directed to the interview room by the health worker and interviewed while ensuring that privacy was maintained. The researcher identified herself, participants were asked to give signed informed consent before participating in the study. Participants were explained to the contents of the informed consent form (Appendix I) before the interviews. Consent for use of tape recorder was sought prior to the in-depth and key informant interviews. The objectives of the study were clearly stated and participation was strictly on a voluntary basis. Privacy and confidentiality were maintained by using numbers on the questionnaire other than actual names. Participants had the right to withdraw from the study anytime, even after consenting to participate and her data was not used in the analysis of final results.

3.8 Pretesting of data collection tools

Pretesting of the research instruments was done before the actual data collection to check whether the data collection tools were clear, well structured, specific, and aligned to the study objectives. Pretesting was done using a sample of 15 respondents from AMREF Kibera Health centre while 2 healthcare providers formed the sample for the KII. These were mothers with similar characteristics to those attending MDH. The subjects were purposively selected using the inclusion and exclusion criteria described in section 3.4.1 and 3.4.2 respectively. The study was explained to the respondents and informed consent obtained. The exercise was used to make corrections, clarifications, suggestions and highlight omissions to improve the research instruments. This was the basis of validating the data collection tools for this study.

3.9 Data collection

The principal investigator trained the research assistants to support in administration of the research tools. The selection criteria of the research assistants was attainment of the Kenya Certificate of Secondary Education and fluency in Kiswahili and English languages. Previous participation in surveys was an added advantage. The training entailed the use of lectures, discussions, role plays and exercises with the help of training aids. They were first taken through the objectives and methodology of the study. The training also involved rigorous guidance on questionnaire administration.

The Data was collected using both quantitative and qualitative methods of data collection. These included interviewer administered questionnaire, in-depth and key informant interviews.

Structured questionnaires: A semi structured questionnaire (Appendix III) developed by the researcher was used for collecting data. Data collected included socio demographic characteristics, knowledge on IFO, attitude on IFO and feeding practices on the IFO. Information collected on practice was based on the guidelines recommended by WHO since the recommendations cater for both HIV positive and negative. The study sought to find out if the postnatal mothers knew and had fulfilled the WHO recommendations despite their HIV status. Data collected on knowledge level was either adequate or inadequate, attitude was positive or negative and feeding practices was either good or bad. Each question had a score whereby a respondent was awarded one score if she got a question correct otherwise no score.

Key informant interviews: were conducted to verify and provide more insights to the information that was collected in the questionnaires. Three healthcare providers (Nurse, Nutritionist and HIV counselor) were purposively selected as key informants (KI). They

were more conversant with the knowledge, attitude and practice concerning IFO for the HIV positive mothers. The KI were selected from each department namely maternal and child health clinic, comprehensive care clinic and nutrition department.

Key informant guide was used to provide additional useful information since they interacted with the postnatal mothers on daily basis. The interview guides (Appendix IV and V) for mothers and healthcare providers mainly focused on their experiences with respect to postnatal mothers' knowledge, attitude and practices of IFO and also on establishing the feeding practices by the mothers. The researcher was the interviewer while the research assistant was recording responses and taking notes as back up. The discussions were held in Kiswahili language.

3.10 Data management

Qualitative data captured through in-depth and key informant interviews were transcribed and stored in word format. All completed questionnaires were checked, numbered, filed and kept safely. Quantitative data from the field was entered into a computer database designed using MS-Access 2010 (version 14.0) application. Data cleaning and validation was performed in order to achieve a clean dataset that was then exported into a Statistical Package format (SPSS). A clean dataset was stored in a computer hard drive for analysis. Data was kept in the principal investigators personal computer protected with the aid of a password. Back up files were stored in CDs and flash disks this was done regularly to avoid any loss or tampering. All the questionnaires and interview forms were stored in a lockable drawer for confidentiality.

3.11 Data analysis

3.11.1 Analysis of quantitative data

Questionnaire data analysis was conducted using SPSS statistical software version 16.0. Exploratory data techniques were used at the initial stage of analysis to uncover the structure of data and identify outliers or unusual entered values.

Univariable analysis: Descriptive statistics such as frequencies and proportions were used to summarize categorical variables while measures of central tendency were used for continuous variables.

Bivariable analysis: Pearson's Chi-square test or Fisher exact test was used to test for the association between categorical variables. All exposure variables (Independent factors) were tested against the dependent variable (*knowledge of IFO recommended to HIV positive mothers*) to determine which ones had significant association. Odds Ratio (OR) and 95% Confidence Interval (CI) were used to estimate the association between independent variables and the dependent variable. The threshold for statistical significance was set at $\alpha = 0.05$ and a two-sided p value at 95% confidence intervals (CI) reported for corresponding analysis.

Multivariable analysis: All independent variables identified to significantly associate with '*knowledge of IFO for HIV positive mothers*' at bivariable analysis were considered together in a Multivariable analysis. This was performed using binary logistic regression where backward conditional method was specified in order to identify confounders and effect modifiers. Adjusted odds Ratios (AOR) together with their respective 95% Confidence Interval (CI) were used to estimate the association between the retained independent predictors and '*knowledge of IFO for HIV positive mothers*'.

Analysis of overall knowledge score

Knowledge on infant feeding options for HIV mother was assessed using knowledge scale of seven assessments;

1. Knowledge score on feeding options recommended for infants born to HIV positive mothers (ranging between 0 – 1).
2. Knowledge on main infant feeding option to HIV positive mothers (ranging between 0 – 1).
3. Knowledge on other products apart from breast milk given to infants at 0 - 6 months (ranging between 0 – 1).
4. Knowledge on total breastfeeding period for HIV positive mother (ranging between 0 – 1).
5. Knowledge on introduction of complementary foods to infant born to HIV positive mothers (ranging between 0 – 1).
6. Whether there is a problem if HIV positive mother exclusively breastfeeds her infant (ranging between 0 – 1)
7. Whether breastfeeding of HIV positive mother always results in HIV transmission to infant (ranging between 0 – 1)

A percentage score for each mother was determined based on the correct response. The maximum attainable score was 7 out of 7 implying that the mother scored 100%. A mother who scored more than 50% (a minimum of 4 out of 7) was considered to be adequately knowledgeable of IFO for HIV positive mothers otherwise a score of less than 4 out of 7 was inadequately knowledgeable.

Analysis of overall attitude score

Attitude towards infants feeding options for HIV positive mothers was assessed using an attitude scale of six assessments;

1. Attitude on whether a mother likes feeding options for HIV positive mothers (ranging 0 – 1).
2. Attitude on infant feeding options for HIV positive mothers (ranging between 0 – 1).
3. Attitude on perception of Breastfeeding for HIV positive mothers (ranging between 0 – 1).
4. Attitude on whether HIV positive mothers should always give other foods and not breastfeed (ranging between 0 – 1).
5. Attitude on whether HIV positive women need support in their choice of IFO (ranging between 0 – 1).
6. Attitude on support of a HIV positive mother that has been advised not to breastfeed (ranging between 0-1).

A percentage score for each mother was determined based on the positive response. The maximum attainable score was 6 out of 6 implying that the mother scored 100%. A mother who scored more than 50% (a minimum of 3 out of 6) was considered to have a positive attitude towards infants feeding options for HIV positive mothers otherwise a score of less than 3 out of 6 was negative attitude.

Analysis of overall practice score

Overall assessment on practice with regard to infant feeding was assessed using two variables namely;

1. Currently applied feeding option (ranging between 0 – 1)
2. Duration of EBF (ranging between 0 – 1)

A percentage score for each mother was determined based on good practice. Those who EBF for six months and those giving appropriate food for age were considered to have good practice. The maximum attainable score was 2 out of 2 implying that the mother scored 100%. The overall score ranged between 0 and 2. ‘*Good practice*’ was characterized by a score of 2, otherwise ‘*bad practice*’.

3.11.2 Analysis of qualitative data

Tape recorded information from KII was transcribed verbatim taking care to accurately reflect words, phrases, tones and effect of statement and was translated to English. This was sorted into coding categories and manually analyzed based on themes developed from the study objectives. Data was presented verbatim.

3.12 Ethical considerations

Approval to conduct the study was obtained from Scientific Steering Committee at KEMRI (AppendixVII) and National Ethical Review Committee (AppendixVIII) for scientific and ethical approvals respectively before commencing the study. Permission was also sought from the medical superintendent at Mbagathi District Hospital to access and to carry out research in the hospital. Postnatal mothers who were sick or with sick infants suffering from any sickness were not to be included in the study.

The data obtained and used for the study was held in strict confidence; questionnaires were given codes and no names of individual subjects were used. Participants were

informed that this information will not be made available to persons outside the study team.

3.13 Study limitations

The study was carried out in a public health facility hence did not portray the situation among users of a private health facility. It was only able to capture information from postnatal mothers utilizing health facilities thus missing information about the same issue in postnatal mothers not using health facilities in Nairobi. The study was supported by the lead researcher who had limited financial resources to cover many areas and was limited to postnatal mothers attending clinic at MDH.

Data was collected using self-reporting method it could give incorrect or dishonest response especially in attitude and practices as the respondents might have feared being seen as having negative attitude or bad practice on the recommended infant feeding options. They were assured of anonymity of their responses by the lead researcher hence they opened up with their responses.

Recall bias was also identified as a limitation given that mothers were required to remember events of up to 24 months ago. This could have been overcome by the use of the WHO 24-Hour recall infant feeding tool.

CHAPTER FOUR

RESULTS

4.1 Introduction

The results presented in this chapter were obtained from both quantitative (Questionnaire) and qualitative (In-depth and Key informant interviews) sources. The findings of this study were interpreted and explained with regards to the stated objectives and research questions. The aim of this analysis was to determine the knowledge, attitude and practice of postnatal mothers attending Mbagathi District hospital on infant feeding options for HIV positive mothers. A cross-sectional hospital based design was used in this study. The results were under three sections mainly socio demographic characteristics, knowledge of recommended IFO, attitude towards the recommended IFO and current practice on the WHO recommended IFO. The respondents mean age was 26.4 with minimum of 14 and a maximum of 46 years.

4.2 Socio-demographic characteristics of respondents

A total of 384 postnatal mothers were interviewed during the study. The highest proportion of the mothers 38.3% (147) was aged between 21 and 25 years, with a small proportion 7.8% (30) aged less than 21 years. Christianity was the predominant religion accounting for 96.1% (369) of the participants. Most 84.9% (326) of the participants were married while 14.3% (55) were single. The level of education showed that the highest proportion of the mothers 39.5% (152) had achieved secondary education, with 25.3% (97) and 34.9% (134) having attained college education and primary education respectively (**Table 4.1**). In terms of occupation, the highest proportion of the participants 44.5% (171) were housewives taking care of children at home., with only

13.3% (51) having formal employment. Majority of the participants had given birth once or twice at 44.5% (171) and 33.1% (127) respectively where as 49.2% (189) had one child and 5.8% (22) had four children and above (**Table 4.1**).

Table 4.1: Socio-demographic characteristics of postnatal mothers attending Mbagathi District Hospital.

