

**ASSESSMENT OF KNOWLEDGE, ATTITUDES AND PRACTICES ON  
BREASTFEEDING AMONG HIV INFECTED MOTHERS WITH INFANTS  
IN KIBAHA TOWN COUNCIL**



**BY**

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## ABSTRACT

Knowledge, Attitudes and Practices (KAP) on breastfeeding among HIV-infected mothers are important in determining the health and nutritional status of their children. The HIV pandemic and the risk of mother-to-child transmission (MTCT) of HIV, especially through breastfeeding (BF) poses special difficulties to HIV-infected mothers, their infants and the community. This study was designed to assess KAP on breastfeeding among HIV-infected mothers having children aged 0-12 months living in Kibaha Town Council. A cross-sectional, descriptive study design was employed and convenient sampling procedure was used to select the respondents. Primary data were collected using structured questionnaire which were administered by face to face interview. Data analysis was done using Statistical Package for the Social Science (SPSS) 15.0 version computer software. The study findings revealed that there is limitation in terms of KAP on BF, complementation and infant feeding options among the HIV-infected mothers. Breastfeeding was chosen by majority of respondents (96%) compared to replacement feeding (6%). About 76% of mothers ceased to practice EBF before their infants were six months old due to fear of MTCT of HIV. The study also revealed that mothers' level of education was significantly associated with their knowledge ( $p = 0.00403$ ). Mixed feeding (63.6%) and nipple cracks (77.8%) were the most known factors by the respondents to increase the risk of MTCT of HIV. Breast conditions such as sore/cracked nipples; fear of stigma; lack of counselling and follow up from the health workers; and cultural beliefs such as BF by using one breast were observed as the constraints faced by the respondents. Counselling services on infant feeding options, regular follow to mothers and more training to the counsellors on BF and PMTCT of HIV need to be strengthened.

**DECLARATION**

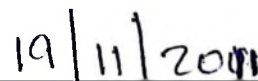
I, Margaret Clement Rweramira, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.



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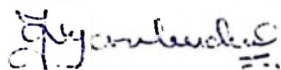
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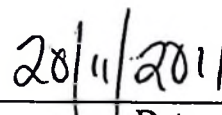
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## **DEDICATION**

This work is dedicated to my beloved parents; Mr. Clement Rweramira and mother Magdalena who laid the foundation of my education. I also declare the work to my beloved family; husband Venant and my two children Queene and Allan.

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**LIST OF ABBREVIATIONS AND SYMBOLS**

AFASS	Acceptable, Feasible, Affordable, Sustainable, and Safe
AIDS	Acquired Immunity Deficiency Syndrome
ARVs	Antiretrovirals
BF	Breastfeeding/Breastfed
BFHI	Baby Friendly Hospital Initiative
CTC	Care and Treatment Clinic
EBF	Exclusive Breastfeeding
ERF	Exclusive Replacement Feeding
HIV	Human Immunodeficiency Virus
IF	Infant Feeding
KAP	Knowledge Attitude and Practice
KTC	Kibaha Town Council
LBW	Low Birth Weight
MF	Mixed Feeding
MOH	Ministry of Health
MOHSW	Ministry of Health and Social Welfare
MTCT	Mother-to-Child Transmission
NACP	National AIDS Control Programme
PMTCT	Prevention of Mother-to-Child Transmission of HIV
RCH	Reproductive and Child Health
RF	Replacement Feeding/Replacement Feed
SPSS	Statistical Package for Social Sciences

TDHS	Tanzania Demographic and Health Survey
TFNC	Tanzania Food and Nutrition Centre
UNAIDS	United Nations Joint Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
URT	United Republic of Tanzania
WHO	World Health Organization

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background Information

Breastfeeding, and especially early breastfeeding, is one of the most critical factors for improving child survival (WHO, 2009). It is generally accepted globally as the form of infant feeding as it contributes 100% of the daily nutritional requirement of children 0-6 months, 50% for children of 6-12 months and 35% of nutritional requirement for children 12-24 months (MOHSW, 2007). Universal Exclusive Breastfeeding (EBF) for the first six months could reduce infant mortality by 13% (Nankunda *et al.*, 2006). The WHO/ UNICEF recommend exclusive breastfeeding for the first six months followed by nutritionally adequate and safe complementary foods, while breastfeeding continues up to 24 months or beyond (WHO/UNICEF, 2003).

World-wide breastfeeding is usually initiated early, however, for the first six months it is not widely practiced; instead, at early age many infants are given water, breast milk substitutes or other drinks or feeds (WHO, 2004a). Available information indicates that only 35% of infants are exclusively breastfed during the first four months worldwide (WHO, 2003). Exclusive breastfeeding for the first six months has been established as the best way to feed infants (Kramer *et al.*, 2003).

The documentation of breastfeeding as a source of HIV infection in babies has come to represent a public health dilemma in countries with a high prevalence rate of HIV

and where breastfeeding is the standard norm and essential to child survival (De Cock *et al.*, 2000). According to WHO (2010), an estimated 430 000 children were newly infected world-wide with HIV in 2008, the vast majority of them through mother-to-child transmission.

The problem of HIV infection through breast milk is of particular concern in most developing countries, where breastfeeding is fundamental for growth, development and survival of young children. Lack of breastfeeding compared to any form of infant feeding has been shown by Meta-analysis to expose children to increased risk of malnutrition and life threatening infectious diseases other than HIV, especially in the first year of life (URT, 2004).

Studies carried out in Zimbabwe and South Africa suggest that exclusive breastfeeding carries a lower risk of HIV transmission compared to mixed feeding ; that mixed feeding should be avoided because it substantially increases the chances of HIV transmission and death (Cautsoudis *et al.*, 1999; Iliff *et al.*, 2005; Coovadia *et al.*, 2007). However, some studies (Nduati *et al.*, 2000) recommend avoiding breastfeeding when mothers are infected. In most parts of Africa, replacement feeding is associated with an increased risk of morbidity and mortality (Wilfert and Fowler, 2007). In countries hardest affected by HIV, the risk of dying from infectious diseases in the first two months of life has been estimated at six times greater for infants who are not breastfed (WHO, 2000). Unfortunately, access to high quality counselling is scarce in the world, resulting in many mothers making

inappropriate feeding decisions (Doherty *et al.*, 2007). Good quality programmes have the potential to save thousands of infant lives.

All the available evidence confirms that breastfeeding is almost universal in Tanzania. According to 2010 Tanzania Demographic Health Survey (TDHS) data, 97% of children are breastfed at some point in their lives. The same report indicates that only 50% of infants below six months are exclusively breastfed. The HIV epidemic has changed the context in which HIV-infected mothers, who can transmit HIV to their children during pregnancy, labour, delivery and breastfeeding, make decisions on how to feed their infants (UNICEF/UNAIDS/WHO/UNFPA, 2004).

Prevention of Mother-to-Child Transmission (PMTCT) is the global intervention aimed at preventing MTCT of HIV. Effective PMTCT requires a number of strategies one of them being preventing the transmission of HIV from HIV-infected mothers to their infants during pregnancy, labour, delivery and breastfeeding. Nevertheless, one way of achieving its strategies is implementation of safer feeding practices (MOHSW, 2007).

The need to reduce HIV transmission to infants necessitates observance of the National Guideline for the PMTCT of HIV which recommends counseling HIV-infected mothers on the appropriate ways of feeding to reduce MTCT; in this regard, two main options are given, namely: to practice EBF or exclusive replacement feeding (ERF) for the first six months, followed by the addition of complementary foods after 6 months. Mothers should continue to give their infants breast milk until

they can wean them safely. ERF for the first 6 months of life with commercial infant formula or home-modified animal milk is recommended only when it is acceptable, feasible, affordable, sustainable and safe (AFASS) (MOHSW, 2007). Mothers need to make the final choice concerning the appropriate way of feeding their babies and be supported to ensure optimal nutrition for themselves and their children.

## **1.2 Problem Statement**

Available information indicates that, exclusive breastfeeding for the first six months is not widely practiced; instead, at early age many infants are given water, breast milk substitutes or other drinks or feeds (WHO, 2004a). In Tanzania, EBF is rarely practiced in many parts of the country (Shirima *et al.*, 2001; de Paoli *et al.*, 2001). Data from the TDHS 2010 indicates that only 50% of infants below six months of age are exclusively breastfed. Breastfeeding has demonstrated lower risk of HIV transmission compared to mixed feeding, hence mixed feeding should be avoided as it substantially increases the chances of HIV transmission and death (Cautsoudis *et al.*, 1999; Iliff *et al.*, 2005; Coovadia *et al.*, 2007).

Knowledge, attitudes and practices (KAP) on breastfeeding among HIV-infected mothers are important in determining the survival, health and nutritional status of their children. Infant and young child feeding and specifically optimal breastfeeding, is a question that has remained unsolved in this era of HIV/AIDS (WHO, 2004b; WHO, 2010). Information on KAP on breastfeeding among HIV-infected mothers is limited. Many studies which have been conducted in the country looked at either knowledge or/and practices of HIV-infected mothers but not the KAP on

breastfeeding and core issues which facilitate successful breastfeeding. If there is any current research which has been done on that in the country, then, they are not yet published. One recent study carried out in some of the Sub-Saharan countries indicated the early introduction of fluids other than maternal milk within 6 months to be a common practice among HIV-infected mothers (Tomasoni *et al.*, 2011). The study did not look at other core issues related to successful breastfeeding. Furthermore, there are KAP studies which had been conducted for health workers in the context of HIV but not for HIV-infected mothers.

Even though EBF will not totally prevent MTCT through breast milk, the implications of this for child survival in the absence of breastfeeding, especially in this era of HIV infection, pose major challenges. HIV-infected mothers need to be supported in order to enable them to practice EBF as a feeding option of their choice and to ensure the risk of MTCT through breastfeeding is reduced and the nutritional status of their children is improved (Kramer *et al.*, 2001; WHO, 2004b).

### **1.3 Problem Justification**

The transmission of HIV, especially through breastfeeding, poses special difficulties not only to infants and young children but also to women, families, communities, health and other related professionals and the nation at large. Most women in Tanzania with their HIV status diagnosed during pregnancy face difficulties on how to feed their infants after delivery (URT, 2007).

Very little is known about the current knowledge, attitude and practices of HIV-infected mothers with regard to breastfeeding as the feeding option to their children for the first 6 months of life. The available information on exclusive breastfeeding in Tanzania is based on studies carried out in different communities to determine current breastfeeding practices to mothers regardless of their HIV status. These studies still demonstrate the low rate of exclusive breastfeeding despite the great efforts that have been made by the nation to promote it, such as training of health personnel on lactation management in all the regions up to the district level. Therefore, this study intends to assess the level of the knowledge, attitude and practices with regard to breastfeeding among HIV-infected mothers having children aged 0-12 months in Kibaha Town Council.

Furthermore, since both national and international guidelines on HIV and infant feeding tend to change regularly due to on going research which comes up with new findings on PMTCT of HIV through feeding practices, there is therefore a need to carry out this study in the country to assess the current KAP on breastfeeding among HIV-infected mothers.

The findings of this study are expected to help in developing efficient policies and coherent strategies that may be employed by different stakeholders to support HIV-infected mothers, especially those living in a resource-limited country like Tanzania to reduce the risks of MTCT of HIV through breastfeeding. Optimal breast feeding is a key to achieving the goal of risk reduction.

## **1.4 Objectives**

### **1.4.1 Overall objective**

To ascertain knowledge, attitudes and practices on breastfeeding among HIV-infected mothers with infants aged 0-12 months in Kibaha Town Council.

### **1.4.2 Specific objectives**

- (i) To establish the knowledge and attitudes on exclusive breastfeeding among HIV-infected mothers
- (ii) To determine the practices of EBF among HIV-infected mothers and assess their adherence to available national guideline on PMTCT of HIV
- (iii) To identify factors that influence HIV-infected mothers' choice of breastfeeding or replacement feeding as an appropriate method of feeding their children
- (iv) To determine the nutritional status of the children born to HIV-infected mothers

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 Global Epidemiology of HIV/AIDS

Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) remain a major health problem globally. By the end of 2007, it was estimated that out of the 30.8 million adults were infected with HIV worldwide, around half of these were women, 98% of whom live in developing countries (UNAIDS, 2006). By 2006 more than two million children under the age of 15 were infected with HIV and 60% of these live in Sub-Saharan Africa (UNAIDS/WHO, 2005). The same report indicates that children constitute 14% (700 000 of 4.9 million) of new global HIV/AIDS infection, and that the number continues to rise world-wide. Out of the infected children in the world, 60% live in Sub-Saharan Africa. In Tanzania, the HIV prevalence in the antenatal sites was 9.6% among pregnant women in 2005. MTCT contributes highly for the majority of HIV transmission (MOH, 2005). Need for intervention is urgent to reverse the trend.