Variables	N=384	%
Age in years		
<21	30	7.8
21 – 25	147	38.3
26 – 30	135	35.2
>30	72	18.7
Religion affiliation		
Christian	369	96.1
Muslim	10	2.6
Traditional	5	1.3
Marital status		
Single	55	14.3
Married	326	84.9
Separated	3	0.8
Highest level of education attained		
None	1	0.3
Primary	134	34.9
Secondary	152	39.5
College	97	25.3

Occupation			
Housewife		171	44.5
Casual worker		35	9.1
Formal employment		51	13.3
Business (self employed)		111	28.9
Farmer		4	1.1
Other		12	3.1
Number of births			
One		171	44.5
Two		127	33.1
Three		55	14.3
Four and above		31	8.1
Number of children			
One		189	49.2
Two		124	32.3
Three		49	12.7
Four and above		22	5.8

4.3 Knowledge of postnatal mothers attending Mbagathi District Hospital, on the recommended infant feeding options

Table 4.2 presents assessment on knowledge of recommended feeding for infants born to HIV positive mothers. Approximately half the population of the mothers 47.9% (184) reported to know the feeding options recommended for infants born to HIV positive mothers. When requested to mention main IFO to HIV positive mothers, 22.7% (87) mentioned replacement infant formula, 20.3% (78) mentioned replacement home milk (cow) while the majority 47.4% (182) said EBF for six months.

Twenty three percent (89) indicated that apart from breast milk, medicine is given to infants at zero to six months, 3.9% (15) and 6.3% (24) thought water and cow milk can be given to infants zero to six months respectively. Sixty three percent (242) had no idea what else can be given apart from breast milk. Fifty one percent (197) thought that total breastfeeding period for HIV positive mothers should be six months.

Similarly, more than half the participants 54.9% (211) mentioned that introduction of complementary foods to infant born to HIV positive mothers should be done after six months. Thirty nine percent (150) of the participating mothers did not agree to the statement that it is a problem if HIV positive mother exclusively breastfeeds her infant. These were classified as having a positive attitude on this aspect. Forty percent (156) of the mothers did not agree to the statement that breastfeeding of HIV positive mother always results in HIV transmission to infant, and were deemed to be positive on this aspect.

Table 4.2: Knowledge of postnatal mothers attending Mbagathi District Hospital on the recommended infant feeding options

Variables	N=384	%
Knowledge of feeding options recommended for infants born to HIV positive mothers		
Yes	184	47.9
No	27	7
Not sure	173	45.1
Main infant feeding option to HIV positive mothers		
Replacement infant formula	87	22.7
Replacement home milk (cow)	78	20.3
Exclusive breastfeeding six months	182	47.4
Not known	37	9.6
Other products apart from breast milk given to infants at zero to six months		
Water	15	3.9
Cow's milk	24	6.3
Medicine	89	23.2
Porridge	14	3.6
Not known	242	63
Total breastfeeding period for HIV positive mothers		
3 months	5	1.3
6 months	197	51.3
2 years	1	0.3
Not known	181	47.1

Introduction of complementary foods to infant born to HIV positive mothers

After 3 months	8	2.1
After 6 months	211	54.9
After 1 year	1	0.3
After 2 years	1	0.3
Not known	163	42.4

There a problem if HIV positive mother exclusively breastfeeds her infant

Yes	206	53.6
No	150	39.1
Not known	28	7.3

Breastfeeding of HIV positive mother always results in HIV transmission to infant

Yes	131	34.1
No	156	40.6
Possibility	97	25.3

Knowledge summary

≤ 50% Inadequate knowledge	209	54.4
>50% Adequate knowledge	175	45.6

In bold are correct responses used to assess the score of adequate knowledge

4.3.1 Source of information of postnatal mothers attending Mbagathi District Hospital on knowledge of recommended infant feeding options in HIV

When asked what was their source of information on recommended infant feeding options for HIV positive mothers, 47.1% (181) indicated that they knew from the hospital/ health worker while 21.4% (82) mentioned mass media (Figure 4.1).

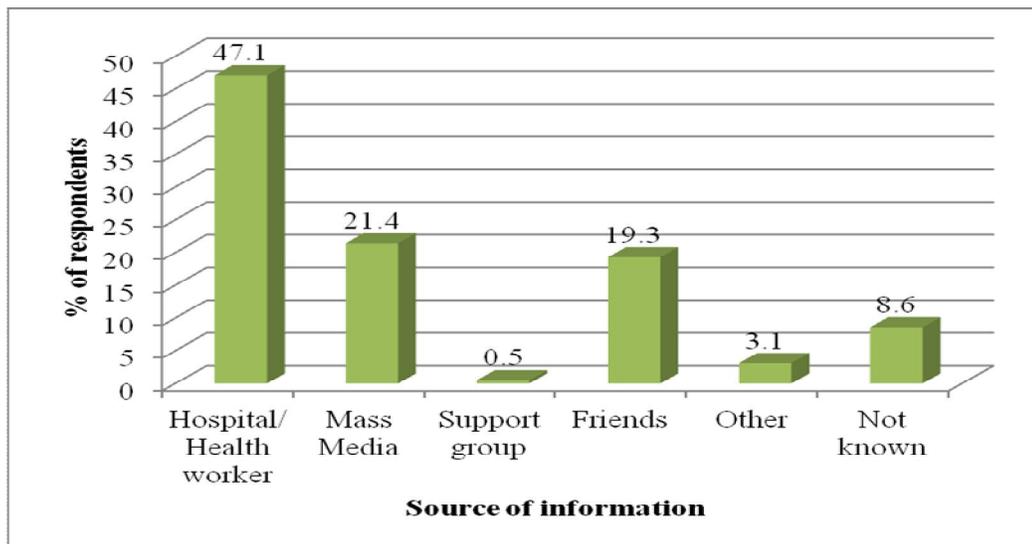


Figure 4.1: Source of information of postnatal mothers on infant feeding options, MDH, Kenya

4.3.2 Perceived problem in exclusive breastfeeding for HIV positive mothers

Out of the 206 mothers who indicated EBF for HIV positive mothers as a problem 91.7% (189) mentioned that if they practice EBF the infant might get HIV, 6.8% (14) mentioned infant will be malnourished (Figure 4.2).

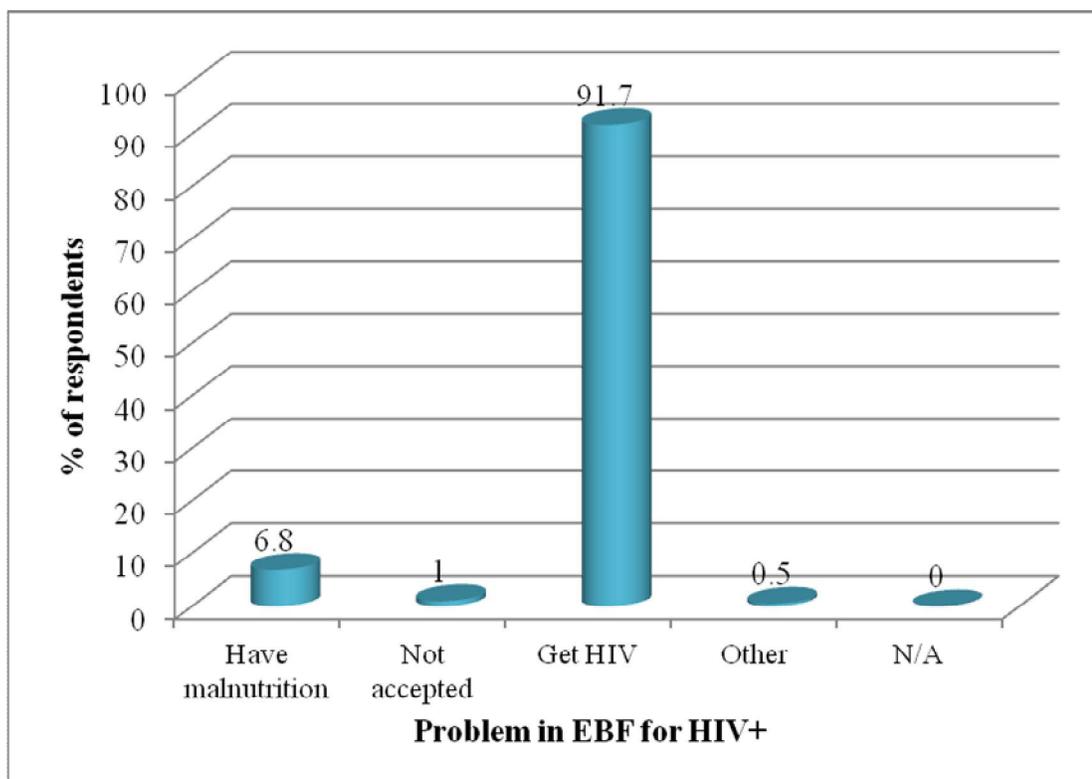


Figure 4.2: Perceived problem in exclusive breastfeeding for HIV positive mothers, MDH, Kenya

Overall assessment of knowledge score revealed that 45.6% (175) of the mothers were adequately knowledgeable of recommended feeding for infants born to HIV positive mothers (with minimum score of 50% or 4/7) constituted by 18.2% that scored >50-75% and 27.4% that scored >75-100%.

4.4 Attitude of postnatal mothers attending Mbagathi District Hospital towards infant feeding options

Table 4.3 presents assessment on attitude towards infant feeding options for HIV positive mothers. The majority of the participating mothers 89.3% (343) had a positive attitude towards the feeding options for HIV positive mothers. A similarly high proportion 80.7% (310) felt that infant feeding options for HIV positive mothers is a healthy arrangement, and were considered to have a positive attitude.

On perception of breastfeeding for HIV positive mothers, 43.8% (168) of the mothers thought it was good and acceptable while 55.2% (212) thought it was not acceptable. Over one-third of the mothers 38.5% (148) disagreed to the statement that HIV positive mothers should always give other foods and not breastfeed, and were deemed to have a positive attitude on this issue.

The majority 99.5% (382) agreed to the statement that HIV positive women need support in their choice of infant feeding option (IFO), and were considered to have a positive attitude on this aspect. The majority 93.7% (360) agreed to the statement that they would support HIV positive mother who have been advised not to breastfeed, and were deemed to be positive on the issue.

Table 4.3: Attitude of postnatal mothers attending Mbagathi District Hospital towards infant feeding options

Variables	N=384	%
Positive to current feeding option for HIV positive mothers		
Yes	343	89.3
No	41	10.7

Feelings on infant feeding options for HIV positive mothers		
It is against our culture	19	4.9
It is expensive	21	5.5
It is associated with HIV infection	31	8.1
It is Healthy	310	80.7
Other	1	0.3
Not known	2	0.5
Perception of Breastfeeding for HIV positive mothers		
Unacceptable	212	55.2
Good and acceptable	168	43.8
Not known	4	1.0
HIV positive mothers should always give other foods and not breastfeed		
Yes	236	61.5
No	148	38.5
HIV positive women need support in their choice of IFO		
Yes	382	99.5
No	2	0.5
Would support HIV positive mother who has been advised not to breastfeed		
Yes	360	93.7
No	23	6.0
Not known	1	0.3
Attitude summary		
<50% negative attitude	62	16.1%
>50% positive attitude	322	83.9%

In bold are correct responses used to assess the score of positive attitude

Overall assessment of attitude score revealed that 83.9% (322) of the mothers had a positive attitude (with a minimum score of 50% or 3/6) towards infant feeding options for HIV positive mothers.

4.5 Current feeding practices of postnatal mothers attending Mbagathi District Hospital on infant feeding options

Table 4.4 presents assessment on current practices among the participating mothers on infant feeding options. Close to two-thirds of the participating mothers 62.5% (240) had infants aged between one and six months. Fifty four percent (209) were practising exclusive breast feeding, with 40.6% (156) practising mixed feeding. Analysis of applied feeding option for age revealed that 85.9% were applying appropriate feeding option, as per the infant feeding recommendations.

The most commonly mentioned reasons why they applied the current feeding option included the option being healthy 53.1% (204) and having been advised at the hospital 41.7% (160). Majority 89.3% (343) indicated that their spouses were satisfied with the option they currently use and that 82.3% (316) were fully supportive of the option they chose to use. Further probing revealed that 93.7% of the mothers used EBF in the first six months of their infant’s life. Seventy eight percent (302) indicated the appropriate duration of EBF.

Table 4.4: Practice of postnatal mothers attending Mbagathi District Hospital on recommended infant feeding options

Variables	N=384	%
Age of the infants		
<1 month	22	5.7
1 - 3 months	125	32.6
>3 - 6 months	93	24.2
>6 months	144	37.5

Currently applied feeding option		
Exclusive breastfeeding	209	54.5
Commercial formula milk	5	1.3
Other foods	14	3.6
Breastfeeding + other foods	156	40.6
Currently applied feeding option		
Appropriate for the age	330	85.9
Inappropriate for the age	54	14.1
Why this option		
It is healthy	204	53.1
Was advised at the hospital	160	41.7
Can afford	15	3.9
Other	5	1.3
Spouse satisfied		
Yes	343	89.3
No	41	10.7
Spouse feelings		
Doesn't want	4	1.0
Not concerned	34	8.9
Likes it but not supportive	30	7.8
Supports it fully	316	82.3
Do/did exclusive breastfeed		
Yes	360	93.7
No	24	6.3
Duration of exclusive breastfeeding		
Appropriate for the age	302	78.6

Inappropriate for the age	82	21.4
Overall assessment on practice with regard to infant feeding		
100% Good practice	281	73.2
<100% Bad practice	103	26.8

In bold are correct responses used to assess the score of good practice

Overall assessment of practice score reveal that 73.2% (281) of the mothers had good practice with regards to infant feeding.

4.6 Factors associated with knowledge of recommended feeding for infants born to HIV positive mothers

4.6.1 Bivariable analysis

Relationship between knowledge of recommended feeding for infants born to HIV positive mothers and selected social demographic and economic characteristics was analyzed as presented in **Table 4.5**. Out of seven selected factors, five emerged to relate significantly with knowledge of recommended feeding for infants born to HIV positive mothers.

When compared to mothers aged less than 21 years, mothers aged 21-25years were 3.08 times likely to be adequately knowledgeable of the recommended feeding options for infants born to HIV positive mothers (OR=3.08; 95% CI: 1.19 – 7.99; p=0.020). The odds of similar knowledge for mothers aged 26-30 years and more than 30 years were 4.06 (95% CI: 1.56-10.56; p=0.004) and 4.23 (95% CI: 1.54 – 11.57; p=0.005) respectively.

Number of children per mother was compared to knowledge; those having two children were 2.18 times more likely to be adequately knowledgeable of recommended feeding for infants born to HIV positive mothers than mothers having one child (OR=2.18; 95% CI: 1.37-3.46, p=0.001). The odds of similar adequate knowledge for mothers with three children was 2.13 (95% CI: 1.13-4.03; p=0.019).

A similar trend was observed for number of births per mother. A high proportion of mothers who indicated that they delivered two times were 2.27 times more adequately knowledgeable of the recommended feeding for infants born to HIV positive mothers compared to those who ever delivered once (OR=2.27; 95% CI: 1.42 – 3.64; p=0.001). Similarly, mothers who ever delivered three times had adequate knowledge of the recommended feeding for infants born to HIV positive mothers (OR=2.06; 95% CI: 1.12 – 3.82; p=0.021).

Level of education attained was related to knowledge of recommended feeding for infants born to HIV positive mothers. The mothers who attained college education were adequately knowledgeable of the recommended feeding for infants born to HIV positive mothers compared to those who attained primary education, (OR=2.20; 95% CI: 1.30 – 3.75; p=0.004).

Occupation was related to knowledge of recommended feeding for infants born to HIV positive mothers. A significantly higher proportion of the mothers with formal employment were more adequately knowledgeable of the recommended feeding for infants born to HIV positive mothers compared to those who were housewife,(OR=2.16; 95% CI: 1.13 – 4.10; p=0.019).

Table 4.5: Factors associated with knowledge of infant feeding options for HIV positive mothers

Variables	Adequate knowledge (n=175)		Inadequate knowledge (n=209)		OR ^w	95% CI ϕ		p value *
	n	%	N	%		Low er	Upp er	
Age in years								
<21	6	20.0	24	80.0	Ref			
21 – 25	64	43.5	83	56.5	3.08	1.19	7.99	0.020
							10.5	
26 – 30	68	50.4	67	49.6	4.06	1.56	6	0.004
							11.5	
>30	37	51.4	35	48.6	4.23	1.54	7	0.005
Marital status								
Currently not married	29	50.0	29	50.0	1.23	0.70	2.16	0.463
Currently married	146	44.8	180	55.2	Ref			
Number of children								
One	69	36.5	120	63.5	Ref			
Two	69	55.6	55	44.4	2.18	1.37	3.46	0.001
Three	27	55.1	22	44.9	2.13	1.13	4.03	0.019
Four and above	10	45.5	12	54.5	1.45	0.60	3.53	0.414
Number of births								
One	60	35.1	111	64.9	Ref			
Two	70	55.1	57	44.9	2.27	1.42	3.64	0.001
Three	29	52.7	26	47.3	2.06	1.12	3.82	0.021
Four and above	16	51.6	15	48.4	1.97	0.91	4.27	0.084
Religion								
Christian	171	46.3	198	53.7	2.38	0.74	7.60	0.134
Non-Christians	4	26.7	11	73.3	Ref			
Level of education attained								

Primary	53	39.3	82	60.7	Ref				
Secondary	65	42.8	87	57.2	1.16	0.72	1.85	0.547	
College	57	58.8	40	41.2	2.20	1.30	3.75	0.004	
Occupation									
Housewife	75	43.9	96	56.1	Ref				
Small income generation activities	68	42.0	94	58.0	0.93	0.60	1.43	0.728	
Formal Employment	32	62.7	19	37.3	2.16	1.13	4.10	0.019	

* Significant at $p < 0.05$ bolded; ^ψ Odds ratio; ^φ 95% Confidence Interval

4.6.2 Multivariable analysis of Predictors of adequate knowledge of recommended feeding for infants born to HIV positive mothers

Multivariable analysis was performed in order to identify independent predictor(s) of adequate knowledge of recommended feeding for infants born to HIV positive mothers among the participating mothers. Five factors associated with adequate knowledge of recommended feeding for infants born to HIV positive mothers at $P < 0.05$ during bivariable analysis were considered for multivariable analysis. They include; (1) Age in years (2) Number of children per mother, (3) Number of births (deliveries) per mother, (4) Level of education attained, and (5) Occupation. Upon fitting the factors using Binary logistic regression and specifying ‘*backward conditional*’ method with removal at $P < 0.05$, the most parsimonious was as shown in **Table 4.6**.

Table 4.6: Predictors of adequate knowledge of infant feeding options for HIV positive mothers

Variables	AOR ^ψ	95% CI ^φ		p value*
		Lower	Upper	
Number of births				
One	Reference			
Two	2.46	1.52	4.00	<0.001
Three	2.61	1.38	4.94	0.003
Four and above	2.39	1.08	5.26	0.031
Level of education attained				
Primary	Reference			
Secondary	1.25	0.77	2.03	0.366
College	2.72	1.55	4.76	<0.001

* Significant at $p < 0.05$ bolded; ^ψ Adjusted odds ratio; ^φ 95% Confidence Interval

Adjusting for other factors and keeping them constant, having delivered twice was associated with adequate knowledge of recommended feeding for infants born to HIV positive mothers (AOR=2.46; 95% CI: 1.52 – 4.00; $p<0.001$). A mother with an experience of two deliveries was 2.46 times more likely to have adequate knowledge of recommended feeding for infants born to HIV positive mothers compared to a mother with an experience of one delivery. Having delivered thrice was associated with adequate knowledge of recommended feeding for infants born to HIV positive mothers (AOR=2.61; 95% CI: 1.38 – 4.94; $p=0.003$). A mother with an experience of three deliveries was 2.61 times more likely to be adequately knowledgeable of recommended feeding for infants born to HIV positive mothers compared to a mother with an experience of one delivery. Similarly, having delivered four or more times was associated with adequate knowledge of recommended feeding for infants born to HIV positive mothers (AOR=2.39; 95% CI: 1.08 – 5.26; $p=0.031$). A mother with an experience of four or more deliveries was 2.39 times more likely to be adequately knowledgeable of recommended feeding for infants born to HIV positive mothers compared to a mother with an experience of one delivery.

Attaining college level of education was associated with adequate knowledge of recommended feeding for infants born to HIV positive mothers (AOR=2.72; 95% CI: 1.55 – 4.76; $p<0.001$). A mother who attained college level of education was 2.72 times more likely to have adequate knowledge of recommended feeding for infants born to HIV positive mothers compared to a mother who attained primary level of education.

4.7 Factors associated with attitude towards recommended feeding options for infants born to HIV positive mothers

4.7.1 Bivariable analysis

Relationship between attitude towards recommended feeding for infants born to HIV positive mothers and selected social demographic and economic characteristics was analyzed as presented in **Table 4.7**. Out of seven selected factors, three emerged to relate significantly with attitude towards recommended feeding for infants born to HIV positive mothers.

Age of the mother was related to attitude towards recommended feeding for infants born to HIV positive mothers. When compared to mothers aged less than 21 years, mothers aged 26-30 years were 2.62 times more likely to have a positive attitude towards the recommended feeding options for infants born to HIV positive (OR=2.62; 95% CI: 1.04 – 6.56; p=0.040). The odds of similar positive attitude for mothers aged >30 years were 3.98 (95% CI: 1.32 – 12.00; p=0.014).

Religion affiliation was established to be significantly related to positive attitude towards the recommended feeding for infants born to HIV positive mothers. Postnatal mothers affiliated to Christian faith were 3.73 more likely to have a positive attitude towards the recommended feeding for infants born to HIV positive mothers compared to those who were Non Christians (OR=3.73; 95% CI: 1.28 – 10.88; p=0.021).

Level of education attained was compared to attitude towards the recommended feeding for infants born to HIV positive mothers. Those who attained secondary education were 2.09 more likely to have a positive attitude towards the recommended feeding for infants born to HIV positive mothers compared to those who attained primary education

(OR=2.09; 95% CI: 1.12 – 3.90; p=0.021). Similar, positive attitude for mothers with college attained education was 2.11 (95% CI: 1.02 – 4.36; p=0.043).