#### 2.2 Mother-to-Child-Transmission (MTCT) of HIV

Mother-to-child transmission (MTCT) remains the major cause of HIV infection in children. It occurs when an HIV-infected mother passes the virus to her child. This transmission can occur during pregnancy, labour and delivery, or breastfeeding. The transmission rate is about 5-10% during pregnancy, 10-15% during labour and delivery and 10-20% through breastfeeding when continued for 2 years (UNICEF/UNAIDS/WHO/UNFPA, 2004). According to the latest data, an estimated

430 000 children were newly infected with HIV in 2008, over 90% of them through MTCT (WHO, 2010). The same report indicates that, without treatment, about half of these infected children will die before their second birthday. Without intervention, the risk of MTCT ranges from 20 to 45%. With specific interventions in non-breastfeeding populations, the risk of MTCT can be reduced to less than 2%, and to 5% or less in breastfeeding populations (WHO, 2010).

MTCT of HIV contributes about 5% of the HIV prevalence in Tanzania (MOH, 2005). Poor infant-feeding practices contribute to about a third of the transmissions.

- Based on a vertical MTCT rate of 40%, about 72 000 Tanzanian babies are estimated to be infected annually through their mothers, approximately 25 000 of them through breastfeeding (MOH, 2004).

Breastfeeding is an important source of mother-to-child HIV transmission. In countries where breastfeeding continues into the second year, 30–50% of all HIV mother-to-child transmission is estimated to occur through this route (De Cock *et al.*, 2000; Dabis and Ekpini, 2002; Mmiro *et al.*, 2009).

### **2.3 Prevention of Mother-to-Child Transmission (PMTCT) of HIV**

PMTCT is the global intervention programme aimed at preventing MTCT of HIV. Effective PMTCT requires a number of strategies, one of them being preventing the transmission of HIV from HIV-infected mothers to their infants during pregnancy, labour, delivery and breastfeeding. In order to achieve this, the protocol for the national PMTCT programme includes effective voluntary counselling and testing,

the use of antiretroviral drugs, safer delivery practices and the implementation of safer feeding practices (MOHSW, 2007). These are being done through provision of comprehensive antenatal care to the HIV-infected women during pregnancy, including ongoing counselling infant feeding and support as an integral part of management.

The National PMTCT guideline recommends that HIV-infected mothers be counselled on the appropriate ways of feeding their children in order to reduce MTCT of HIV. Two main options are given to HIV-infected mothers, that is: either to practice EBF or ERF for the first six months, followed by the addition of complementary foods after 6 months. Mothers should continue to give their infants breast milk until they can wean them safely. ERF for the first 6 months of life is recommended only when AFASS criteria applies (MOHSW, 2007). Mothers need to make the final choice concerning appropriate way of feeding their babies and be supported to ensure optimal nutrition for themselves and their children. Moreover, the HIV-infected mothers should be provided with lifelong antiretroviral therapy (ART) or antiretroviral prophylaxis to reduce HIV transmission to infants during breastfeeding. The 2009 WHO recommendations propose that, in light of the effectiveness of ARV interventions, continued breastfeeding by HIV-infected mothers until the infant is 12 months of age capitalizes on the maximum benefit of breastfeeding to improve the infant's chances of survival while reducing the risk of HIV transmission (WHO, 2009).

Hence, the documentation that exclusive breastfeeding involves a lower risk of MTCT of HIV than mixed feeding (Coutsoudis *et al.*, 1999; Iliff *et al.*, 2005) has raised hopes that MTCT can be reduced where breastfeeding is culturally normative. Mixed feeding has demonstrated a four-fold increase in the risk of HIV transmission from an HIV-infected mother to her child during the first six months of life, compared to EBF (Coutsoudis *et al.*, 2005; Iliff *et al.*, 2005).

#### **2.4 National and International Guidelines on HIV and Infant Feeding**

With the onset of the HIV/AIDS epidemic, and in recognition of the fact that HIV-infected mothers can transmit HIV to their infants through breastfeeding, specific recommendations apply to infants born to HIV-infected mothers (WHO, 2004b). Both national and international guidelines recommend avoidance of all breastfeeding by HIV-infected mothers and making use of replacement feeding when it is acceptable, feasible, affordable, sustainable and safe (AFASS). Otherwise, EBF for the first six months is recommended for the infants born to HIV-infected mothers as it carries a lower risk of HIV transmission compared to mixed feeding (MOHSW, 2007; WHO, 2010). In the previous WHO infant feeding guidelines, one of the options on infant feeding was early cessation of breastfeeding before the child is six months. The newly issued national and international guidelines recommend EBF up to six months and invalidate early cessation of breastfeeding. This review has been made due to the recognized important impact of the recent evidence of the effect of ARVs during breastfeeding (WHO, 2010). Therefore, HIV-infected mothers need to adhere to the national guidelines for PMTCT of HIV when making an informed choice on how to feed their children.

## 2.5 Breastfeeding and Exclusive Breastfeeding Status

Breastfeeding is a natural African practice and early breastfeeding, is one of the most critical factors for improving child survival. Breastfeeding also confers many benefits other than reducing the risk of child mortality (WHO, 2009). EBF for the first months of life has been established as the best way to feed infants (Cohen *et al.*, 2000; Kramer *et al.*, 2003) and could prevent 13-15% of child deaths in low- income countries (Arifeen *et al.*, 2001; Jones *et al.*, 2003). In order for mothers to EBF for the first six months and continue to breastfeed for 2 years and beyond, they need to be well informed and fully supported. They should also have access to skilled practical help from trained health workers, other service providers and family/community support groups (MOHSW, 2007).

Despite efforts made to promote infant and young child feeding practices world-wide, still these practices are not optimal. Globally, only 39% of all infants are exclusively breastfed (WHO, 2003). The rate is particularly low in Africa, where less than one third of infants under 6 months are exclusively breastfed (UNICEF, 2009). Exclusive breastfeeding, though better than other forms of infant feeding and associated with improved child survival, is uncommon (Coovadia *et al.*, 2007). According to Sibanda *et al.*, (2004) it was found that in different parts of Southern Africa, EBF rates range between 19% and 76%. Data from the Tanzania Demographic Health Survey 2010 indicate that only 50% of infants below six months are EBF (TDHS, 2010).

Exclusive breastfeeding goes concurrent with early initiation of breastfeeding. Early beginning of breastfeeding contributes to reducing overall neonatal mortality (Edmond *et al.*, 2006). It ensures that skin-to-skin contact is made early on, an important factor in preventing hypothermia and establishing the bond between mother and child. According to 2010 TDHS data, only 49% of newborns in the country are put to the breast within one hour of birth; a notable decline when compared with the 2004-2005 TDHS (59%) (TDHS, 2010).

Early initiation of breastfeeding stimulates mother's to produce the first milk quickly known as colostrum. Colostrum provides protective antibodies and essential nutrients, acting as a first immunization for newborns, strengthening their immune system and reducing the chances of death in the neonatal period (Huffman *et al.*, 2001). Introduction of pre-lacteal feeds inhibit an infant from getting adequate protection from the colostrum. It is recommended that infants be fed with colostrum immediately after birth and continue to be exclusively breastfed even if the regular breast milk has not yet started to flow. However, in some communities colostrum is discarded or expressed before being given to an infant with the belief that it is dirty and can harm the baby. A study carried out in Morogoro, Tanzania (Shirima *et al.*, 2001) found that 43% of mothers in rural areas were discarding colostrum though reasons for doing so (and its effect on breastfeeding) were not established.

## **2.6 Exclusive Breastfeeding in the Context of HIV**

Even in the era of HIV/AIDS infection, breastfeeding remains the best possible nutrition for the great majority of babies (WHO, 2005). EBF is recommended

because it protects infants from morbidity and mortality whether or not HIV related. International guidance currently states that when replacement feeding meets AFASS criteria, the avoidance of all breastfeeding by HIV-infected mothers is recommended (WHO, 2000). Otherwise, EBF is recommended during the first six months of life. In Africa, replacement feeding that meets AFASS criteria is uncommon, and many HIV-infected women are choosing to breastfeed (Kiarie *et al.*, 2004). Finding ways to make breastfeeding safer for HIV-infected women living in resource-limited settings is a matter of priority.

A study conducted in Zimbabwe revealed that the introduction before the age of 3 months of solid foods or animal milk to breastfed infants born to HIV-infected mothers was associated with a fourfold greater risk of postnatal transmission at 6 months compared with EBF. The protective effects of early EBF were still significant at 18 months post-delivery, with a 61% reduction in postnatal, compared with mixed feeding. This demonstrates that the more strictly HIV-infected mothers are able to breastfeed exclusively, the lower the risks of HIV or death will be for their infants (Iloff *et al.*, 2005).

New evidence on HIV transmission through breastfeeding revealed that EBF for up to six months was associated with >50% reduced risk of transmission of HIV compared to non-EBF in three large cohort studies conducted in Côte d'Ivoire, South Africa and Zimbabwe. However, WHO has highlighted the fact that in countries mostly affected by HIV, the risk of dying from infectious diseases in the first two

months of life has been estimated to be six times greater for infants who are not breastfed (WHO, 2007).

The cumulative findings that EBF carries a lower risk of HIV transmission compared to mixed feeding (Coutsoudis *et al.*, 1999; Iliff *et al.*, 2005; Coovadia *et al.*, 2007) set new challenges for promoting breastfeeding. However, these findings provide crucial confirmatory evidence that when HIV-positive mothers breastfeed exclusively, their babies have only a low risk of infection with HIV. This risk is lower than that in babies who receive other foods or liquids in addition to breast milk before 6 months of age. Mixed feeding before or after 14 weeks nearly doubled transmission risk and the addition of solids increased the risk 11-fold. Exclusive breastfeeding is also associated with reduced mortality over the first year of life in HIV-exposed infants compared to mixed feeding and replacement feeding in both research and programme settings, especially if inappropriately chosen by mothers (Mbori-Ngacha *et al.*, 2001; Doherty *et al.*, 2007).

The newly issued guideline on PMTCT recommends that if a child is being breastfed then this should be up to 6 months. Subsequently, the mother should supplement her breast milk with complementary feeding and all breastfeeding should be stopped by 12 months of life. ERF for the first 6 months of life with commercial infant formula or home-modified animal milk is recommended only when it is acceptable, feasible, affordable, sustainable and safe (MOHSW, 2007).

A number of papers highlight difficulties in implementing infant feeding recommendations for HIV-infected women in Sub-Saharan Africa (Bland *et al.*, 2007; Doherty *et al.*, 2007; Lunney *et al.*, 2008), because of unavailability of appropriate alternatives that would potentially increase HIV disease-free survival (Iliff *et al.*, 2005). In Tanzania, feasibility studies of AFASS recommendations have examined infant feeding practices and alternatives to breastfeeding (de Paoli *et al.*, 2004; Leshabari *et al.*, 2007) and concluded that more work needs to be done in the context of breastfeeding cessation and appropriate alternatives in order to implement these practices.

## **2.7 Factors Influencing Exclusive Breastfeeding Practices**

A number of factors have been investigated in different settings which are involved in early cessation of EBF. Among the documented factors include those which are socio-economic, demographic, cultural, obstetric and pediatric (Lawoyin *et al.*, 2001). Decision to supplement breast milk before the recommended age of six months is influenced by some of these factors. However, these factors vary among different populations hence become difficult to make generalizations for populations with different characteristics. Pre-lacteal feeds seem to be commonly given to infants within Sub-Saharan Africa. These include water, tea, infant formula, cow's milk, honey and other local fluids (Agnarsson *et al.*, 2001; de Paoli *et al.*, 2001; Shirima *et al.*, 2001). Demand for mothers to return to work, lack of sufficient milk, because babies were thirsty and hungry and pressure from family and social members were the major reasons given, among others (Shirima *et al.*, 2001; Leshabari *et al.*, 2006).

HIV-infected mothers fear to practice EBF due to the risk of HIV transmission to their babies. Nonetheless, there are certain factors which influence some of the mothers to choose EBF; these include: fear of stigma and discrimination associated with replacement feeding and other difficulties regarding the affordability and safety of replacement feeding. Moreover, most of these mothers who tend to opt EBF contrary to their intention end up practicing mixed feeding (Leshabari *et al.*, 2006).

But, there is another side of this problem; Breast disorders such as cracked and bleeding nipples, mastitis, breast abscesses or in cases where the baby has infections or sores in its mouth, tend to increase the risk of HIV transmission. This leads to HIV-infected mothers to stop practicing EBF (UNICEF/ UNAIDS/WHO/UNFPA, 2004).

Studies in the developing countries have looked at infant feeding practices in the general population (Engebretsen *et al.*, 2007; Marriott *et al.*, 2007). These studies showed that early cessation of breastfeeding were associated with high maternal education level, presence of a new pregnancy and illness of the mother or of the child. But, most of these studies were done in settings where the HIV epidemic was not a major public health problem, or did not report on the HIV status of the subjects studied.

### **2.7.1 Mothers' knowledge on the importance of exclusive breastfeeding**

Lack of appropriate information, knowledge and adequate support regarding optimal duration of EBF and its benefits has been considered as one of the factors that contribute to early cessation of EBF (Bovell- Benjamin *et al.*, 2001; Sibanda *et al.*,

2004). In Sibanda's study carried out in Ndola, Zambia, under PMTCT programme, it was reported that for mothers who had received adequate counselling, EBF rate rose from 56 to 76%. Lack of knowledge about breastfeeding management skills and support are therefore the main barrier to successful EBF.