Table 4.7: Factors associated with attitude towards recommended feeding options for infants born to HIV positive mothers

Variables	Positive attitude (n=322)		Negative attitude (n=62)		OR ^ψ	95% CI ^φ		p value *	
	N	%	n	%		OR ^ψ	Low		Upp
							er		er
Age in years									
<21	21	70.0	9	30.0	Ref				
21 – 25	120	81.6	27	18.4	1.90	0.79	4.62	0.154	
26 – 30	116	85.9	19	14.1	2.62	1.04	6.56	0.040	
>30	65	90.3	7	9.7	3.98	1.32	0	0.014	
Marital status									
Currently not married	50	86.2	8	13.8	1.24	0.56	2.77	0.597	
Currently married	272	83.4	54	16.6	Ref				
Number of children									
One	153	81.0	36	19.0	Ref				
Two	107	86.3	17	13.7	1.48	0.79	2.77	0.220	
Three	42	85.7	7	14.3	1.41	0.59	3.40	0.442	
Four and above	20	90.9	2	9.1	2.35	0.53	3	0.263	
Number of births									
One	138	80.7	33	19.3	Ref				
Two	108	85.0	19	15.0	1.36	0.73	2.52	0.330	
Three	48	87.3	7	12.7	1.64	0.68	3.95	0.270	

Four and above	28	90.3	3	9.7	2.23	0.64	7.79	0.208
Religion								
							10.8	
Christian	313	84.8	56	15.2	3.73	1.28	8	0.021
Non Christians	9	60.0	6	40.0	Ref			
Level of education attained								
Primary	104	77.0	31	23.0	Ref			
Secondary	133	87.5	19	12.5	2.09	1.12	3.90	0.021
College	85	87.6	12	12.4	2.11	1.02	4.36	0.043
Occupation								
Housewife	135	78.9	36	21.1	Ref			
Small income generation activities	141	87.0	21	13.0	1.79	0.99	3.22	0.052
Formal Employment	46	90.2	5	9.8	2.45	0.91	6.63	0.077

* Significant at $p < 0.05$ bolded; ^ψ Odds ratio; ^φ 95% Confidence Interval

4.7.2 Multivariable analysis of predictors of positive attitude towards recommended feeding for infants born to HIV positive mothers

Multivariable analysis was performed in order to identify independent predictor(s) of positive attitude towards recommended feeding for infants born to HIV positive mothers among the participating mothers. Three factors associated with positive attitude towards recommended feeding for infants born to HIV positive mothers at $P < 0.05$ during bivariable analysis were considered for multivariable analysis. They include; (1) Age in years (2) Religion affiliation, and, (3) Level of education attained. Upon fitting the factors using binary logistic regression and specifying ‘*backward conditional*’ method with removal at $P < 0.05$, the most parsimonious was as shown in **Table 4.8**.

Table 4.8: Predictors of positive attitude towards infant feeding options for HIV positive mothers

Variables	AOR ^ψ	95% CI ^φ		p value [*]
		Lower	Upper	
Religion				
Christian	4.21	1.40	12.66	0.010
Non Christians	Reference			
Level of education attained				
Primary	Reference			
Secondary	2.26	1.19	4.28	0.013
College	2.09	1.01	4.35	0.047

*Significant at p<0.05 bolded; ^ψ Adjusted odds ratio; ^φ 95% Confidence Interval

Adjusting for other factors and keeping them constant, a mother affiliated to a Christian faith was associated with positive attitude towards recommended feeding for infants born to HIV positive mothers (AOR=4.21; 95% CI: 1.40 – 12.66; p=0.010). A mother affiliated to Christian faith was 4.21 times more likely to have positive attitude towards the recommended feeding for infants born to HIV positive mothers compared to a mother with Non Christian faith.

Positive attitude towards recommended feeding for infants born to HIV positive mothers was significantly associated with attaining secondary (AOR=2.26; 95% CI: 1.19 – 4.28; p=0.013) or college level of education (AOR=2.09; 95% CI: 1.01 – 4.35; p=0.047). A mother who attained secondary or college level of education was 2.26 times or 2.09 times respectively, more likely to have positive attitude towards the recommended

feeding for infants born to HIV positive mothers compared to a mother who attained primary level.

4.8 Factors associated with practice of postnatal mothers on the WHO recommended infant feeding options

4.8.1 Bivariable analysis

Relationship between practice with regard to infant feeding and selected social demographic and economic characteristics was analyzed as presented in **Table 4.9**. Out of seven selected factors, only one emerged to relate significantly with practice with regard to infant feeding.

Number of births per mother was established to be significantly related with good practice with regards to infant feeding. Postnatal mothers who indicated to have delivered twice were 0.52 times more likely to have good practice with regard to infant feeding compared to those who indicated to have delivered once, (OR=0.52; 95% CI: 0.31 – 0.88; p=0.015). A woman who indicated to have delivered thrice was 49% less likely to have good practice with regard to infant feeding compared to one who indicated to have delivered once. The same was observed for those indicating more deliveries.

Table 4.9: Factors associated with practice of postnatal mothers on the WHO recommended infant feeding options

Variables	Good practice (n=281)		Bad practice (n=103)		OR ^ψ	95% CI ^φ		p value *
	N	%	N	%		Lower	Upper	
Age in years								
<21	25	83.3	5	16.7	Ref			
21 – 25	110	74.8	37	25.2	0.59	0.21	1.67	0.322
26 – 30	96	71.1	39	28.9	0.49	0.18	1.38	0.177
>30	50	69.4	22	30.6	0.45	0.15	1.34	0.154
Marital status								
Currently not married	47	81.0	11	19.0	1.68	0.83	3.38	0.143
Currently married	234	71.8	92	28.2	Ref			
Number of children								
One	146	77.2	43	22.8	Ref			
Two	84	67.7	40	32.3	0.62	0.37	1.03	0.063
Three	34	69.4	15	30.6	0.67	0.33	1.34	0.255
Four and above	17	77.3	5	22.7	1.00	0.35	2.87	0.998
Number of								

births									
One	137	80.1	34	19.9	Ref				
Two	86	67.7	41	32.3	0.52	0.31	0.88	0.015	
Three	37	67.3	18	32.7	0.51	0.26	1.00	0.051	
Four and above	21	67.7	10	32.3	0.52	0.22	1.21	0.129	
Religion									
Christian	273	74.0	96	26.0	2.49	0.88	7.04	0.132	
Non Christians	8	53.3	7	46.7	Ref				
Level of education attained									
Primary	99	73.3	36	26.7	Ref				
Secondary	113	74.3	39	25.7	1.05	0.62	1.79	0.846	
College	69	71.1	28	28.9	0.90	0.50	1.60	0.712	
Occupation									
Housewife	123	71.9	48	28.1	Ref				
Business Formal Employment	122	75.3	40	24.7	1.19	0.73	1.94	0.485	
t	36	70.6	15	29.4	0.94	0.47	1.86	0.852	

*Significant at $p < 0.05$ bolded; ^ψ Odds ratio; ^φ 95% Confidence Interval

4.9 Summary of qualitative results

Qualitative information was collected through IDI in order to explore deeper and KII to provide more insights to the information that was collected in the questionnaires on the postnatal mother's knowledge, attitude and practice of IFO. Participants stated their knowledge of IFO which focused on their perception about the WHO recommended options for infants born to HIV positive mothers and the importance of practicing the WHO, RIFO. According to most of these mothers, their perception and practice about exclusive breastfeeding were shaped by health workers and spouse.

4.9.1 Knowledge of Infant feeding options available for HIV positive mothers

Postnatal mothers presented different views concerning the knowledge of infant feeding options available for HIV positive mothers, with reference to the UNICEF/WHO recommendations (NASCO, 2002). Many mothers responded that exclusive breast feeding was the ideal food for babies less than six months. This is evident through their responses provided below:

“A HIV positive mother is supposed to either Exclusively breastfeed for six months then introduce foods and stop breastfeeding or she can decide not to breastfeed but give formula milk such as NAN if she affords or not to breastfeed but give cow, goat, packet milk which is cheaper than NAN.”
(IDI, Female 28 years).

Another mother stated:

“What I know about the available infant feeding options for HIV positive mothers is that a mother can either (i) breastfeed exclusively for six months

and give no other foods or (ii) should not breastfeed at all and give formula milk e.g. NAN. This information I learnt from reading and listening from other people.” (IDI, Female 30 years).”

On the other hand, a mother expressed her view that as long as one was HIV positive breast milk was not an option instead other foods should be given to the infant.

She stated:

“According to what I know a HIV positive mother is not supposed to breastfeed her baby at all, she should just give these other feeds like cow’s milk because if she breastfeeds the baby will be HIV infected.” (IDI, Female 23 years).

Another mother expressed her view that even though breast milk is the recommended food for babies, other supplements should be added to breastfeeding.

“HIV infected mothers are supposed to give their baby breast milk exclusively for six months and not give them other foods or they can give NAN only or they are also allowed to give baby cow’s milk plus water or porridge.” (IDI, Female 22 years).

A healthworker who was the key informant cited lack of knowledge among the postnatal mothers since infant feeding options were further emphasized to the HIV positive mothers, she stated:

“Every morning we organize health talks for postnatal mothers at the clinic on different topics infant feeding in general and in HIV being one of the topics.

Also during immunization of the infants the information is enhanced but to the HIV positive mothers only.” (KI female 36years).

Another health worker responded:

“According to my daily encounter with postnatal mothers they are not really in the know; most of them have misconceptions that if one breastfeeds and she is HIV positive automatically the baby will be infected. The reason for this misconception is that this IFO campaign has not yet reached the grassroots so most postnatal mothers are not enlightened, the health workers also are not well informed.” (KI, Female 28 years).

4.9.2 Attitude towards WHO recommended Infant feeding options

Mothers perceived that IFO by WHO were good and healthy, they protect the infant but also felt the baby needed maximum protection from the HIV virus. They also said that breastfeeding promotes growth and development of baby, breast milk serves as a first immunization for the infant.

“Aaaam!! About the infant feeding options for HIV positive mothers I feel that they are very good because the infant will be secure and safe. I also feel that this baby born to HIV positive mother can miss out on the benefits of breast milk but not to get HIV infected, such a baby will lack essential nutrients but at least he is healthy and disease free.” (IDI, Female 35 years).

A mother who participated in this study gave her view that the options were stigmatizing, stating.

“The infant feeding options (IFOs), I like them and I think they are good, they greatly help infants of HIV positive mothers but if a mother chooses the no breast milk option it stigmatizes her when she decides she will not breastfeed because she is mostly suspected to be HIV positive.” (IDI, Female 33 years).

Another one responded that the duration of feeding was a challenge considering the risk of infection.

“I feel the IFO’s are good, they protect the infant from diseases, though it is quite challenging since a mother may wish to breastfeed her baby to two years but it poses a risk of infecting the baby. The HIV positive mother also faces challenge of getting enough food for herself as she exclusively breastfeeds.” (IDI, Female 26 years).