Knowledge regarding several infant feeding options has an influence on practicing of the chosen method. A study done in three PMTCT sites in South Africa showed that 57.5% of HIV-infected mothers practiced EBF due to entrenched knowledge that "breast milk is the best" and also because they were worried to disclose their HIV status to their relatives (Doherty *et al.*, 2006). A cross-sectional study conducted in three regions of Tanzania, namely, Kilimanjaro, Mbeya and Kagera, found limitations of knowledge and skill in breastfeeding and infant feeding options, including exclusive breastfeeding (TFNC, 2004). However, infant feeding counsellors have an important role to ensure mothers get all the information concerning infant feeding of their choice and also assisted in order to enable them EBF their babies effectively.

### **2.7.2 Health workers' support**

Misinformation from various sources regarding EBF can influence mother's choice of feeding her child. Weak and poorly organized health services affect the quality of infant feeding counselling and support. Inaccurate, insufficient, or non-existent infant feeding counselling has led to inappropriate feeding choices by both HIV-infected and HIV-uninfected women (WHO, 2007). However, the health workers need to

have adequate knowledge and skills in infant feeding to be able to help mothers effectively to breastfeed exclusively.

WHO (2005) has stipulated the importance of counselling and support by the health workers as the key interventions for the PMTCT of HIV. All HIV-infected mothers necessitate individualized infant feeding counselling that includes information concerning the risk and benefits of each feeding option, guidance in selecting the most suitable option for their situation and support to adopt the choice made (WHO, 2005). The same report noted that counsellors on PMTCT are often pressed for time and have too little insight into the mother's personal circumstances to provide appropriate comments and recommendations on the basis of the AFASS criteria.

In Côte d'Ivoire findings revealed that health workers had difficulty counselling HIV-infected mothers and that the long-term infant feeding options for these women appeared inadequate (Becquet *et al.*, 2005). Studies conducted in Tanzania revealed that many PMTCT counsellors are not well informed about how to protect babies from MTCT, and few know of national or international guidelines on HIV and infant feeding. Inaccurate and inconsistent information and lack of adequate time for counselling also limit HIV and infant-feeding counselling in Tanzania and other settings (de Paoli *et al.*, 2002; Leshabari *et al.*, 2006). Lack of knowledge among counsellors on infant feeding has a negative implication for the mother's KAP on ways of feeding their children.

HIV-infected mothers need support by the trained PMTCT counsellors to enable them carry out their decision safely and effectively. Adequate support and training of health care providers has demonstrated improvement in exclusive breastfeeding practices (Kramer *et al.*, 2001; Nita *et al.*, 2003).

## CHAPTER THREE

### 3.0 METHODOLOGY

#### 3.1 Study Area

The study was conducted in Kibaha Town Council (KTC), Coast region. KTC is a new council which officially started in September 2004. It emerged by splitting the former Kibaha District Council into Kibaha Rural Council and KTC. The council has an estimated area of about 750 square kilometres with geographic latitude and longitude of 06° 46' South and 38° 55' East respectively. It is bordered by Kinondoni District to the East, Bagamoyo District to the North, Kisarawe District to the South and the small Town of Mlandizi to the West. According to the population and housing census held in 2002, the council had a total population of 78 294 people of which 38 846 were females and 39 448 males who make up 17 788 households, each with an average size of 4.4 members. Since 2002, population has grown to 95 639 in 2009, with an increase rate of 2.9% as per Tanzania Bureau of Statistics (URT, 2009).

Administratively, the council consists of 8 wards and 53 streets of which 28 are found along Dar es Salaam – Morogoro road and the 25 are away from the trunk road. The council has 28 health facilities, which include the council's eight dispensaries and one district hospital owned by Kibaha Education Centre, while the rest are non-government facilities. The main economic activities include trade, agriculture, formal employment and petty trading (URT, 2009).

### **3.2 Study Design**

The study was a cross-sectional descriptive involving mothers who are HIV-infected with infants' aged 0-12 months in Tumbi and Mkoani PMTCT sites. The age of 0-12 months was considered to be suitable for the study due to the convenient access of those mothers with children of that age group attending PMTCT clinic. Moreover, mothers with children aged 0-12 months could remember very well what exactly they had practiced as far as breastfeeding was concerned. Also an observation method was employed to look at the way a mother positions and attaches the baby to the breast; if a mother has any breast condition such as cracked nipples or mastitis; and if her baby has any infections or sores in its mouth. Besides, nutritional status of the children was assessed by weight for age (in months) criteria, whereby three consecutive readings for weight were recorded.

### **3.3 Study Population**

The primary target was only HIV-infected mothers with children aged 0-12 months, who had opted either for exclusive breastfeeding or for replacement feeding. All study subjects were selected within the study area.

### **3.4 Sampling Procedures and Sample Size**

Convenient sampling procedure was used in this study. The choice was based on convenient access to specific individuals in a sample. Purposive sampling technique was used to select 2 PMTCT sites in Kibaha Town Council (Tumbi and Mkoani) as they are the ones in the district with a higher number of HIV-infected mothers compared to other PMTCT sites in the Council (Warioba, J. personal communication, 2010). This technique was also employed owing to the fact that the

selection of mothers depended on those who were ready to participate in the study. HIV-infected mothers with children aged 0-12 months were requested individually in a counselling room to take part in the study. A written consent was sought from each subject before the administration of the questionnaire.

The study covered 100 HIV-infected mothers with their infants aged 0-12 months. The sample size was determined using the following formula by Fox *et al.* (2009):

$$n = \frac{p(1-p)}{(SE)^2} \dots\dots\dots (1)$$

Whereby:  $n$  = the desired sample size

SE = Standard Error (95%CI (0.05) divided by 1.96 =2.55)

$p$  = Estimated proportion of breastfeeding mothers in Kibaha = 95%

$$\frac{0.05 \times (1 - 0.05)}{(2.55)^2} = 73$$

In order to take care of drop outs at the end of study, the sample size was increased up to 100 HIV-infected mothers

### 3.5 Recruitment and Training

One research assistant who holds a university degree with previous experience in community surveys especially in HIV and infant feeding issues was recruited for two days. The training focused to the concepts of breastfeeding, PMTCT in general, objectives and general aim of the study and data collection procedures. The research assistant was also oriented to interviewing techniques as well as how to observe ethical issues.

### **3.6 Data Collection**

Both primary and secondary data were collected to meet the objectives of this study.

#### **3.6.1 Primary data**

Primary data from the selected respondents was collected using a structured questionnaire with both open and closed ended questions which were administered by face to face interview. An observation guide was also used to observe breastfeeding practices. However, nutritional status of the children was also determined by weight for age criteria (road to health growth chart) whereby three consecutive readings for weight were recorded. The tool was prepared in English and translated in Kiswahili. Supervision had to be done daily in order to ensure accuracy and completeness of the questionnaires. Data collection was carried out daily except on Saturdays and Sundays. Interview session took approximately 30-40 minutes per respondent and data collection was conducted for eight weeks.

#### **3.6.2 Secondary data**

Secondary data on infant feeding, focusing on knowledge, attitudes and practices regarding breastfeeding in the context of HIV/AIDS was collected from different sources including books, theses, journals, websites, several published and unpublished government reports and health reports. Due to ongoing research which comes up with new findings on PMTCT of HIV through feeding practices the use of different sources of secondary data was important in assessing the current KAP on Breastfeeding among HIV-infected mothers.

### **3.7 Assessment of the Nutritional Status**

The nutritional status of the children born to the interviewed respondents was determined by weight for age criteria (Road to Health Growth Chart) whereby three consecutive readings for weight were recorded and compared to their age (weight-for-age). In this criterion, the dynamic picture of growth velocity is usually determined using Reproductive and Child Health (RCH) card number 1. Three categories of the nutritional status were differentiated by using three colours in RCH card number 1, namely green, grey and red. The green colour shows children with weight-for-age values between 80 and 100, which indicate that they were in good health. The grey colour signifies children with weight values between 60 and 80, showing that they were moderately underweight and red for those falling below 60 percent whom were considered severely underweight.

### **3.8 Pretesting of the Study Tool**

Pretesting of the survey tool was done at Mlandizi PMTCT Centre in Kibaha Rural District. Ten HIV-infected mothers were purposively selected and were not included in the final sample of the actual study. The purpose of pre-testing the tool was to check the validity and reliability of the questions. After pre-testing the tool, necessary modifications were made in the final study tool for use in the field.

### **3.9 Data Processing and Statistical Analysis**

The filled in questionnaires were manually edited in order to minimize the unintended omissions as well as identification of inconsistencies. Verified data was then summarized and condensed from the questionnaires, organized and coded to facilitate data entry in the personal computer for processing. Data analysis was done using Statistical Package for Social Sciences (SPSS) computer programme version

15.0. Descriptive statistics such as percentages and frequencies were calculated to give characteristics of variables. Cross tabulation to determine the relationship between certain variables and breastfeeding practices was done. Moreover, Chi square test was used to analyze categorical variables and P-value was used to interpret the significance of the statistical tests at  $\alpha$  level of 5%.

### **3.10 Study Limitations**

It was difficult to obtain the weight of some babies for the past one or two months from the Reproductive and Child Health (RCH) card number one whose mothers were supposed to bring with them during an interview. This is due to the fact that some of the mothers were not taking their children to the RCH clinic monthly for growth monitoring exercise as recommended by the Ministry of Health and Social Welfare policy.

Due to financial constraints encountered during the study, only one research assistant could be hired for data collection exercise instead of two as earlier planned. So, this affected time allocated for data collection as well as the thorough observation of breastfeeding practices. On the other hand, few respondents could not remember exactly time their children started breastfeeding and taking complementary foods. This, obviously, has affected the quality of the findings.

### **3.11 Ethical Consideration**

Ethical clearance for conducting the research was obtained from the National Institute for Medical Research Coordinating Committee of the Ministry of Health and Social Welfare. Permission to conduct the study was also obtained from the

Regional Administrative Secretary for Coast region and other relevant district authorities. Both verbal and written informed consents were sought from the study participants before they were enrolled into the study after explaining clearly the aims and objectives of the study.

## CHAPTER FOUR

### 4.0 RESULTS

#### 4.1 Socio-Demographic Characteristics of the Study Population

The socio-demographic characteristics considered include: age of the interviewed mothers, marital status, education level, household size, number of the children in household together with the age and sex of the targeted child.

A total of 100 HIV-infected mothers with infants between 0 to 12 months were interviewed. The majority of the interviewed respondents (46%) were in the 25–30 years age category. Their ages ranged from 17 to 45 years and most of them (85%) had more than one child. The results indicate that most of the respondents were married (53%), and out of these, 40 (75.5%) were in monogamy kind of marriage, while 13 (24.5%) were in polygamy type of marriage. However, over half of the babies involved in the study (56%) were between 0 to 6 months old and the rest 44 (44%) were between 7 to 12 months respectively. About 55% were baby boys and the rest (45%) were girls. The socio-demographic characteristics of respondents are summarized in Table 1 below.

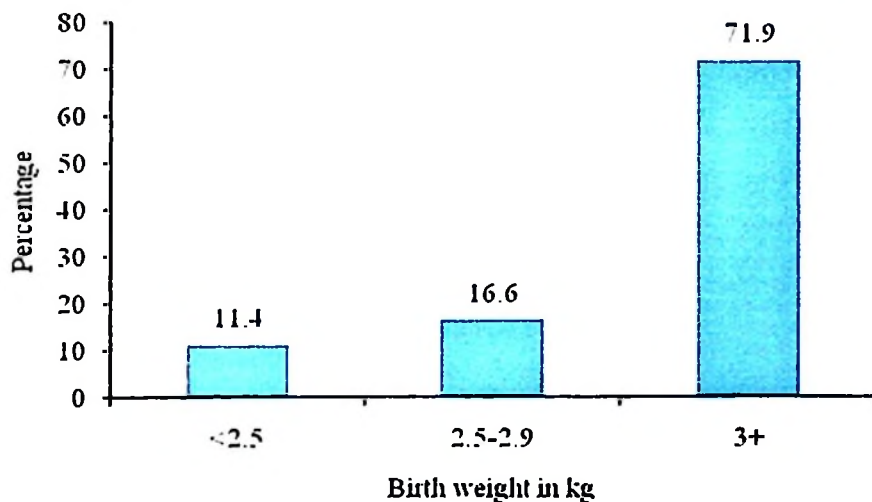
**Table 1: Frequency distribution of socio-demographic factors of respondents in Kibaha Town Council**

<b>Variable</b>	<b>Frequency</b>	<b>Percentages (n=100)</b>
<b>Respondent's age (years)</b>		
≥ 24	9	9
25-30	46	46
31-35	23	23
36+	22	22
<b>Marital status</b>		
Married (monogamy)	40	40
Married (polygamy)	13	13
Unmarried	29	29
Divorced	4	4
Widowed	2	2
Cohabiting	12	12
<b>Education</b>		
No formal education	23	23
Primary education	67	67
Secondary education	10	10
<b>Occupation</b>		
Employed	5	5
Self employed	19	19
Petty business	25	25
Farmer	9	9
Housewife	42	42
<b>Age of the children</b>		
0-6 months	56	56
7-12 months	44	44

#### 4.2 Information on Place and Mode of Delivery, Birth Weight of the Baby and the Person Provided Assistance During Delivery

The results indicate that 89 (89%) mothers delivered in the hospital, 2 at health centre, 4 at the dispensary and 5 at home. Out of 100 mothers, 91% had normal spontaneous vaginal delivery while the rest (9%) had caesarian section delivery. Of those deliveries, 95 (95%) were conducted by either nurses or doctors, while the remaining 5% were facilitated by Village Health Workers (VHW) with the help of family members.

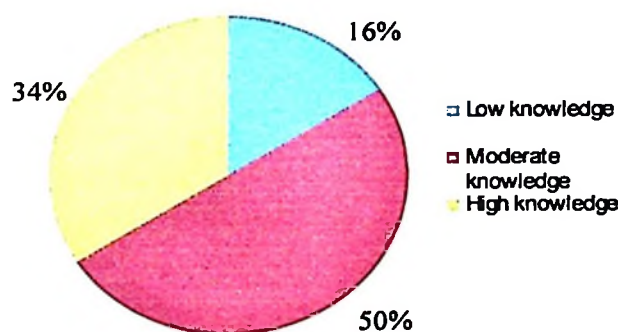
Information on birth weight of the baby is shown in Fig. 1. Moreover, a majority of babies (86%) were in good health and the rest (14%) who were born either with LBW or prematurely had some problems such as being very weak and difficulty in breathing.



**Figure 1: Birth weight of the baby at delivery**

### 4.3 Mothers' Knowledge on MTCT of HIV and Exclusive Breastfeeding

Mothers' knowledge on MTCT of HIV was assessed using a series of questions. Answers provided by them were assessed as being correct or incorrect, if the mother gave any of the listed possible answers. Scoring of the answers to the questions given with the purpose of measuring knowledge was done as follows: Right answers on each aspect of breastfeeding, MTCT and infant feeding in general was given score of one point (one score) while wrong answers received no point (zero score). All the scores on knowledge related to breastfeeding, MTCT and infant feeding in general for each respondent were summed up. However, the maximum score set was 40 and the highest and lowest scores obtained were 30 and 6 respectively. It was found that majority of the respondents had moderate knowledge (50%) compared to 16% and 34% who were found to fall in the other two categories. Categorization of level of knowledge was done as shown in Fig. 2.



**Figure 2: Categorization of level of knowledge on breastfeeding, MTCT and infant feeding in general**

#### 4.3.1 Association of respondents' knowledge on breastfeeding, MTCT of HIV and infant feeding in general and level of education

As shown on Table 2, no mother who had secondary education was found to have low knowledge on breastfeeding, MTCT of HIV and infant feeding in general. However, there was significant association between mothers' level of knowledge and the level of the education attained ( $p=0.0403$ ).

**Table 2: Association between respondents' knowledge on breastfeeding, PMTCT of HIV and infant feeding issues and their level of education**

Level of knowledge	Education attained						Significance	
	No formal education		Primary		Secondary			Total
	n	(%)	n	(%)	n	(%)		
Low knowledge	8	(50.0)	8	(50.0)	0	(0.0)	16	$X^2=10.02,$ ( $p=0.0403$ )
Moderate knowledge	11	(22.0)	33	(66.0)	6	(12.0)	50	
High knowledge	4	(11.8)	26	(76.5)	4	(11.8)	34	

#### 4.3.2 Respondents' knowledge on appropriate time to initiate breastfeeding and the importance of colostrum

Out of 100 interviewed respondents, a majority of them (96%) practiced exclusive breastfeeding either for the first three months or more than that, while the remaining 6% reported to opt for exclusive replacement feeding. Among the questions asked to measure their knowledge include appropriate time to initiate breastfeeding after delivery and the importance of colostrum to their infants. A majority of the

respondents (84%) were aware that it should be within one hour after delivery. Table 3 shows the results of knowledge test of the respondents on appropriate time to initiate breastfeeding.

As far as the importance of colostrum to the infants was concerned, it was noted that some mothers (56%) were aware that it is nutritious and 35% mentioned its importance in helping to protect the baby against infection. Other multiple responses given are indicated as shown in Table 3 below.

**Table 3: Respondents' knowledge on appropriate time to initiate breastfeeding and the importance of colostrum to the infant**

<b>Variable</b>	<b>Frequency</b>	<b>Percentages (n=100)</b>
<b>i) Appropriate time to initiate BF</b>		
Within 1 hour	84	84
2-6 hours	7	7
Do not know	9	9
<b>Total</b>	<b>100</b>	<b>100</b>
<b>ii) Importance of colostrum*</b>		
Nutritious	56	56
Protect against infections	35	35
No importance	7	7
Do not know	31	31
<b>Total</b>	<b>129</b>	<b>129</b>

\*Respondents provided more than one response to each of the asked question

#### **4.3.3 Respondents' knowledge on meaning, benefits and duration of exclusive breastfeeding**

These issues were investigated and also used to categorize the respondents' knowledge on exclusive breastfeeding. The results indicate that a majority (97%)

have ever heard about EBF. When they were asked to explain the meaning of it, about 87% managed to give the meaning correctly while 13% failed to do so. Among the multiple answers given by the respondents concerning the importance of EBF were as follows: that it reduces chances of MTCT of HIV (74%) and that it reduces risks of infections (24%). Others did not know at all the importance of EBF despite the fact that all HIV-infected mothers attending PMTCT are supposed to know them in order to enable them make an informed choice of feeding their infants. Furthermore, the respondents were asked on the duration of practicing exclusive breastfeeding. Most of them were aware that it should be at six months. Table 4 shows mothers' knowledge on meaning, benefits and duration of practicing EBF.

**Table 4: Mothers' knowledge on meaning, benefits and duration of practicing EBF**

<b>Variable</b>	<b>Frequency</b>	<b>Percentages (n=100)</b>
<b>Ever heard about EBF</b>		
Yes	97	97
No	3	3
<b>Meaning of EBF</b>		
Correct explanation	87	87
Incorrect explanation	13	13
<b>Importance of EBF*</b>		
Reduces chance of MTCT of HIV	74	74
Reduces risk of infections	24	24
Reduces costs	21	21
Facilitate bonding	1	1
Do not no any importance	13	13
<b>Duration of practicing EBF</b>		
1-3 months	24	24
4-5 months	2	2
6 months	71	71
Do not know	3	3

\*Respondents provided more than one response to each of the asked question

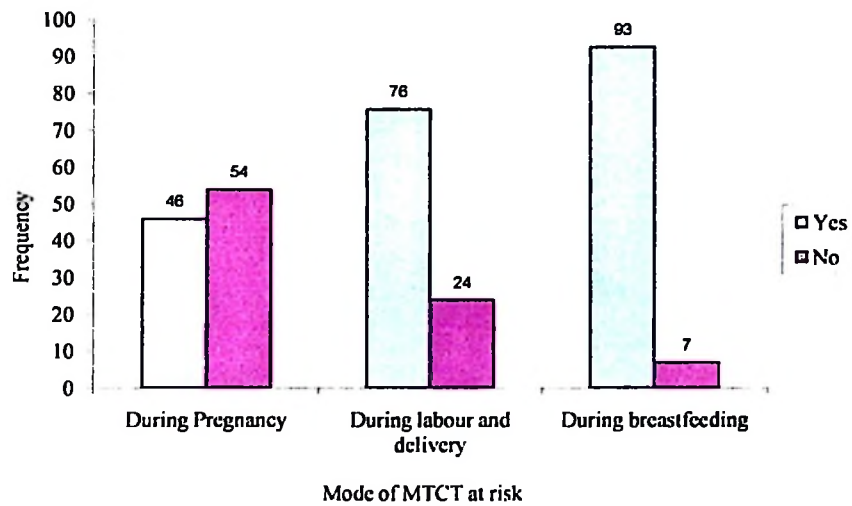
#### **4.3.4 Respondents' knowledge on reasons that hinder HIV-infected mothers from practicing exclusive breastfeeding**

Mothers were also assessed if they were knowledgeable about the main reasons which hinder HIV-infected mothers from breastfeeding babies exclusively for the first 6 months. Multiple responses were given by them and the main reason mentioned was fear of MTCT of HIV (91.9%); lack of information on importance of EBF (14.1%); and insufficient milk due to poor nutritional status of the mother (29.3%). Other responses indicated were associated with sore/cracked nipples of the infected mothers as well as the carelessness of the mother to breastfeed her child effectively. Four mothers were not aware of any of the above mentioned reasons. The common opinion given by the respondents about how to overcome the problems related to EBF was appropriate counselling to the infected mothers by the health workers.

#### **4.3.5 Knowledge about possibility of MTCT of HIV and its mode of transmission at risk**

Almost all mothers were aware that there is possibility of MTCT of HIV. About 84% responded that not all HIV infected mothers pass the virus to their children, 15% thought that all infected mothers pass the virus to their children and the remaining 1% did not know anything.

Respondents were further asked on mode of MTCT of HIV at risk. A majority of the respondents (93%) were aware on the mode of MTCT of HIV which occurs during breastfeeding as well as during labour and delivery (76%). Figure 3 below summarizes respondents' knowledge on the mode of MTCT of HIV at risk.



**Figure 3: Distribution of respondents according to their knowledge on mode of MTCT of HIV at risk**

#### **4.3.6 Knowledge on factors that can increase risk of MTCT of HIV and ways of reducing the transmission**

Respondent's knowledge on factors that can increase or reduce the risk of MTCT of HIV is shown in Table 5. Multiple responses concerning these factors were given by the respondents. Mixed feeding (63.6%) and nipple cracks (77.8%) seemed to be more known to increase the risk of MTCT of HIV compared to other factors. Other responses given are shown in the same table.

The main ways mentioned by the respondents which can be used to reduce MTCT of HIV were avoidance of mixed feeding and practicing EBF for the first six months (74.4%); and ensure that mother do have cracked nipples and mastitis (66.7%). Other ways of reducing MTCT of HIV are also shown in Table 5.

**Table 5: Distribution of respondents on factors that can increase risk of MTCT of HIV and ways of reducing the transmission**

<b>Variable</b>	<b>Frequency</b>	<b>Percentages</b>
<b>(i) Factors that increases the risk of MTCT of HIV*</b>		
Mixed feeding	63	63.6
Nipple cracks	77	77.8
Duration of breastfeeding	28	28.3
Mastitis	3	3.0
High maternal viral load	7	7.1
Fungal infection/sores in baby's mouth	25	25.0
Growth of teeth	1	1.0
Did not know	10	10.0
<b>Total</b>	<b>214</b>	<b>215.8</b>
<b>(ii) Ways of reducing MTCT of HIV*</b>		
Avoid mixed feeding and practice EBF	67	74.4
Ensure no cracked nipples/mastitis	60	66.7
Good position and attachment	5	5.5
Effective use of ARVs	17	18.9
Stop BF when child grows teeth/fungal infection in mouth	12	13.3
No opinion given	10	10.0
<b>Total</b>	<b>171</b>	<b>188.8</b>

\*Respondents provided more than one response to each of the asked question

#### **4.3.7 Respondents' knowledge on types of infant feeding options and reported sources of information**

Respondents were asked to mention two types of infant feeding (IF) options they knew. A majority of them (96%) could mention EBF as one type of infant feeding option and again only 80% knew the existence of another type which is ERF. When they were asked if they could explain those feeding options clearly, only 93% responded positively. Out of those who gave the explanation concerning the EBF option, most of them (91.4%) managed to give a correct explanation. However, it was found that ERF as another feeding option could be well explained by only 54.8%

and the rest 45.2% could not give proper explanation regarding this aspect. Table 6 summarizes respondents' knowledge on types of infant feeding options.

It was also found that the main source of exclusive breastfeeding and replacement feeding information to the mothers was the health service providers (96.8%). Other sources of information on EBF and replacement feeding are also reported in Table 6.

**Table 6: Respondents' knowledge on types of infant feeding options and reported sources of information**

<b>Variables</b>	<b>Frequency</b>	<b>Percentages</b>
<b>(i) Type of IF option known</b>		<b>(n=100)</b>
<b>Exclusive breastfeeding</b>		
Known	96	96.0
Not known	4	4.0
<b>Exclusive replacement feeding</b>		<b>(n=100)</b>
Known	80	80.0
Not known	20	20.0
<b>(ii) If IF options could be briefly explained</b>		<b>(n=100)</b>
Yes	93	93.0
No	7	7.0
<b>(iii) Explanations given</b>		<b>(n=93)</b>
<b>Exclusive replacement feeding</b>		
Explanation given correctly	85	91.4
Explanation given not correctly	8	8.6
<b>Exclusive breastfeeding</b>		
Explanation given correctly	51	54.8
Explanation given not correctly	42	45.2
<b>(iv) Sources of infant feeding information*</b>		
Health service providers	92	96.8
Radio/TV	4	4.0
Family members	3	3.2
Friends	1	1.0
Seminars	1	1.0

\*Respondents provided more than one response on sources of infant feeding information

#### 4.4 Respondents' Attitudes Towards Breastfeeding MTCT and Infant Feeding in General

The respondents' attitudes were measured basing on a five-point scale towards breastfeeding, MTCT of HIV and infant feeding in general. Table 7 summarizes the attitudes of the respondents towards the MTCT of HIV and infant feeding general information. As far as initiation of breastfeeding is concerned, a majority (48%) strongly agreed that it should be within one hour of delivery, while 7% strongly disagreed on that. With regard to feeding colostrum to the baby, most of the respondents (40%) strongly agreed on the issue, as compared to 14% who had different opinions with the statement. The results also show that 48% of the respondents strongly disagreed on HIV-infected mother to practice mixed feeding. However, there was high significant association between respondents' attitudes and practices towards PMTCT of HIV ( $p=0.001$ ).