Even though most mother’s attitude was positive some had a negative attitude citing that the main option which was breastfeeding was tantamount to HIV infection to the infant.

‘I personally feel breastfeeding as an IFO for HIV positive is bad because the breast milk has virus therefore giving the baby a risk of HIV transmission. I would opt the mother use the other options and give other forms of milk eg cow, NAN but not to breastfeed.’ (IDI, Female 24 years).

Another responded:

“I feel the breastfeeding option is not good, in the event you leave your baby in another person’s care and you exclusively breastfeed, mixed feeding might occur and endanger the baby. It is better to protect the infant than expose him/her to

HIV i.e. sacrifice health and protect an infant's life from HIV, better the infant misses out on breast milk benefits but be protected from HIV disease.” (IDI, Female 28 years).

A health worker was asked about the reception/ reaction of postnatal mothers towards the WHO/RIFO. She responded:

“The postnatal mothers receive the RIFO positively whether they are HIV positive or HIV negative.” (KI, Male 33 years)

4.9.3 Current feeding option practiced in relation to the age of the infant

When asked how they were feeding their infants in relation to age of the infant and the WHO recommendations, majority had good practice. These were some of their responses:

“My baby is one and half months old and I exclusively breastfeed him which I intend to till when he is six months. The reason I chose this option is because with my first born I did not know, so I introduced food at two weeks and he got complications with the stomach so I want to exclusively breastfeed for six months this time round to avoid any complications.” (IDI, Female 35years).

Another mother stated:

“I breastfeed my baby exclusively she is three months old. I do that because she is so young and mother's milk is the best nutritionally and provides immunity. It is my desire to breastfeed her for six months exclusively since

according to my opinion it is the healthiest way to feed an infant unless there are other health issues involved.” (IDI, Female 27 years).

Some of the mothers who had infants above six months were feeding the infants well since they had introduced complimentary feeding as one mother stated:

“My baby is seven months and I give her other foods plus breastfeeding. I chose that option because my baby is growing, breast milk is best for her and she needs energy from other foods. Her health and well being is my priority. Was also told at clinic after six months infant is to be breastfed and given other foods.” (IDI, Female 37 years).

When mothers were asked about the reasons for the introduction of complementary food, a mother said:

“After six months, breast milk only couldn’t satisfy the child. Also, the nutrients the child needed were more than what is in breast milk.” (IDI, Female 28 years)

Likewise, a mother confirmed this statement by giving a more detailed explanation:

“My reason was after the exclusive breastfeeding for the six months I noticed that my child was growing and breast milk was not enough for her so the child needed an extra food or addition food and water or drink to make her satisfied.” (IDI, Female 25 years)

A working mothers' reasoning was:

“I stopped when I was unable to express enough breast milk down for the baby before going to work.” (IDI, Female 30 years)

A health workers response on what the mothers practice at home:

“Exclusive breast feeding is mostly applied but only 50% tell the truth what they practice at home. What I know is HIV positive mothers do more of EBF more than 90% practice it.” (KI, Male 33 years).

4.9.4 Influence on perception and practice

Spouse's attitude also influenced the practice of a mother as one mother responded:

“Our baby being one and half months old makes my husband be very strict on breastfeeding, in fact he preaches EBF for six months. I can say he is okay with my choice and he fully agrees to it.” (IDI, Female 24 years).

Another responded that only her spouse and the health workers advice is what she follows:

“The only people who influence on my one and half month baby's feeding are my husband and the doctor or health workers. We do not listen to other people only the health workers and spouse have an influence.”(IDI, Female 29 years).

CHAPTER FIVE

DISCUSSION

5.1 Knowledge of recommended Infant feeding options for HIV positive mothers

Knowledge and attitude about infant feeding options in HIV is the most important weapon in the fight against further spread of HIV virus through breastfeeding. Infant feeding options for HIV infected women have largely been governed by guidelines from WHO, the United Nations Children's Fund (UNICEF) and the Joint United Nations Programme on HIV/AIDS (WHO, UNICEF, UNAIDS, 2009). In Kenya these guidelines have been adopted to the Kenyan setting by the Ministry of health. The guidelines offer women a reasonable framework in which to make choices on infant feeding appropriate to their socio economic conditions.

The findings of this study showed that almost half of the postnatal mothers were knowledgeable of the infant feeding options for HIV positive mothers. It could be due to the fact that these infant feeding options are further emphasized only to the HIV positive mothers during immunization as mentioned by a health worker. This study contrasted with another done in Gurage zone, south Ethiopia where 84% of the respondents knew the recommended infant feeding options for HIV positive mothers (Belachew and Jira, 2007). A similar study by Wachira in western Kenya found that there was lack of knowledge about the range of infant feeding options, limiting their choices and hence preferences (Wachira *et al.*, 2009).

Above half of the respondents mentioned hospital and mass media as their source of information on the infant feeding options. This could be attributed to the study having been done in an urban set up and respondents being well versed with the infant feeding

options. Being in the urban dwelling they have access to the health care facilities where health education is received and there are various educative materials on the hospitals notice boards that provide information on HIV and infant feeding. They also have access to media where promotion of health education is done through radio and television. This agreed with a study done by Belachew whereby respondents from the urban areas were 1.82 (1.12-2.96) more knowledgeable of the IFO due to accessibility to information via mass media and other sources of information. Our study also agreed with in Nigeria study where majority of the respondents 94% said the source of their information on IFO was hospital (Belachew *et al*, 2007; Mohammed *et al*, 2010).

When asked about the main infant feeding option for HIV positive mothers less than half the mothers mentioned EBF for six months. This was a poor understanding of the RIFO for HIV positive mothers and a need for public health intervention to increase their knowledge. The findings of this study may be explained by the fact that there is a gap in the education given to the postnatal mothers regardless of their HIV status about infant feeding options for HIV positive mothers. During the interviews some of the mothers gave responses related to infant feeding options for the HIV negative mothers or mothers of unknown status. Poor knowledge on EBF as the main infant feeding option could be explained by the fact that the health workers do not fully emphasize on EBF for all the infants below six months. This was inconsistent with a study from Uganda where 63% reported EBF for six months. Another study from south Ethiopia 16% mentioned EBF as an option for feeding infants below six months born to HIV positive mothers (Byamugisha *et al.*, 2010; Belachew *et al.*, 2007).

Twenty percent of respondents mentioned that replacement home milk as a main infant feeding option. Although this contrasted with a study done in western Kenya by Wachira whereby majority of the respondents reported that they would alternatively prefer cow's

milk to any of the recommended options perceiving it to be acceptable, available and affordable (Wachira *et al.*, 2009). In our study findings this is still a high number especially since WHO no longer recommends home modified animal milk as a placement feeding option to be used for the first months of life. Home modified animal milk does not provide all the nutrients an infant needs (WHO, 2006). Therefore, it is important for health workers to give quality education and counseling to mothers since they mostly influence the mother's knowledge on infant feeding options.

When asked what else could be given to infants born to HIV positive mothers other than breast milk at zero to six months, only almost a quarter of the mothers indicated medicine. This clearly shows the mothers did not know that only medicine can be given to an infant born to HIV positive mother apart from breast milk and further shows that they still have not grasped the whole notion about importance of EBF. This could have further implications (repercussion) should these postnatal mothers who mentioned water, cows milk and porridge or their relatives find themselves in such a situation. Findings from a study done in Kumasi, Ghana, 38% of mothers first introduced water to their infants soon after birth and within one month of their lives citing reasons that it cleanses the infants gut and help babies gums to be cleansed from sugary breast milk (Singh, 2010).

About half of the mothers knew the total EBF period for HIV positive. The time of introduction of complimentary foods to infants born to HIV positive mothers, slightly above half of the mothers gave an answer of six months. This could be explained that the mothers get insufficient information or the information is given hastily hence unable to interject with questions where they do not understand. Over half of the mothers perceived a problem if a HIV positive mother exclusively breastfeeds her infant. Thirty four percent of them further gave reason that if HIV positive mother exclusively

breastfeeds then the infant might get the HIV virus. This was similar to the findings of a study done in Botswana where 56.3% of respondents believed that an infant of HIV infected mother could become infected with HIV when breastfed (Ndubuka 2013).

The overall knowledge score among the postnatal mothers was 45.6% (175). The maximum attainable score was seven which implied a percentage score of 100%. The criterion to this study was to take correct replies to a percentage score of 50% or 4/7 and above of the questions asked as adequate knowledge. This score (45.6%) was expected since the respondents were all postnatal mothers irrespective of their HIV status. It could be concluded that postnatal mothers who are HIV negative and those who do not know their status might ignore the infant feeding options education thinking that it does not concern them not realizing that every mother is at risk of HIV.

Age of the mother was significantly associated with the postnatal mothers' knowledge of HIV infant feeding options. The older the postnatal mothers the more likely they were to be knowledgeable. This can be explained that these older mothers were more attuned than the younger mothers through the health education given at the clinic and mass media. They were likely to pay more attention and embrace the health education than the younger mothers. This finding indicates the importance of empowering mothers and the need of targeting the young mothers for interventions and education. This was contrary to the findings of a study done in south Ethiopia that found that age advancement was not associated with knowledge of infant feeding options for HIV positive mothers (Belachew et al 2007).

Another socio demographic variable that showed significant association with knowledge of infant feeding options for HIV positive was the number of children a mother had. Mothers having either two or more children were more likely to know of the IFOs. This could therefore be postulated that a mother with more than one child is eager to be

conversant with health issues that affect infants thus taking keen interest on education given at the hospital thereby becoming more knowledgeable of infant feeding options in HIV cases. It could also be that these mothers with more children have heard this information many times and are also independent of their families in seeking information. Byamugisha et al, (2010) established that those with three or more pregnancies were three times likely to have good knowledge about EBF as an infant feeding option

Knowledge of RIFO was highest amongst older mothers and those of higher parity. It is probable that mothers acquire experience and confidence in good child care practices with time. This is supported by the fact that older women probably were more knowledgeable of RIFO and have more realistic outcome expectations.

The level of education attained by the mothers also was significantly associated with knowledge of RIFO for HIV positive mothers. Education among the primary and secondary level could have affected understanding of instruction and acquisition of knowledge on infant feeding. Postnatal mothers who had attained college education were 2.2 times more likely to know the RIFO for HIV positive mothers. This could be due to the fact that the educated have better access to health information; education helps the mothers understand health communication messages. Moreover such mothers have better chances to come across considerable knowledge about RIFO for HIV in the media and to be able to read and understand on their own. This differed from the findings of a study conducted in south Ethiopia where educational status was not associated or rather significant with knowledge of RIFO (Belachew *et al*, 2007). Contrary it was supported by Byamugisha in Uganda that found having completed secondary school or higher level was 2.5 times more likely to be associated with knowledge of RIFO especially knowledge of EBF.

Occupation was another socio-demographic variable that was significantly associated with knowledge of RIFO. A significantly higher proportion of postnatal mothers with formal employment were 2.1 times more likely to know the RIFO than housewives. This finding contradicted with a study done by Belachew in Ethiopia that found no significant association between occupation and knowledge of RIFO.