**Table 7: Distribution of respondents' attitudes towards PMTCT of HIV and infant feeding methods**

Variable	Attitude category (n=100)					Significance
	Strongly Agreed	Agreed	Undecided	Disagreed	Strongly disagreed	
	n (%)	n (%)	n (%)	n (%)	n (%)	
Initiation of BF within 1 hour	48 (48)	36 (36)	3 (3)	6 (6)	7 (7)	$X^2=159.14$ , ( $p=0.001$ )
Feeding colostrum	40 (40)	36 (36)	1 (1)	9 (9)	14 (14)	
HIV-infected mothers to EBF for the first 6 months	39 (39)	39 (39)	2 (2)	7 (7)	13 (13)	
HIV infected mothers practice MF	6 (6)	5 (5)	2 (2)	39 (39)	48 (48)	

#### **4.4.1 Risk involved in practicing mixed feeding**

Most of the respondents (89%) were aware that there are risks involved in practicing mixed feeding. 8% said no risk while 3% did not know if there is any risk involved. Moreover, multiple responses given concerning the risk were as follows: 79% noted the risk as being increase of MTCT of HIV; 18% pointed out the risk of infectious diseases; 3% mentioned the risk of a child becoming malnourished; and 4% named abdominal pain/constipation.

#### **4.4.2 Respondents' attitudes towards the feasible option for HIV-infected mothers**

Table 8 indicates multiple responses given by the respondents concerning the most feasible option for HIV-infected mothers. A majority (81%) felt that EBF for six months is the most feasible compared to other feeding options. The main reasons given as to why they chose those feeding options were that the chosen type of feeding reduces MTCT of HIV (50%) and involves less cost (47%). Other reasons given are also indicated in the table below.

**Table 8: Distribution of respondent's attitudes towards the feasible option for HIV-infected mothers**

<b>Variable</b>	<b>Frequency</b>	<b>Percentages</b>
<b>(i) Feasible option*</b>		
EBF for six months	81	81
EBF and early cessation before 3 months	23	23
Commercial infant formula	4	4
Cow's milk	5	5
Do not know	2	2
<b>Total</b>	<b>115</b>	<b>115</b>
<b>(ii) Reasons for choosing EBF option*</b>		
Reduces MTCT of HIV	50	50
Offers protections against diseases	24	24
Nutritious	24	24
Involve less cost	47	47
Breast milk is readily available	2	2
Reduces fear of stigma	1	1
Facilitates bonding	1	1
<b>Total</b>	<b>149</b>	<b>149</b>

\*Respondents provided more than one response to each of the asked question

#### **4.4.3 Association between respondents' level of education and their attitudes towards HIV-infected mother to practice EBF**

Table 9 indicates association between respondents' level of education and their attitudes towards HIV-infected mother to practice EBF for the first six months. The study findings revealed that mothers with high knowledge were not having any doubt as far as an HIV-infected mother's practice of EBF was concerned. Sixty percent of them strongly agreed on the necessity of HIV-infected mothers to practice EBF for the first six months and the remaining 40% had a moderate view of the practices, but agreed. The findings further showed that all respondents with secondary education (100%) were aware that there are risks involved when an HIV-infected mother decides to practice mixed feeding. But, some of the respondents with no formal

education and primary education reported of there being no risk involved by practicing mixed feeding. This indicates that there was an association between mothers' level of education and their attitudes towards HIV-infected mother to practice EBF for the first six months ( $p= 0.026$ ).

**Table 9: Association between respondent's level of education and their attitudes towards EBF practices**

Attitudes	Total						Significance	
	No formal education		Primary level		Secondary level			
	n	(%)	n	(%)	n	(%)		
Strongly agreed	8	(34.8)	25	(37.3)	6	(60.0)	39	$X^2=0.479, (p=0.026)$
Agreed	7	(30.4)	28	(41.8)	4	(40.0)	39	
Undecided	0	(0)	2	(3.0)	0	(0)	2	
Disagreed	3	(13.0)	4	(6.0)	0	(0)	7	
Strongly Disagreed	5	(21.7)	8	(11.9)	0	(0)	13	
<b>Total</b>	<b>23</b>	<b>(100)</b>	<b>67</b>	<b>(100)</b>	<b>10</b>	<b>(100)</b>	<b>100</b>	

#### 4.5 Respondents' Practices on Breastfeeding and Infant Feeding in General

Several questions related to practices on breastfeeding and infant feeding in general were asked to the respondents. The study findings revealed that 94% of the interviewed mothers breastfed their babies while replacement feeding was opted by only 6%.

Furthermore, it was found that only 82% of the respondents could hold their infants within an hour after delivery, 15% were given their infants to hold them between 1-12 hours after delivery, 2% could not remember and one held her infant as soon as

she was able to recover from anaesthesia. Only three mothers (3%) out of 100 had skin-to-skin contact with their infants during the first time after delivery.

#### 4.5.1 Initiation of breastfeeding after delivery and introduction of pre-lacteal feeds

Seventy two (76.6%) respondents initiated breastfeeding within one hour of delivery while 22 (23.4%) of mothers had delayed in initiating breastfeeding. The delayed period reported was between 1-72 hours and most (54.6%) were delayed between 1-2 hours (Table 10). Besides, only one infant was given pre-lacteal feeds (glucose water) before initiating breastfeeding and three mothers were not aware whether their infants were given pre-lacteal feeds or not. On the other hand, 6(6.4%) of breastfeeding infants were not given the yellowish milk (colostrum). Reasons given for not offering colostrum to their infants were that it is dirty and could probably harm the baby.

**Table 10: Time used to put the baby on the breast after delivery**

Variable	Frequency	Percentages
<b>Initiation of BF</b>		<b>(n=94)</b>
Within 1 hour	72	76.6
After 1 hour	22	23.4
<b>Delay of breastfeeding in hour</b>		<b>(n=22)</b>
1 – 2 hours	12	54.6
3 – 4 hours	5	22.7
5+	5	22.7

#### 4.5.2 Association of level of knowledge of the respondents and breastfeeding practices

The results show that out of 100 interviewed respondents, a majority (94%) opted for breastfeeding as feeding method of their choice for their infants and the rest (6%)

reported to opt replacement feeding. The results further indicate that most women who initiated breastfeeding within one hour of delivery were having high and moderate knowledge compared to those who had low knowledge despite the fact that the number of those who had low knowledge was limited (8.5%). Furthermore, no respondent with high knowledge discarded or expressed colostrum before being given to an infant (Table 11). Hence, mother's level of knowledge on breastfeeding was not significantly associated with feeding colostrum to the infant ( $p=0.1387$ ).

Findings also demonstrate that most respondents (87.5%) with high knowledge did not experience breast problems compared to the other two groups. However, there was no significance association between mothers' level of knowledge and experience of breast problems ( $p=0.1243$ ).

**Table 11: Association of level of knowledge of the respondents and breastfeeding practices**

Variable	Level of knowledge (n=94)						Total	Significance
	Low		Moderate		High			
	n	%	n	%	n	%		
<b>Initiation of BF</b>								
With one hour								
After one hour	8	8.5	38	40.2	26	27.6	72	$X^2 = 3.52. (p=0.172)$
Total	6	6.7	10	10.6	6	6.7	22	
	14	100	48	100	32	100	94	
<b>Feeding colostrum</b>								
Yes	12	85.7	44	91.7	32	100	88	$X^2=3.951.(p=0.1387)$
No	2	14.3	4	8.3	0	0	6	
Total	14	100	48	100	32	100	94	
<b>Experience of any breast problem</b>								
Yes	1	7.1	13	27.1	4	12.5	18	$X^2=4.17. (p=0.1243)$
No	13	92.9	35	72.9	28	87.5	76	
Total	14	100	48	100	32	100	94	

#### **4.5.3 Mode of feeding**

Respondents were asked about the mode of feeding their infants during the time of the study. About 42% were practicing EBF, 10% were breastfeeding and giving other foods, 40% had already stopped breastfeeding and were being fed with other foods, two had already stopped BF and were using cow's milk and 6% of them did not opt breastfeeding at all. When they were asked about the duration they intend or intended to exclusively breastfeed their babies, 61.5% intended for six months and the rest for less than six months mostly at three months. The main reason given for practicing EBF for less than 6 months was fear of MTCT of HIV (81.6%).

#### **4.5.4 Experience of any breast problem**

The study revealed that about 19% of the interviewed respondents experienced breastfeeding problem while the rest 81% did not encounter any problem. Among the breast conditions mentioned included sore/cracked nipples (2%), mastitis (4%), breast engorgement (3%), painful nipple (4%) and belief that one breast is bad (4%). In order to overcome the aforementioned problems, it was reported that some of the mothers were given analgesics to relieve the pain while using only one breast to feed the baby. Those who believed that one breast was bad and had been attacked by an evil spirit, breastfed using only one breast which they believed to be uninfected; for fear that the child might become sick.

#### **4.5.5 Time and reasons for stopping breastfeeding**

Among those who had already stopped breastfeeding, most stopped at 3 (40.5%) and 6 months (40.5%). About 5% stopped after 6 months, while 7% reported to have stopped before 3 months. Table 12 summarizes multiple reasons given by the respondents for stopping breastfeeding. The main reason was to reduce the HIV

transmission (97.6%). A good number of those reported to have been advised to stop breastfeeding, health workers had indicated to be the main group that influenced their decision (94.3%).

**Table 12: Reasons for stopping breastfeeding among the respondents**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage*</b>
To reduce HIV transmissic	40	97.6
I was advised to stop	30	73.2
The child has become big	6	14.6
Did not have enough milk	2	4.9
Fungal infection	1	2.4
Baby refused breast milk	1	2.4
Baby tested positive	1	2.4
<b>Total</b>	<b>81</b>	<b>197.5</b>

\*Respondents provided more than one response to each of the asked question

#### **4.5.6 Respondents practices on food and drinks given to the infants who did not exclusively breastfed**

Respondents who were not practicing EBF during the time of study were asked about the types of food and drinks they were using to feed their infants before the age of six months. About 32% reported to use infant formula milk, while the remaining 68% did not to use that milk. Most of them seemed to use cow's milk (55.3%); juices and plain water reported to be given by 5.3% and 63.2% respectively. Porridge was the main food given to the babies (70.3%) compared to other foods which carried a small proportion as vegetables (1%), potatoes (1%), "mtori" (1%) and "ugali". rice and stew (1%). Based on the multiple responses provided by the respondents it implies that after they stopped practicing EBF, most of the children were introduced to other

type of milk at the same time given other food and/ or drinks before the age of six months. The study findings revealed that, majority (50%) started to introduce food at the age of 3 months and then followed by those who introduced before their children were even three months old (26.3%). About 15.8% and 5.3% started at 4 and 5 months respectively. Only 2.6% introduced at the recommended age of 6 months.

#### **4.5.7 Time of weaning and type of complementary food given to both exclusive breastfed and exclusive replacement fed infants**

Table 13 illustrates time respondents started to introduce complementary foods to their infants. Since the study involved respondents who were also having children above the age of six months up to one year, all mothers except those who had been practicing EBF at the time of study were asked exactly what time they started complementary feeding. This involved all mothers regardless of whether they practiced EBF for the first six months or not. It was found that most (61.8%) of the respondents introduced food at the age of six months, followed by those who did so at four months (18.2%). A majority of mothers reported to feed their infants more than five times per day.

Furthermore, multiple responses were given by the respondents which show that most of the children were given almost every kind of food (58.8%) though in very small amount; followed by those who were being given porridge (23.5%) and other foods as reported in Table 13 below.

**Table 13: Distribution of respondents on time introduced complementary feeding and types of food used**

<b>Variable</b>	<b>Frequency</b>	<b>Percentages</b>
<b>Time introduced food</b>		
2 months	2	3.6
3 months	2	3.6
4 months	10	18.2
5 months	5	9.2
6 months	34	61.8
7+ months	2	3.6
<b>Type of food used</b>		
Porridge	16	23.5
Eat almost everything	40	58.8
Fruits	4	5.9
Juice	4	5.9
Ugali	2	2.9

#### **4.5.8 Utensils used to feed the infants and number of meals provided**

Table 14 summarizes the kind of utensils used to feed the infants and number of meal given per day. About two thirds (68.4%) used bottle for feeding their infants, 54% used a cup/bowl and spoon and 10.5% used cup only. Furthermore, the data show that a majority (68.4%) of the infants were being fed more than five times per day.

**Table 14: Utensils used to feed the infants and number of meals provided per day**

<b>Variable</b>	<b>Frequency</b>	<b>Percentages (n=38)</b>
<b>Utensils used for feeding</b>		
<b>Bottle</b>		
Yes	26	68.4
No	12	31.6
<b>Cup and spoon</b>		
Yes	19	50.0
No	19	50.0
<b>Cup only</b>		
Yes	4	10.5
No	34	89.5
<b>Number of meals provided</b>		
Three times	2	5.3
Four times	3	7.9
Five times	7	18.4
More than 5	26	68.4

#### **4.6 Factors that Influenced the Respondents' Choice on Infant Feeding**

##### **Methods**

A number of factors related to the decision of the respondents to opt infant feeding of their choice were looked at. These include: constraints faced in practicing infant feeding options; disclosure of HIV status to the relatives; those to whom the status was disclosed; and reasons for not disclosing the status. Moreover, respondents were also asked if there were any follow-up and support given by the health workers to enable them practice infant feeding of their choice more effectively.

##### **4.6.1 Constraints faced by mothers in feeding their infants**

As regards constraints faced by the respondents during the course of feeding their infants, about 76% of the respondents reported to face none while the remaining 24% had experienced constraints in one way or another. Table 15 summarizes the results

of the reported constraints, the main ones being: breast conditions which led mothers to stop breastfeeding as they feared MTCT of HIV (25%); and mothers staying with their babies all the time for fear of being given water and other foods (25%).

**Table 15: Constraints faced by mothers in feeding their infants**

Variable	Frequency	Percentages (n=24)
Breast condition contributed to stop BF	6	25.0
Stay with baby fearing of being given water and food	6	25.0
Breast milk not enough, baby cries a lot	5	20.8
Infant formula is expensive, shifted to cows milk	3	12.5
Use of one breast to feed the baby/dirty breast	3	12.5
Used MF to hide HIV status	1	4.2

#### **4.6.2 Diagnosis and disclosing of the HIV status**

The results in Table 16 show the year in which a respondent was diagnosed to be HIV-positive. The results revealed that, a majority of the respondents (48%) were diagnosed in the year 2009 followed by those in the year 2010 (27%). Others were diagnosed in the preceding years as shown in the table. The diagnosis of the HIV status of respondents was possible due to the implementation of one of the PMTCT strategies in Tanzania which uses compulsory testing and counselling to every pregnant woman before delivery to get safe intervention including appropriate infant feeding practices based on mother's choice in order to protect the baby from acquiring HIV (URT, 2007; MOHSW, 2007).

Most of the respondents (81%) disclosed their HIV status to their relatives. A majority of them disclosed to their husbands (54%) followed by those who made a disclosure to their parents (30%). Another group which the HIV status was disclosed to was the relatives of the infected-mothers (37%). With regard to reasons for not disclosing the HIV status to their relatives, the data show that all respondents feared stigma and about 11% feared both stigma and divorce by their husbands.

**Table 16: Distribution of the respondents by the year they were diagnosed to be HIV- positive**

<b>Year of diagnosis</b>	<b>Frequency</b>	<b>Percentages (n=100)</b>
1999	1	1
2003	1	1
2004	2	2
2005	2	2
2006	5	5
2007	7	7
2008	6	6
2009	48	48
2010	27	27
2011	1	1
<b>Total</b>	<b>100</b>	<b>100</b>

#### **4.6.3 Counseling provided to the respondents in the context of PMTCT**

Eighty six percent of respondents had been counselled on infant feeding options, while the remaining 14% had not. Table 17 shows multiple responses indicated by HIV-infected mothers who were counselled on infant feeding before and during

pregnancy, at delivery and after giving birth. According to the multiple responses given, a majority (70.9%) of the respondents were counselled during pregnancy.

On the other hand, the respondents were asked whether it was demonstrated to them by the health workers how to position and attach the baby to the breast during infant feeding counselling. About 73% reported to have seen a demonstration about that, while 26.6% had not seen any. When respondents were asked to demonstrate how properly to position and attach the baby to the breast, only 37% of them could demonstrate correctly; the rest failed to do so.

**Table 17: Distribution of respondents counselled on infant feeding and time they received counselling**

<b>Variable</b>	<b>Frequency</b>	<b>Percentages (n=100)</b>
<b>Counselled on IF options</b>		
Yes	86	86
No	14	14
<b>Time of counselling*</b>		<b>(n=86)</b>
Before pregnancy	7	8.1
During pregnancy	61	70.9
During delivery	3	3.5
After delivery	47	54.7

\*Respondents provided more than one response to each of the asked question

#### **4.6.4 Follow-up of the respondents by the health workers**

Only 51% of the respondents received support and follow-up from the health workers on how to feed their babies. The kind of support reported to be provided include proper position and attachment (68.8%), dangers of mixed feeding (81.2%),

preventing breast conditions (22.9%), breastfeeding on demand (39.6%) and duration of breastfeeding (43.5). Other kinds of support provided but carry very small proportion include: preparation of infant formula (2%), advice to stop breast feeding (1%), seminar on breastfeeding issues (1%) and group support (1%).

#### 4.6.5 Respondents' way of protecting their infants from getting HIV

Table 18 summarizes multiple responses given by the respondents on what they were doing to protect their infants from acquiring HIV infection. Most of the respondents (56%) reported to practice EBF and avoided the use of mixed feeding. Use of condoms with their partners was also mentioned as the way of protecting their babies from acquiring HIV infection. Other means of protecting their infants were reported as shown in the table.

**Table 18: Means used by the respondents in protecting their infants from acquiring HIV infection**

Way of protecting the baby*	Frequency	Percentages
Practice EBF/avoid MF	56	56
Use of condoms	39	39
Use of ARVs	16	16
Stopped BF totally	24	24
Did not opt BF	6	6
Baby doesn't have sore/ fungal infection and avoid breast conditions	10	10
Not doing anything as baby already infected	6	6

\*Respondents provided more than one response to each of the asked question

#### **4.6.6 Opinions of the respondents on how to improve infant feeding in PMTCT of HIV**

Multiple responses were given by the respondents as suggestions to improve infant feeding in the context of PMTCT of HIV. Thirty eight percent recommended that mothers should practice EBF for six months and 29% suggested the HIV-infected mothers to stick on their infant feeding choices. Other recommendations given were: practicing EBF for 3 months (8%), avoidance of mixed feeding (7%) and mothers ensuring that they do not have the breast conditions such as sore/cracked nipples or breast abscess during breastfeeding. However, 24% of the respondents had no opinion.

#### **4.7 Nutritional Status of the Children Born to the Interviewed Respondents**

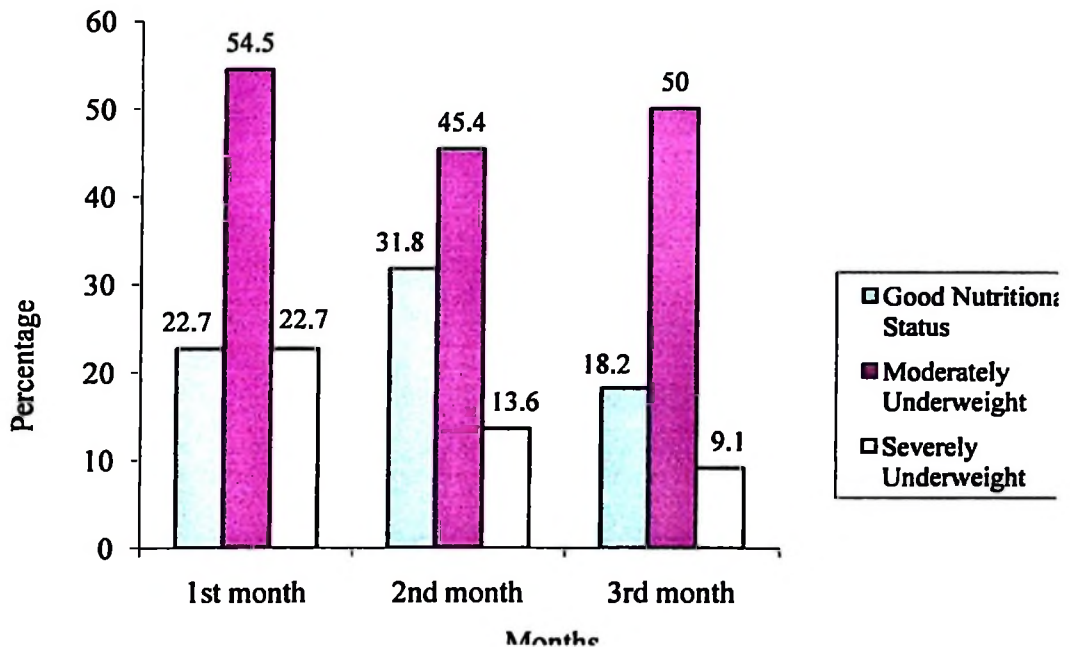
The results of the nutritional status of the children for three consecutive months are summarized in Figure 3. This section also indicates the nutritional status of the children in relation to low birth weight as well as their mode of feeding.

##### **4.7.1 Nutritional status of the children for three consecutive months**

The study findings revealed that 22% of the children were malnourished in either one or in all 3 months, whereby the readings have been recorded to determine the trend of their nutritional status. Children with good nutritional status throughout the three consecutive readings were 78 (78%). The nutritional status recorded as the first reading encompasses 22 children of whom 22.7 % had good nutritional status and the remaining 54.5% and 22.7% were moderately and severely underweight respectively. It should be borne in mind that those reported with good nutritional

status recorded in the first reading were also found to be moderately or/ and severely underweight during the second or third readings. Moreover, in the second and third month of the nutritional status follow-up, the number of children dropped from 22 to 20 and 17 respectively. This is due to the fact that some of the infants were only one month old when the first readings were taken. So, it was not possible to get the subsequent other two readings (Figure 4).

The findings also showed that all seven infants (31.8%) who were severely underweight either in one or in all three months of nutritional status follow up, had birth weight below 3.0 kilogram. However, birth weight of 3.0 kilogram is regarded by WHO as the standard birth weight for the normal child.



**Figure 4: Nutritional status of the children taken for three consecutive months**

#### **4.7.2 Nutritional status of the children and low birth weight**

Out of the 22 babies found to be malnourished, either in one or in all three months of nutritional status follow up, it was found that seven (31.8%) were born with low birth weight. This shows that HIV-infected mothers tend to deliver infants with low birth weight.

#### **4.7.3 Nutritional status of the children and mode of feeding**

Out of the 22 children who were found to fall in either one or in all categories of bad nutritional status, two (9.1%) were on replacement feeding, seven (31.8%) were still breastfeeding, 11 (50%) had already stopped breastfeeding and two of them (9.1%) were breastfeeding and being given other foods. All two children who were on ERF and found to be malnourished were severely underweight. In fact one of them had to be admitted during the time of study because her health condition was severely bad. Moreover, the types of milk chosen were both animal and commercial infant formula and feeding bottles were reported to be used to feed the infants. It was also reported that, among the respondents who had already stopped breastfeeding, four of them introduced other foods and drinks before their infants were six months old. They also used both commercial infant formula and cows' milk in a feeding bottle to feed their infants.

## CHAPTER FIVE

### 5.0 DISCUSSION

#### 5.1 Breastfeeding and Exclusive Breastfeeding

Breastfeeding is a fundamental way of providing food for infants and young children for their overall health, growth and development. It enhances the wellbeing of the infant by providing the best source of nutrition for optimal growth. The WHO/UNICEF (2003) recommends that infants should be exclusively breastfed for the first six months of life and should then receive nutritionally adequate and safe complementary foods while breastfeeding continues up to 24 months or beyond. EBF for the first six months of life confers important benefits to the infants. Among these benefits is protection of infants against common childhood diseases, including repeated gastrointestinal infections and pneumonia, which are the major causes of childhood mortality (WHO, 2003). It is also recommended because it protects infants from morbidity and mortality, whether or not HIV-related. Universal EBF for the first six months has been noted to reduce infant mortality by 13% (Nankunda *et al.*, 2006).

The transmission of HIV through breast milk has led to the proclamation of the national and international guidelines on infant feeding, which recommend avoidance of all breastfeeding by HIV-infected mothers and making use of replacement feeding when it is acceptable, feasible, affordable, sustainable and safe (AFASS). Otherwise, EBF for the first six months is recommended for the infants born to HIV-infected mothers as it carries a lower risk of HIV transmission compared to mixed feeding.

The study findings revealed that breastfeeding was an infant feeding method chosen by a majority of the respondents (96%) compared to replacement feeding which was found to be practiced by only 6% of the respondents. Previous studies conducted in Tanzania and other parts of Africa (de Paoli *et al.*, 2001; Shirima *et al.*, 2001; TDHS, 2004-05; Engebretsen *et al.*, 2007; Tomasoni *et al.*, 2011) have also reported that breastfeeding is universal and practiced by the majority. The findings are also similar to the study carried out by TFNC (2004) which noted that 83% of the interviewed HIV-infected mothers opted for breast milk as the most nutritious food for their infants. Actually this indicates that even though breastfeeding has shown to contribute to MTCT of HIV, it is still found to be the best food for the respondents' infants as well as the feasible infant feeding of their choice. However, due to the importance of breastfeeding the WHO (2005) insists that it should continue to be protected, promoted and supported among HIV-infected and non-infected mothers.