Multivariable logistic regression was computed after adjusting for the identified independent variables. Number of births was retained as a predictor of knowledge of RIFO whereby having delivered twice and more was a predictor of adequate knowledge. This could be due to the fact that having delivered more than once routinely exposed the mother to the health education given at the clinic on RIFO thereby making mother be knowledgeable. College level of education was also a predictor of adequate knowledge of RIFO. Byamugisha from Uganda in his study found out that predictors for knowledge of EBF as one of the measures for prevention of mother to child transmission of HIV, having three or more pregnancies (OR=2.5, CI: 1.4-4.5) and having completed secondary school (OR: 2.5, CI:1.3-4.9) (Byamugisha *et al.*, 2010). Our study therefore agrees to a large extent with the finding of Byamugisha (2010).

Findings of our study showed that marital status and religion were not significantly associated with knowledge of infant feeding options. This finding is in consonance with what was observed in a study in Ethiopia that found no association between marital status and knowledge of recommended infant feeding options (Belachew *et al.*, 2007).

5.2 Attitude towards recommended infant feeding options for HIV positive mothers

The postnatal mother's assessment on attitude towards RIFO for HIV positive mothers was favorable though a few did not like this HIV prevention RIFO. This is similar to a study done in Ethiopia in which 81.6 % of HIV positive mothers had favorable attitude towards feeding options (Girma *et al.*, 2014). In our study when asked what they felt about the feeding options majority said that the options were healthy and some felt that the options were associated with HIV infection. This can be attributed to the fact that these mothers knew and had seen the benefits of the IFO recommended by WHO. However some of the mothers could have come up to say they are healthy just because it is what WHO has recommended and they would want to give the most appropriate answer.

In as much as these postnatal mothers liked the WHO RIFO, a small number of all postnatal mothers had fear that the options were associated with HIV infection and choosing not to breastfeed stigmatized the mother.

Half of the postnatal mothers perceived that breastfeeding for HIV positive mothers was unacceptable. Sixty one percent were of the opinion that a HIV positive mother should not breastfeed her infant but she should always give other foods to her infant. This finding was similar one in a study in Uganda in which HIV infected and HIV uninfected mothers were classified as adherent and non adherent to Ugandan feeding guidelines. The findings were that 83.1% of adherent and 71.2% of non adherent were of the opinion that HIV infected mothers should never breastfeed (Babirye 2009). This could be due to the fact that these mothers feel that if a woman is HIV positive and breastfeeds she exposes the infant to danger of HIV and could infect the infant so she should rather not breastfeed at all.

Almost all the postnatal mothers were of the opinion that HIV positive women need support in their choice of infant feeding option. Majority of the mothers agreed that they would support a HIV positive mother who has been advised not to breastfeed. These mothers cited survival and protection of the infant against infections as reasons for supporting the HIV positive mothers. This is suggestive of postnatal mothers' concern for the wellbeing and survival of infants born to HIV positive mothers.

The overall assessment of attitude score of the respondents 83.9% (322) showed that these postnatal mothers had a positive attitude to RIFO for HIV positive mothers. The highest attainable score was six which implied a percentage score of 100%. The criterion to this study was to take correct replies to 50% or 3/6 and above of questions asked as appropriate attitude.

In assessing attitude of the postnatal mothers three socio-demographic variables emerged to associate with attitude towards the RIFO. Age of the mother was significantly associated with positive attitude towards RIFO. Postnatal mothers of 26 years and above had positive attitude compared to the younger mothers less than 25 years with those aged above 30 years being 3.98 times more likely to have positive attitude towards the RIFO. This could be explained by the fact that the older mothers are more mature and tend to take health issues more seriously than their younger counterparts. Religion was significantly associated with positive attitude towards the RIFO for infants born to HIV positive mothers. Mothers affiliated to the Christian religion were 3.73 times more likely to have a positive attitude towards RIFO than the non Christian mothers. In addition the level of education attained by the mother was related to attitude towards RIFO, mothers who had attained secondary education and college education having positive attitude towards the RIFO.

The findings of this study show that postnatal mothers of age 26-30 years, above 30 years and mothers who had completed above secondary education had a positive attitude towards RIFO than the younger, less educated mothers. The UNGASS country progress report on Kenya shows that in 2008/09 HIV prevalence among women was twice as high as that for men at 8% and 4.3% respectively. This disparity being even greater in younger women aged 15-24 who are four times more likely to become infected with HIV than men of the same age (WHO, 2010). Thus findings of this study indicate the importance of empowering mothers using education and the need of targeting the young mothers for interventions that promote appropriate or safe infant feeding practices and prevention of MTCT.

Multivariable analysis showed that the predictors of positive attitude towards RIFO for infants born to HIV positive mothers were religion and level of education. Being a Christian was associated with positive attitude towards RIFO (AOR=4.21; 95% CI: 1.40-12.66; p=0.010).

The level of education of the postnatal mother was also significantly associated with a positive attitude. Those having secondary attained education were 2.26 times more likely to have a positive attitude when compared with college attained education being 2.09 more likely to have a positive attitude.

5.3 Feeding practices among the postnatal mothers on RIFO

Based on the RIFO laid down by WHO, infants are to be exclusively breastfed from birth to six months, then complimented with other foods as they continue with breast milk for two years. Of all the respondents interviewed, more than half had infants below six months. Fifty four percent of the mothers interviewed practiced EBF and slightly less than half practiced mixed feeding. More than half of the mothers were practicing EBF

and this could be attributed to the fact that majority of the postnatal mothers were housewives and therefore had enough time to practice EBF.

The study showed that most of the postnatal mothers applied the appropriate feeding option for the age of the infant. Fourteen percent inappropriately fed their infants in relation to age by mix feeding the infants. This was probably because mixed feeding is a culturally acceptable form of infant feeding among many African communities. In citing reasons for the choice of feeding option, half the mothers indicated that it was healthy others were following advice given at the hospital. These women might have been more empowered and used primary health care facilities well, thereby receiving most of the preventive health messages provided at the postnatal care unit.

When asked if their spouses were satisfied with their current feeding option, a large number affirmed and were fully supported by their spouses on the IFO they had chosen. This meant that infant feeding decisions and practice by these women were more likely to be influenced by male partners for the married participants.

This study also revealed that majority of the mothers practiced EBF in the first six months indicating the appropriate duration of EBF. It could be attributed to the fact that majority of the postnatal mothers were housewives and business women therefore had enough time to practice EBF for longer periods. This highly contrasted with findings in Bangladesh where only 10.7% practiced EBF at six months which was a decrease from 78.3% at one month (Saha *et al.*, 2008). It further contrasted a study in Norway where the proportion of exclusively breastfed infants was more than 90% at one week and decreased to 10% at six months of age (Kristiansen *et al.*, 2010).

The overall assessment of practice among the postnatal mothers revealed that 73.2% (281) of the postnatal mothers had good practice with regards to RIFO. Respondents

were considered to have good practice if they had appropriate response for the age in question. This was for both currently applied feeding option and duration of EBF otherwise they were considered to have bad practice.

In the bivariable analysis the only variable out of seven socio-demographic factors that revealed association with current practice with regard to infant feeding was the number of births per mother. Postnatal mothers who indicated to have delivered twice had good practice with regard to infant feeding compared to those who had delivered once (OR=0.52; 95% CI: 0.31-0.88; p=0.015).

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

1. This study revealed that there is a gap in terms of knowledge of infant feeding options in HIV by postnatal mothers. The older mothers had high knowledge of IFO in HIV than their younger counterparts. Knowledge of EBF as the main recommended option in HIV by WHO was poor. There was also lack of knowledge that medicine was the only product other than breast milk that can be given to infants during EBF. The results showed a positive correlation between maternal parity, maternal education and knowledge. Health advocates and health workers were identified as the main agents of information dissemination. However there's is need to sensitize communities to be knowledgeable and adhere to infant feeding guidelines in both HIV negative and HIV positive situations.
2. Findings of this study demonstrated that the postnatal mothers had positive attitude towards RIFO, greatly showing acceptance of WHO efforts in combating mother to child transmission of HIV. A small proportion of mothers were in view that HIV positive mothers should not give infants other foods but only breastfeed. This shows good trend and efforts towards embracing EBF fully. Religion and level of education attained by the mother had an influence on their attitude towards RIFO for infants born to HIV positive mothers.
3. Practice of the postnatal mothers, a high percentage was found to be giving appropriate food for the age of the infant in line with the WHO infant feeding guidelines. An equally high proportion had exclusively breastfed their infants adhering to WHO six months exclusive breastfeeding for infants. Very few mothers utilized commercial infant formula milk. A high number of mothers had followed

advice given at the hospital on how they should feed their infants in relation to the infant's age. The number of births a mother had was positively correlated with practice.

6.2 Recommendation

From the findings of this study, the following recommendations should be undertaken by government and interested stakeholders in line with knowledge, attitude and practice of feeding options of postnatal mothers on WHO prescribed infant feeding options.

1. Both the HIV positive and HIV negative mothers at the hospitals/clinics should be educated on RIFO with emphasis on EBF. This can be done by creating avenues for programs countrywide and through media messages campaigns.
2. The younger mothers need education and encouragement to understand and embrace RIFO whether they are HIV positive or HIV negative.
3. There should be frequent trainings given to all health workers to ensure that all health facilities relay the same information to antenatals, postnatals and all members of the society.
4. Further research needs to be carried out to generate more current information on the postnatal mothers' knowledge, attitude and practice on RIFO by WHO.
5. There is also need for research into health care workers knowledge, attitude and practices with regard to RIFO by WHO as the health workers are key in influencing the mothers positively towards RIFO. The aim is to identify their gaps regarding these issues to allow knowledge creation among health workers.

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APPENDICES

Appendix I: Informed consent to participate in research

Title of the study: Knowledge, Attitude and Practices of postnatal mothers attending Mbagathi District Hospital on Infant Feeding Options for HIV positive mothers

RESEARCHERS' STATEMENT

The following information is provided to assist you in this study. We wish you will accept to be interviewed through your careful decision. This form will give you information you need so you can make a decision. We will give you time to consider if you want to be in the study.

Please read the form well, ask questions about the study, the risks and benefits as a participant. When we have answered all your questions it is your right to participate or not.

PURPOSE OF THE STUDY

The purpose of this study is to collect information about knowledge, attitude and practice of postnatal mothers regarding infant feeding options for the HIV positive mothers. This information will be collected from all postnatal mothers regardless of their HIV status.

STUDY PROCEDURES

In this study, we hope to recruit 384 postnatal mothers. If you agree to participate in this study you will be required to give consent. We will talk to you after you have been seen by the nurse, inform you the type of questions you will be asked and the risks and benefits of the study. The interview will last about half an hour in a private place at the clinic and you will be required to give answers to the questions that will be asked by our team members. We will ask what you know and what you think about infant feeding options for HIV positive mothers and the current feeding options. We will ask about your belief, attitude and what you know regarding infant feeding options for HIV positive mothers.

RISKS

There are no foreseen risks associated with this study. All information you will give us in the interview will be kept confidential within our research team. All this data will be put in locked cabinets.

BENEFITS

It will generate information which will be useful to the society in general and other health stakeholders and you will be part of the people that will contribute important information on HIV infant feeding options.

ALTERNATIVES TO PARTICIPATION

1. You are not forced to participate in the study, it is voluntary.
2. Withdrawal from this study is allowed at any time though your participation will highly be appreciated.
3. You are free to ask any questions that are of concern to you as regards this study.

PRIVACY AND CONFIDENTIALITY

Your name will not be used on any of the reports from the study. You and other participants will be given different identification numbers and the information relating to you will be strictly confidential, available only to the study team

VOLUNTARY

Your participation in this study is entirely voluntary. You may withdraw at any point you want.

CONTACT INFORMATION

If you have any question regarding the study please feel free to contact the principal investigator.

SUBJECT STATEMENT

This study described above has been explained to me and therefore I volunteer to take part in it. I have had a chance to ask questions but if I have future questions about the research, I can ask the investigators. If I have questions about my rights as respondent, I

Appendix II: Translation of Informed Consent in Swahili Language

Ufahamu, Fikra Na Desturi Ya Akina Mama Ambao Wamejifungua Na Huudhuria Hospitali Ya Wilaya Ya Mbagathi Kuhusu Njia Zakuwalisha Watoto Wachanga Kwa Akina Mama Walio Na Vvu

TAARIFA YA MTAFITI

Habari yako? Jina langu ni JACQUELINE AMOLO. Mimi ni mwanafunzi kutoka Idara ya Utafiti wa Madawa na Magonjwa ya Kuambukiza katika Chuo Kikuu cha Jomo Kenyatta cha Kilimo na Teknolojia. Nafanya utafiti juu ya Ufahamu, Fikra na Desturi ya akina mama ambao wamejifungua na huudhuria Hospitali ya wilaya ya Mbagathi kuhusu njia za kuwalisha watoto wachanga kwa akina mama walio na VVU (Virusi vya Ukimwi).

Maelezo yafuatayo yametolewa ili kukusaidia katika utafiti huu. Tungependa kupitia uamuzi wako wa makini ukubali kuhojiwa. Fomu hii itakupa habari unayohitaji kukuwezesha kufanya maamuzi. Sisi tutakupatia muda wa kufikiria kama unataka kuwa katika utafiti huu au la. Tafadhali soma fomu vizuri, waweza kuuliza maswali juu ya utafiti huu, pia hatari na faida kama mshiriki. Wakati tutakapojibu maswali yako yote ni haki yako kushiriki au la.

KUSUDI YA UTAFITI

Madhumuni ya utafiti huu ni kukusanya habari kuhusu ufahamu, fikra na desturi za akina mama kuhusu njia za kuwalisha watoto wachanga kwa ajili ya akina mama walio

na VVU. Habari hii itakusanywa kutoka kwa kina mama wote waliojifungua, bila ya kujali hali yao ya VVU.

UTARATIBU WA UTAFITI

Katika utafiti huu, tuna matumaini ya kusajili idadi ya wamama 384 waliojifungua. Ukikubali kushiriki katika utafiti huu utahitajika kutoa kibali. Baada ya wewe kuhudumiwa na muuguzi, sisi tutazungumza na wewe kuhusu aina ya maswali utakayoulizwa, athari na faida ya utafiti. Mahojiano yatachukuwa kama nusu saa hivi katika nafasi binafsi kwenye kliniki na utahitajika kujibu maswali ambayo yataulizwa na wanachama wa timu yetu.

Tutakuuliza unachojua kuhusu njia za kulisha watoto wachanga wa kina mama walio na VVU na dhana zako kuhusu hizi njia ambazo zimebuniwa na WHO na njia ipi unayotumia kumlisha mtoto wako kwa wakati huu. Tutakuuliza juu ya maoni yako, fikra, tabia na yale jamii watadhani ikiwa mama atakosa kunyonyesha mtoto wake.

HATARI

Hakuna hatari yoyote iliyotabiriwa inayohusiana na utafiti huu. Habari zote utakazotoa katika mahojiano yatawekwa siri kwenye utafiti wa timu yetu. Makala haya yote yatawekwa katika makabati iliyofungwa.

FAIDA YA UTAFITI

Utafiti huu utatoa taarifa ambayo itakuwa na manufaa kwa jamii kwa ujumla na washika dau wa afya.

NJIA MBADALA YA USHIRIKI

1. Wewe hulazimishwikushiriki katika utafiti huu, ni kwa hiari yako.
2. Kutoka katika utafiti huu unaruhusiwa wakati wowote ingawa ushiriki wako utadhaminiwa.
3. Uko huru kuuliza maswali yoyote ambayo ni ya wasiwasi kwako kuhusu utafiti huu.

USIRI WA UTAFITI

Jina lako halitatumika katika ripoti yoyote ya utafiti huu. Wewe na washiriki wengine mtapewa namba tofauti za utambulisho na habari zinazohusiana na wewe zitakuwa za siri, zitapatikana tu kwa timu ya utafiti.

HIARI

Ushiriki wako katika utafiti ni huu ni wa hiari kabisa. Waweza kujitoa katika utafiti huu wakati wowote.

UTAMBULISHO WA WAKAGUZI

Kama una maswali yoyote kuhusu utafiti, tafadhali jisikie huru kuwasiliana na mchunguzi mkuu.

TAARIFA YA MSHIRIKI.

Nimeelezwa kuhusu utafiti huu ninajitolea kushiriki. Nimekuwa na nafasi ya kuuliza maswali lakini nikiwa na maswali baadaye kuhusu utafiti, nitamuuliza mchunguzi mkuu. Kama nina maswali kuhusu haki yangu kama mshiriki, ninaweza kuwasiliana na

mwenyekiti wa kamati ya uchunguzi maadili ya marekebisho ya matumizi ya binadamu,
KEMRI kutumia anwani ifwatayo;

Mwenyekiti/Katibu NERC

Sanduku la Posta 54840-00200 Nairobi

Nambari ya Simu: 254 (020) 2722541, 2713349

Simu ya kibinafsi: 0722-205901, 0733-400003

Barua pepe:director@kemri.org; infokemri.org.

.....

Mshiriki

.

.....

Jina la mtafiti

.....

Sahihi

.....

Sahihi

Tarehe.....

Appendix III: Semi-structured questionnaire for postnatal mother

KNOWLEDGE, ATTITUDE AND PRACTICES OF POSTNATAL MOTHERS
ATTENDING MBAGATHI DISTRICT HOSPITAL ON INFANT FEEDING
OPTIONS FOR HIV POSITIVE MOTHERS.

InterviewerQuestionnaire Serial No.....

Date of interview..... Age of infant.....

SOCIO-DEMOGRAPHIC INFORMATION

How old are you (completed years of age).....

What is your religion?

1=Christian

2= Muslim

3= Traditional

1. What is your marital status?

1=Single

2=Married

3=Separated

2. What is your highest level of education?

1= None

2=Primary

3=Secondary

4=College

3. What is your main occupation?

1=Housewife

2=Casual worker

3=Formal employment

4=Business

5=farmer

6=other specify.....

4. How many births have you had?

1=one

2=two

3=three

4=four and above

5. How many children do you have?

1=one

2=two

3=three

4=four and above

KNOWLEDGE ON INFANT FEEDING OPTIONS

6. Do you know the feeding options recommended for infants born to HIV positive mothers?

1=Yes

2=No

3=Not really / not sure

7. If yes, state the source of your information?

1= Hospital/health worker

2=Mass media

3=Support group

4=Friends

5=Others specify.....

88=Don't know

8. If yes, what is the **main** infant feeding option to HIV positive mothers?

1=Replacement feeding with commercial infant formula

2= Replacement feeding with home milk (cow, goat, camel)

3=Exclusive breastfeeding for 6 months

88=Don't know

9. What can be given to infants born to HIV positive mothers other than breast milk, at 0-6 months?

1=water

2=cow's milk

3=medicine

4=porridge

88= Don't know

10. What should be the total exclusive breastfeeding period for HIV positive mothers?

1=3months

2=6 months

3= 2 years

88= Don't know

11. When should complimentary foods be introduced to an infant born to HIV positive mother?

1=after 3 months

2=after 6 months

3=after 1 year

4=after 2years

88= Don't know

12. Is there any problem if HIV positive mother exclusively breastfeeds her infant?

1=Yes

2=No

3= Don't know

13. If yes, what is the problem?

1=Infant will have malnutrition

2=It is not accepted

3=Infant might get HIV virus

4=others specify

88= Don't know

14. Will breastfeeding of HIV positive mother always result in HIV transmission to the infant?

1=Yes

2=No

3=Possibility

ATTITUDE ON INFANT FEEDING OPTIONS

15. Do you like current feeding options for HIV positive mothers?

1=Yes

2=No

16. What do you feel about infant feeding options for HIV positive mothers?

1=It is against our culture

2= It is expensive

3=It is associated with HIV infection

4=It is healthy

5=Others specify.....

88=participant doesn't answer

17. How do you perceive breastfeeding for HIV positive mothers?

1=Unacceptable

2=Good and acceptable

88=Don't know

18. Do you think HIV positive mothers should always give other foods and not breastfeed?

1=Yes

2=No

19. Do you think HIV positive women need support in their choice of IFO?

1=Yes

2=No

20. Would you support a HIV positive mother who has been advised not to breastfeed?

1=Yes

2=No

3=Don't know

21. Give reasons.....

CURRENT PRACTICES ON THE INFANT FEEDING OPTIONS

22. How old is your infant?

23. Which option are you currently applying to feed your infant?

- 1=Exclusive breastfeeding
- 2=commercial formula milk
- 3=other foods
- 4=Breastfeeding+ other foods

24. What made you choose this option?

- 1=It is healthy
- 2= was told at the hospital
- 3=I can afford
- 4=others specify.....

25. Is your spouse satisfied with your feeding option?

- 1=Yes
- 2=No

26. What does your spouse feel about your choice?

- 1=He doesn't want
- 2=He is not concerned
- 3=Likes it but isn't supportive
- 4=supports it fully

27. Do/did you exclusively breastfeed your infants?

1=Yes

2=No

28. If yes what is the duration?

1=4 months

2=2years

3=6 months

4=one year

88=Dont know

Thank you very much for you assistance and co-operation.

Appendix IV: Key informant guide for postnatal mothers

**KNOWLEDGE, ATTITUDE AND PRACTICES OF POSTNATAL MOTHERS
ATTENDING MBAGATHI DISTRICT HOSPITAL ON INFANT FEEDING
OPTIONS FOR HIV POSITIVE MOTHERS.**

Interviewer Date of interview.....

Age of infant..... Questionnaire Serial No.....

1. State the Infant feeding options available to HIV positive mothers? (probe)
2. What do you feel about Infant feeding options for HIV positive mothers?
(probe)
3. Which option are you feeding your infant on? (probe further)
4. Why? (Probe)
5. What is the attitude of your spouse towards your choice of infant feeding
option? (probe)
6. Who influences infant feeding at home? self/ spouse/ in-laws/friends?(probe)
7. How does your spouse support you in infant feeding? (probe)

We have come to the end of the interview, thank you for your cooperation. Good day.