## **5.2 Knowledge, Attitudes and Practices on Breastfeeding and Exclusive Breastfeeding**

Generally, the study found that there was limitation of knowledge, attitudes and practices as far as breastfeeding and exclusive breastfeeding are concerned. The respondents seem to be not knowledgeable about important issues concerning breastfeeding and PMTCT in general. Limitation of knowledge and lack of information among them might have contributed to their practices which were found to be not encouraging as far as breastfeeding is concerned. A recent KAP study carried out in Sub-Saharan Africa revealed that, EBF was the preferred feeding modality for the interviewed HIV-infected mothers. However, EBF reported to be difficult in practice due to complex reasons such as deeply engrained socio-cultural

attitudes, family influences and increased availability of free formula milk in some urban areas (Tomasoni *et al.*, 2011). The PMTCT of HIV guidelines both international and national recommend that all pregnant women should be counselled on infant feeding and be given all the information concerning infant feeding options so that they can make informed decisions about feeding their infants.

### **5.2.1 Knowledge of HIV-infected mothers on breastfeeding, MTCT of HIV and exclusive breastfeeding**

Knowledge of mothers on breastfeeding is a very important factor for the mother to be able to make an informed decision on infant feeding option for their infants. According to the findings of this study less than half of the respondents (34%) had high knowledge of MTCT of HIV and EBF issues. Most of the important aspects which facilitate successful breastfeeding were unknown to most of the respondents. This indicates that knowledge about PMTCT of HIV, including breastfeeding, is still limited among the HIV- infected mothers. However, mothers with secondary education showed they had high and moderate knowledge on breastfeeding, MTCT of HIV and infant feeding in general compared to those with a lower standard of education. So the results indicated that mothers' level of education was significantly associated with their knowledge ( $p=0.00403$ ).

Furthermore, in normal circumstances, it was expected that HIV-infected mothers in PMTCT sites would be more knowledgeable than the rest because they are supposed to be well informed on PMTCT issues, including infant feeding options, but that wasn't the case. The respondents' poor level of knowledge found could be due to

inadequate knowledge among the counsellors on PMTCT issues, including counselling on appropriate choices regarding infant feeding options. A study by Sibanda *et al.* (2004) reported the importance of adequate counselling to the HIV-infected mothers. The authors found that adequate counselling on breastfeeding increased the EBF rate from 56% to 76%.

However, it was encouraging to find that all HIV-infected mothers were aware of the possibility of MTCT of HIV, though some of them (15%) thought that all infected mothers pass the virus to their infants regardless of whether they breastfeed or not. This finding conforms to the study by TFNC (2004) which reported of 95% of the HIV-infected mothers being aware of the possibility of mother-to-child transmission of HIV. It was also found that few mothers (7%) were unaware if breastfeeding is one of the modes of HIV transmission. The information on acquiring HIV infection during pregnancy, labour and delivery and during breastfeeding is expected to be known by all HIV-infected mothers so that they can make an informed choice to avoid or minimize the possibility of passing the virus to their infants.

#### **5.2.1.1 Knowledge on the core issues related to breastfeeding**

Questions about the most core issues which facilitate EBF to be successful or not were asked to measure knowledge of the respondents. These issues include: appropriate time to initiate breastfeeding, importance of colostrum to the infant, benefits of breastfeeding and appropriate time to commence complementation. The findings of this study show that not all the respondents knew that initiation should start within one hour of delivery.

Colostrum, the milk produced by the mother during the first post-partum days provides protective antibodies and essential nutrients acting as the first immunization for newborns. This study found that 31% of the respondents had no knowledge on its importance and other (7%) said that it had no any importance. These issues are very crucial for optimal breastfeeding and need to be addressed adequately to the mothers who decide to opt EBF as an infant feeding option of their choice.

Furthermore, a high proportion of mothers (74%) were found to be knowledgeable about the importance of EBF as they mentioned that it reduces chances of MTCT of HIV compared to mixed feeding. On the other hand, few admitted they knew nothing as far as the importance of EBF is concerned.

#### **5.2.1.2 Knowledge on reasons that hinder HIV-infected mothers from practicing EBF**

The main reason given by a majority of mothers, which hinder them from practicing EBF was fear of MTCT of HIV. This could be an explanation for a majority of them (76.3%) to cease practicing EBF when their infants were still very young (at the age of 3 months and before that). Most of these mothers replaced EBF with other foods and drinks such as porridge, water or mixed cows/formula milk with other foods instead of practicing EBF as recommended by the national infant feeding guidelines on PMTCT of HIV. HIV-infected mothers need to have adequate knowledge and skills on the importance of EBF and be cautioned on the dangers of infant formula or cows' milk when chosen without meeting AFASS criteria. It is noteworthy that although infant formula was reported to reduce the MTCT of HIV it still

demonstrated very high infant mortality rates (217/1000) in the 'formula plus' program in Haiti. This is despite the fact that the mothers were given free formula, growth-monitoring services, regular medical assessment, skills on safe preparation and appropriate treatment and care (Noel *et al.*, 2006).

Breast conditions such as cracked/sore nipples, engorgement and mastitis were also among the reasons mentioned in this study, which hinder the HIV-infected mothers from practicing EBF. The findings conform to what has been reported by other sources (UNICEF/UNAIDS/WHO/UNFPA, 2004; Coovadia *et al.*, 2007). Adequate and skilled counselling is very important to HIV-infected mothers in order to ensure that they use a good breastfeeding technique to prevent breast problems, which should be treated promptly if they occur.

It was encouraging to find that the concept of practicing mixed feeding, i.e. EBF and giving other foods or drinks at the same time as a way of increasing the transmission of HIV, was well known by most of the respondents. All PMTCT centres need to emphasize the avoidance of mixed feeding because this is a major problem facing a majority of HIV-infected mothers. Dewey (2001) in his study found the possibility of EBF to lower HIV-1 transmission compared to mixed feeding.

Then there is the question of the required duration of practicing EBF, which seems not to have been well understood by certain mothers, due to the change in the guidelines on infant feeding. In the previous infant feeding guideline by the WHO, one of the options was early cessation of breastfeeding before the child is six months.

But the new guidelines, both national and international recommend EBF up to six months and invalidate early cessation of breastfeeding. The review has been made due to recognizing the important impact of the recent evidence of the effect of ARVs during breastfeeding (WHO, 2010). Evidence has been reported that antiretroviral (ARV) interventions to either the HIV-infected mother or HIV-exposed infant can significantly reduce the risk of postnatal transmission of HIV through breastfeeding. No previous recommendation had been given on the use of antiretroviral drugs to prevent transmission through breast-feeding. Previous guidelines recommended ARVs to only women who needed them for their own health.

### **5.2.2 Attitudes of HIV-infected mothers on breastfeeding, MTCT of HIV and exclusive breastfeeding**

Generally, the attitude of respondents towards breastfeeding, PMTCT and infant feeding was positive as majority seemed to be aware of what has to be done to facilitate successful breastfeeding. Nevertheless, there were few who had a negative attitude regarding good breastfeeding practices such as giving colostrum to the infant, initiation of breastfeeding within one hour after delivery and HIV-infected mothers to practice EBF for the first six months. The negative attitude of the few respondents towards the core issues in PMTCT of HIV, especially those who chose breastfeeding as their feeding option, has negative effects when it comes to the implementation of optimal breastfeeding practices. However, the study findings show that there was high significant association between respondents' attitude and practices towards PMTCT of HIV ( $p=0.001$ ).

Furthermore, it was learned that the majority had a positive attitude towards ERF as the type of infant feeding which reduces the risk of transmission of HIV. But when it came to the option which is the most feasible to a majority of HIV-infected mothers, they felt that EBF for six months was feasible.

Both international and national guidelines on PMTCT of HIV recommend the HIV-infected mothers to practice either EBF or ERF as the feeding option of their choice to their infants. Mixed feeding is discouraged as it has proven in different studies (Cautsoudis *et al.*, 1999; Iliff *et al.*, 2005; Coovadia *et al.*, 2007) to increase the transmission of HIV and the incidence of death. Findings of this study have shown that nearly half of the respondents strongly disagreed on the HIV-infected mothers to practice mixed feeding. This implies that their attitude towards mixed feeding comply with what has been reported by Cautsoudis (1999), Iliff (2005) and Coovadia (2007) studies.

### **5.2.3 Practices of HIV-infected mothers on breastfeeding, MTCT of HIV and exclusive breastfeeding**

Findings of this study revealed that a majority of the interviewed mothers (94%) breastfed their infants while replacement feeding was opted by only 6%. The results of this study conform to the study carried out in Kenya (IBFAN-AFRICA, 2007) which indicated that about 67% of the interviewed HIV-infected mothers chose to breastfeed as they believed that breastfeeding was nutritionally optimal food for their infants. The findings also do not differ with the study carried out in three regions of Tanzania (TFNC, 2004) which showed that 83% of the HIV-infected mothers opted

to breastfeed their infants as they believed that breast milk was the most nutritious food for their infants. This indicates that whatever the crisis of HIV, breast milk is still the best food to the majority of infant's born to HIV-infected mothers.

#### **5.2.3.1 Breastfeeding and mixed feeding practices**

Although breastfeeding was found to be practiced by a majority of the respondents, the practices were not optimal. This has been demonstrated by those who had already stopped breastfeeding and feeding their infants with other foods and drinks. It was found that more than a half of these respondents (54.9%) stopped practicing EBF and instead introduced other milk in combination with other foods and drinks before the children reached six months. The type of milk to be introduced after stopping EBF was another problem for the interviewed mothers. This is due to the fact that, some of the mothers introduced both commercial infant formula and cow's milk at the same time before the infant was six months; though cow's milk was used by the majority compared to commercial infant formula. It was also noted that cow's milk provided to the infants before the age of six months was not modified as recommended in both national and international infant feeding guidelines. Cow's milk has more protein and a greater concentration of sodium, phosphorus and other salts than breast milk. Modification of cow's milk therefore involves dilution with boiled water to reduce the concentration of salts. Dilution, however, reduces energy concentration, hence sugar must be added. The milk, water and sugar must be mixed in right proportions (WHO, 1998).

The study also showed that, porridge and water were mostly used to feed the infants along with the commercial infant formula and cow's milk. This implies that the concept of ERF for the first six months as recommended by both national and international guidelines for PMTCT of HIV is either not well known to the interviewed respondents or "does not exist" as far as they are concerned. Moreover, the results of this study showed that the respondents' practices were contrary to the national guidelines for the PMTCT of HIV, which recommend practicing EBF or ERF for the first six months, then followed by the additional complementary foods after six months. Exclusive replacement feeding is only recommended as an infant feeding option when it is acceptable, feasible, affordable, sustainable and safe. The study findings comply with what has been reported by Tomasoni *et al.* (2011) whereby the introduction of fluids other than maternal milk within 6 months of age found to be a common practice in Sub-Saharan Africa.

It should be borne in mind that breast milk or other recommended infant milk whether animal milk or commercial infant formula is all that an infant needs for the first six months. As the baby grows, additional complementary food at a proper time is important for optimal growth and development.

Commercial infant formula is a breast milk substitute manufactured industrially in accordance with applicable Codex Alimentarius standards to meet the nutritional requirements of infants for the first six months of age, followed by the introduction of complementary foods. It is based on modified cow's milk or soya protein; it is closest in nutrients composition to breast milk, though it may lack some substances

such as long-chain essential fatty acids present in breast milk. It is usually adequately fortified with micronutrients, including iron. This milk is recommended for HIV-infected mothers who meet AFASS criteria to feed their infants in order to prevent them from transmission of HIV. In resource limited countries like Tanzania only few HIV-infected mothers can afford it even if the product is widely available in shops. Commercial infant formula is considered as an option by HIV-infected mothers when the family has reliable access to sufficient formula for at least six months and the resources such as clean and safe water, fuel, utensils, skills and time to prepare it accurately and hygienically (WHO, 1998).

According to the findings of this study, 6% of the respondents who opted RF, either ended up mixing infant formula or/and cow's milk before the infants were six months or introduced other foods and drinks along with the infant formula. Reasons for doing so could not be established; probably it was due to its expensiveness. The main reason given by mothers who opted RF as a feeding option of their choice was to avoid transmission of HIV to their infants through breast milk. The investigation done in Botswana by UNICEF (2002), indicated that RF opted by HIV-infected mothers from birth does not improve HIV-survival compared to breastfeeding even in such better-off African countries.

#### **5.2.3.2 Utensils used to feed the infants**

Nearly two third of the respondents (68.4%) used bottle for feeding their infants; and all mothers who opted replacement feeding indicated the use of feeding bottles. The findings of this study do not differ much from what has been found by Nyagawa

(2004) which indicated that about 9% of all infants receive food and drinks from bottles. Feeding bottles are discouraged as they increase the risk of diarrhoea due to difficulty in cleaning, hence easy contamination. Cullinan (2007) reported of more deaths among formula fed infants (more than double) than those that occur among exclusively breastfed infants. Many of these deaths were not related to HIV but were the result of diarrhoea brought about by the risk of bottle feeding-based gastrointestinal infections caused by contaminated water and unsterilized bottles.

#### **5.2.3.3 Core issues which facilitate successful breastfeeding**

Core issues which facilitate successful breastfeeding were also investigated. The study findings have shown that skin-to-skin contact was rarely practiced. Only 3% of respondents had skin-to-skin contact with their infants soon after delivery. Skin-to-skin contact is encouraged by the Baby Friendly Hospital Initiative (BFHI) to be made early as it helps to establish a bond between mother and child; it also helps to keep the newborn warm. There is a great need to promote skin-skin contact in health facilities so that even the HIV-infected mothers who may have chosen not to breastfeed could have plenty of physical contact with their infants, as this facilitates bonding between the mother and the baby (URT, 2007).