Appendix V: Key informant guide for healthcare providers

Knowledge, attitude and practices of postnatal mothers attending mbagathi district hospital on infant feeding options for hiv positive mothers.

InterviewerDate of interview.....

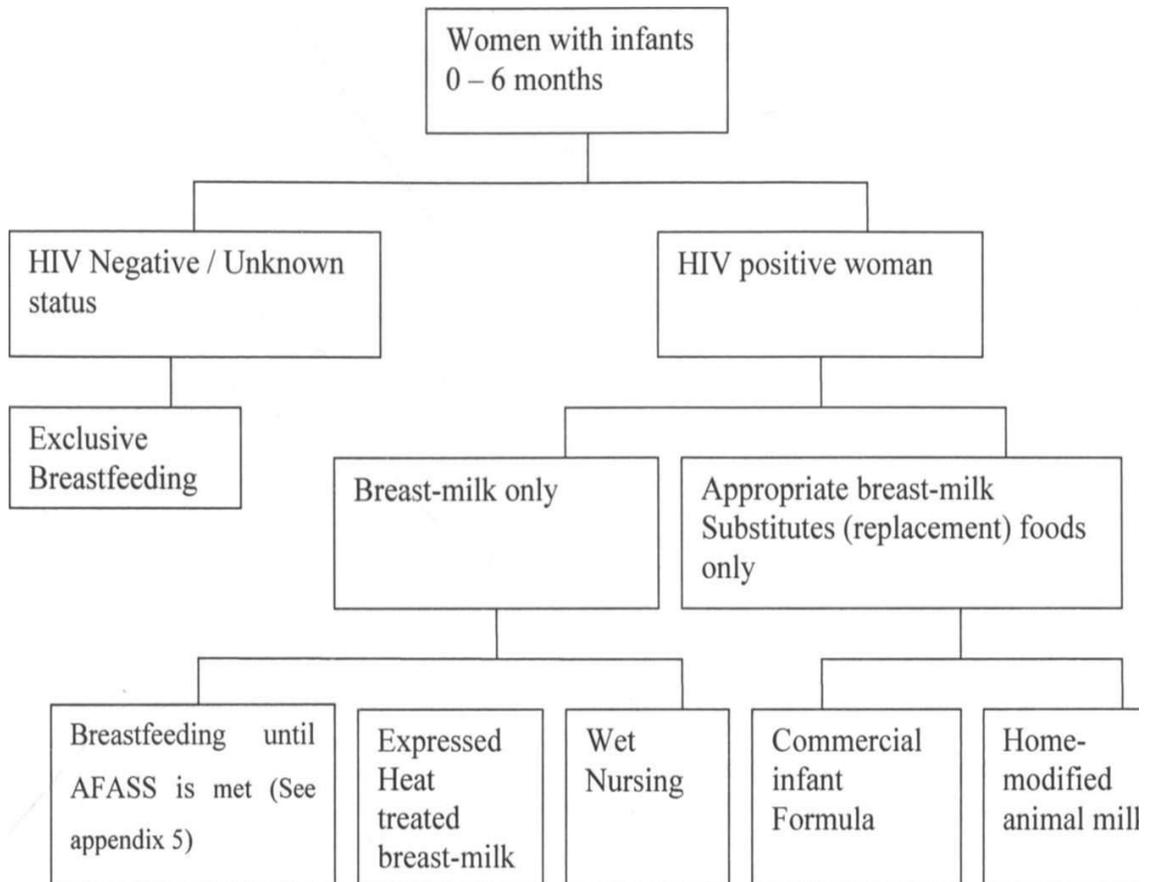
Occupation..... Questionnaire Serial No.....

1. What are the infant feeding options available for HIV positive mothers?(probe)
 - How do you communicate to the mothers on available Infant feeding options?
 - How do these postnatal mothers receive or react to IFO?
 - What are the most common feeding options applied by the mothers? Why?
2. Do you think postnatal mothers know the IFO for HIV positive mothers?(probe)
 - If no why? (Give the main reasons)
 - What efforts do you put in to enhance knowledge of postnatal mothers on IFO?
3. What is the attitude of these postnatal mothers towards IFO for HIV positive mothers?
 - What is the attitude of health workers towards IFO?
 - What is the attitude of the spouses on RIFO?

4. In as much as you advice these mothers on RIFO what is the actual situation in practicing the advice given by the health workers?

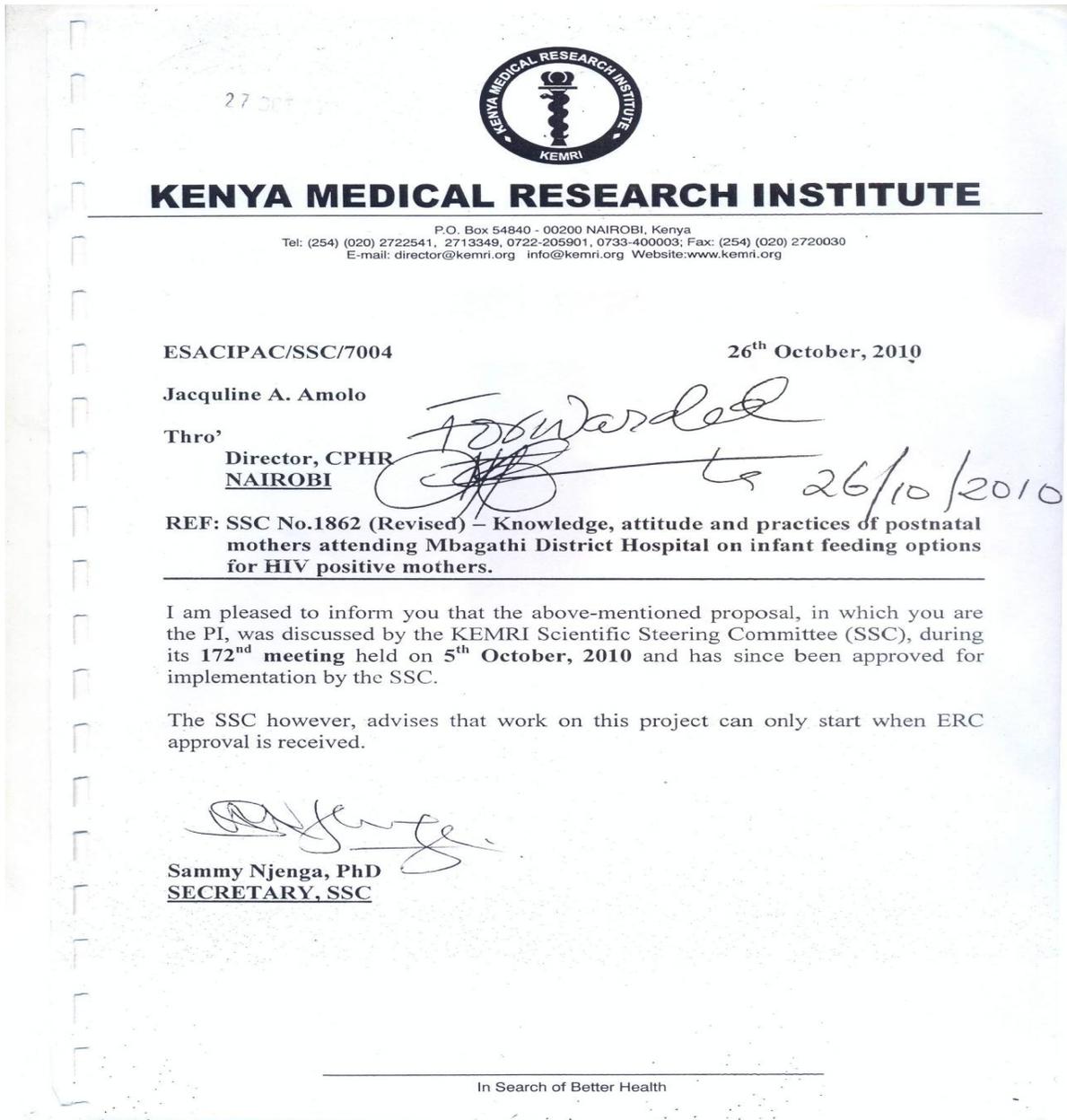
We have come to the end of the interview, thank you for your cooperation. Good day.

Appendix VI: Guidelines for Infant Feeding during Period 0 to 6 Months in view of HIV/AIDS



Source: LINKAGES; Infant Feeding Options in the Context of HIV/AIDS, 2004

Appendix VII: KEMRI Scientific Steering Committee approval



Appendix VIII: KEMRI/ National Ethical Review Committee approval


KENYA MEDICAL RESEARCH INSTITUTE

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E-mail: director@kemri.org info@kemri.org Website:www.kemri.org

KEMRI/RES/7/3/1 **November 30, 2010,**

TO: **JACKLINE A AMOLO, PRINCIPAL INVESTIGATOR**
TM310-0287/2009
ITROMID STUDENT

THRO': **DR. YERI KOMBE,** *Forwarded*
THE DIRECTOR, CPHR, *11/2/2010*
NAIROBI

RE: **SSC PROTOCOL NO. 1862 (RE - SUBMISSION): KNOWLEDGE,**
ATTITUDE AND PRACTICES OF POSTNATAL MOTHERS ATTENDING
MBAGATHI DISTRICT HOSPITAL ON INFANT FEEDING OPTIONS
FOR HIV POSITIVE MOTHERS

Make reference to your letter dated 25th November, 2010 received on 25th November, 2010. Thank you for your response to the issues raised by the Committee. This is to inform you that the issues raised during the 184th meeting of KEMRI/National Ethical Review Committee held on 9th November, 2010, have been adequately addressed.

Due consideration has been given to ethical issues and the study is hereby granted approval for implementation effective this **30th day of November 2010**, for a period of twelve (12) months.

Please note that authorization to conduct this study will automatically expire on **29th November 2011**. If you plan to continue with data collection or analysis beyond this date, please submit an application for continuing approval to the ERC Secretariat by **15th October 2011**.

You are required to submit any amendments to this protocol and other information pertinent to human participation in this study to the ERC prior to initiation. You may embark on the study.

Yours sincerely,
RCK:thinj
R. C. KITHINJI,
FOR: SECRETARY,
KEMRI/NATIONAL ETHICS REVIEW COMMITTEE

In Search of Better Health

Appendix IX: African Journal of Health Sciences (AJHS) publication approval



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KEMRI/AJHS/2013-2015/Vol 1

12th October 2015

Amolo JA,
ITROMID JKUAT,
P.O BOX 62000-00200,
Nairobi.

Dear Amolo JA,

REF AJHS/2015/445 AWARENESS, ATTITUDE AND PRACTICES OF POSTNATAL MOTHERS ATTENDING MBAGATHI DISTRICT HOSPITAL ON INFANT FEEDING OPTIONS FOR HIV POSITIVE MOTHERS BY AMOLO JA ET AL

We are pleased to inform you that your manuscript titled above was approved for publication in the African Journal of Health Sciences (AJHS).

Thank you for taking interest in the AJHS.


Miss Jane Muthoni Rintari,
Principal Administrative Officer (AJHS),
For: Editor-in-Chief, AJHS,
KENYA MEDICAL RESEARCH INSTITUTE (KEMRI).

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