Early initiation of breastfeeding, preferably within one hour of delivery, is one of the aspects being promoted by BFHI. The BFHI is a worldwide project launched in 1991 by the WHO and UNICEF which recognizes that good maternity care is important to promote breastfeeding. Baby friendly practices improve conditions for all mothers and babies, including those who are not breastfeeding. Early initiation of

breastfeeding helps to stimulate breast milk production and also fosters mother-child bonding. Delayed initiation of breastfeeding might increase the chance of introducing pre-lacteal feeds to an infant, which may later contribute to ineffective suckling of infant to the breast, hence failure in breastfeeding. However, the results from this study showed that, there was no significant association between respondents' knowledge and the practice of early initiation of breastfeeding ( $p=0.172$ ). About 23.4% of mothers delayed in initiating breastfeeding after delivery. A study carried out in Morogoro, Tanzania (Shirima *et al.*, 2001) reported the same findings.

Regarding introduction of pre-lacteal feeds to infants immediately after delivery, only one infant was given glucose water before initiating breastfeeding. These results differ from what has been found in studies conducted in Tanzania regions of Morogoro, Igunga and Kilimanjaro (Shirima *et al.*, 2001; Agnarsson *et al.*, 2001; de Paoli *et al.*, 2001) whereby the practice of giving pre-lacteal feeds was common. The difference noted might be due to the efforts being made by PMTCT of HIV strategy of discouraging mixed feeding from early days of an infant, as they increase the transmission of HIV.

In this study knowledge of mothers was not significantly associated with the practice of feeding colostrum to the newborn babies ( $p= 0.139$ ). Results show that 6.4% of breastfed infants were not given the colostrum as they thought it was dirty and might harm the baby. The findings conform to previous study (Shirima *et al.*, 2001) which reported the discarding of colostrum among the studied groups of breastfeeding mothers. Colostrum provides protective antibodies and essential nutrients to an infant

against infections and also reduces the chances of death in the neonatal period (Edmond *et al.*, 2006). However, most of the respondents had either primary education or no formal education, hence might have failed to acknowledge the importance of colostrum in the early days of an infant. Although the figure of mothers who discarded colostrum is not so alarming, it is significant; there is, therefore, a need to promote the importance of its use among breastfeeding mothers, especially in this era of MTCT of HIV.

The WHO/UNICEF Global strategy for infant and young child feeding clarifies what all infants need in terms of food in order to support normal growth and development. While breastfeeding represents a critical aspect of infant feeding throughout the first two years of life, all infants need additional nutritionally adequate and safe complementary foods after six months of age, irrespective of whether they receive breast milk or replacement feeds. Timely complementary feeding is important for good nutritional status of children.

Although more than half of the respondents in the study were found to introduce complementary food at six months, there still were those who practiced EBF for only three months or less, and these reported to start giving other foods and /or drinks before the infants were six months (early complementation). Maize porridge was mentioned by the majority as the main complementary food for their children. The findings also showed that a majority of the children were fed five-times or more a day as recommended. The practice of early complementation among the infants has been reported in many parts of Sub-Saharan Africa, Tanzania being one of them

(Coutsoudis *et al.*, 1999; Coovadia *et al.*, 2007). Similar results of early complementation have also been reported by TFNC (2004) which indicated 67% of children starting complementary feeding before the age of six months. The findings show that there is an urgent need for PMTCT counsellors to strengthen counselling and make a child reach six months and avoid early complementation.

### **5.3 Factors that Influenced the Respondents' Choice on Infant Feeding Methods**

In order for a mother to decide whether to practice EBF or replacement feeding, there are a number of issues which influence her decisions. These issues include: infant feeding counselling, experience with any breast conditions, whether follow-up and support was provided to the mother and disclosure of the HIV positive status to the relatives.

Infant feeding counselling is very important for an HIV- infected mother so that she can be able to make an informed choice on how to feed her infant. All HIV-infected mothers should receive skilled counselling which includes provision of general information about the risks and benefits of various infant feeding options, and specific guidance in selecting the option most likely to be suitable for their situation. Whatever a mother decides, she should be supported in her choice (WHO, 2010). Provision of counselling in a study area does not adhere to the national guidelines for PMTCT of HIV, as 14% of mothers were found not to have received counselling as far as infant feeding is concerned. Those found to have been counselled, most got the counselling during pregnancy. Counselling the mother during pregnancy is important

so that she gets enough time to prepare herself for feeding the expected infant. These findings do not differ much with the study conducted in Botswana which showed that the HIV-infected mothers discussed with health workers on infant feeding options during pregnancy and only 35% discussed advantages and disadvantage of the options (MOH Botswana, 2001).

However, counselling goes hand in hand with demonstration so that the lesson conducted can be well understood by the clients. In this study not all breastfeeding mothers were shown by demonstration how to position and attach the baby to the breast. This was observed when mothers were asked to demonstrate the way to properly attach and position the baby to the breast, and only few could demonstrate correctly. This could be attributed to inadequate knowledge and skill among the counsellors on infant feeding issues as it was found in previous studies carried in Tanzania and Malawi respectively (Leshabari *et al.*, 2007; Njuga, 2008). In Njuga's study done in Malawi, an interviewed nurse observed that lack of training in PMTCT infant feeding counselling represented major obstacles on how messages on infant feeding for HIV infected mothers were provided. The nurse explained her situation by elaborating that "I have had no training in PMTCT infant feeding counselling. I was just given an infant feeding training manual to study- but you know, self study is not the same thing as being trained. I am sure my messages to HIV-infected mothers will improve after training". Hence, there is a great need for PMTCT counsellors to be adequately trained on infant feeding issues and be updated with new knowledge. This is very important because guidelines on HIV and infant feeding continue to be revised due to ongoing research and new findings to prevent MTCT of HIV.

Inadequate support and regular follow up was also observed in this study. HIV – infected mothers need to be supported so that they can implement the infant feeding option of their choice as well as get help in case any problem occurs. Mothers usually failed to stick to their decision to exclusively breast feed up to six months due to breast conditions such as cracked nipples or mastitis. This has been observed in a study done in Malawi (Njuga, 2008). Probably lack of support and follow-up observed in this study could have led some mothers to abandon EBF to replacement feeding which also was found to be inappropriately done. It was surprising to find some cultural beliefs among the respondents, whereby they breastfed using one breast, believing the other breast had been attacked by an evil spirit. Such kind of cultural belief hinders HIV-infected mothers to practice EBF and as a result end up practicing replacement feeding. Adequate support and regular follow up is very important to enable mothers adhere to EBF option as well as to overcome constraints being faced by them during breastfeeding.

The findings of this study show that HIV-infected mothers were sensitized on the importance of disclosing their HIV-positive status to their relatives (81%). However, more than half of the mothers did not disclose their status to their husbands due to fear of stigma and others were worried about the prospect of being divorced by their husband. Disclosure of HIV status to the partner is usually a major obstacle to the practice of replacement feeding in early days of an infant. Findings of this study comply with what has been reported by other research findings (Leshabari *et al.*, 2007; Njuga, 2008) which showed that mothers feared for their families' social and economic future. Njuga in his findings explained how the families of nine HIV-

infected mothers were disrupted after they had disclosed their HIV+ status. Their partners abandoned them and when four remarried and revealed their status, the new partners, in the end, also deserted them. Findings in this study differ from other studies carried out in other African countries which maintain that disclosure of HIV+ status to the partner brings about family sympathy and support, and improves adherence to infant feeding options (Medley *et al.*, 2004).

#### **5.4 Nutritional Status of the Children Born to the Interviewed Respondents**

Adequate feeding practices are crucial to achieving optimal child growth. Dietary diversity, the consumption of an adequate variety of food groups, is an aspect of dietary quality and can be considered an indicator of general nutritional adequacy. Dietary diversity is endangered if breast-feeding is abruptly replaced by poor replacement feeding (Becquet *et al.*, 2006). The study findings revealed that 22% of babies were malnourished either in one or in all three months of their nutritional status follow up. Moreover, out of children found to be malnourished, about three quarters of them were having low birth weight. This could have been contributed by so many factors, including shorter gestational age, viral load (severity of HIV disease) and intrauterine growth retardation in HIV-infected mothers. Furthermore, those infants found to be malnourished, about 59% were between 6 -12 months. This indicates that the problem might be related to feeding practices during complementation period. Although a majority of the respondents reported of feeding their children more than five times a day as recommended, we felt that some of the mothers were not practicing what they reported.

Hence, HIV-infected women should turn to early cessation of breastfeeding only when they are counselled properly to replace EBF with ERF until the child is six months. Then they should provide adequate and safe complementary feeding to take the place of breast milk or any other milk chosen based on AFASS criteria.

## CHAPTER SIX

### 6.0 CONCLUSIONS AND RECOMMENDATIONS

#### 6.1 Conclusions

- (i) The study revealed glaring evidence that knowledge, attitude and practices on breastfeeding among HIV-infected mothers are limited. It was expected that HIV-infected mothers attending PMTCT centres were well equipped with adequate knowledge and skills on PMTCT and infant feeding issues so that they could make an informed choice of feeding their infants. Contrary to this, it was found that even core aspects which facilitate optimal breastfeeding are not either known or practiced by the interviewed mothers.
  
- (ii) The study found that breastfeeding was an infant feeding option chosen by the majority of the mothers. Nevertheless, its implementation was found not to adhere to both the national and international guidelines which recommend that those who have opted it, should practice EBF for the first six months. It was noted that due to fear of MTCT of HIV through breastfeeding, mothers stop practicing EBF early and shift to replacement feeding which is not even implemented as per national guideline recommendation. Infants from early stage were given other foods and drinks such as porridge, water and juices before the age of six months. Instead of practicing ERF, mothers tended to mix infant formula/cows milk with other foods and drinks before the age of six months. However, bottle feeding was found to be preferred by all mothers who opted for replacement feeding from the beginning as well as those who decided

to shift from EBF to replacement feeding. Consequences of bottle feeding such as diarrhoea and gastrointestinal infections caused by contaminated water and unsterilized bottles might be a problem in the area, though there was no established evidence for that.

- (iii) Breast conditions such as sore/ nipple cracks and mastitis; fear of stigma, lack of counselling and follow up, as well as cultural beliefs such as breastfeeding by using one breast, were observed as the constraints faced by the study respondents. Other core aspects which facilitate successful breastfeeding such as early initiation of breastfeeding, skin-to-skin contact and giving colostrum to the newborn were found not to be practiced as recommended. All these hinder mothers from practicing optimal breastfeeding in this era of HIV infection.
- (iv) The limitation of KAP, as found, could have been attributed by factors like inadequate counselling and skills provided as well as lack of support and follow up from both service providers and community/family members to the mothers. HIV-infected mothers do not get specific guidance in selecting the option most likely to be suitable for their situation. Both health service providers and community/family members play a big role in influencing mothers' decision on infant feeding issues.
- (v) Counselling services on infant feeding options need to be strengthened. More training and sensitization to update knowledge among the counsellors on

breastfeeding and PMTCT of HIV in general is needed. Moreover, community groups such as Home Based Care (HBC) providers need to be recruited to provide support for, and make a follow up of mothers in the communities. They also need to be equipped with current knowledge on PMTCT of HIV specifically on issues related to the promotion, protection and support of EBF.

- (vi) The study findings can be directly generalized to the Tanzanian community. This is due to the uniformity of PMTCT of HIV services provided to all HIV-infected mothers all over the country.

## **6.2 Recommendations**

- (i) Since the national and international guidelines on HIV and infant feeding tend to change based on findings of the on-going research, there is a need for the Ministry of Health and Social Welfare, in collaboration with Local Government and Non-Government Organizations, to conduct KAP studies more often to assess current KAP of the HIV –infected mothers. This will help to correct inadequate knowledge and skills as well as to facilitate good practices for successful EBF in prevention of MTCT of HIV.
- (ii) There is a need to conduct a research on assessment of KAP of the health workers/counsellors attending HIV-infected mothers in PMTCT centres. The limitation of KAP found among the interviewed mothers could have been highly contributed by inadequate knowledge and skills among the PMTCT counsellors. In order for the PMTCT of HIV programme in the country to be

successful, there is a need to have adequate and skilled counselling as well as regular follow up and support to enable mothers implement the feeding options of their choice without any hindrance.

- (iii) Furthermore, mothers who have opted EBF as the feeding option of their choice should be accorded a demonstration on how to position and attach the baby properly to the breast. This will help to minimize the likelihood occurrence of the breast conditions.
- (iv) PMTCT programs in the country should increase the involvement of community leaders as well as family members, particularly male partners, to build awareness on infant feeding. This will ensure that when the mother chooses a recommended infant feeding regime, she is able to go back home to a community and family that will support her intentions and reduce the existence of stigma and discrimination against her.
- (v) EBF practice for six months as recommended by WHO has been a problem reported for a very long time in so many studies carried out especially in Sub-Saharan African countries and other developing countries. It is high time both national and international communities set out applicable recommendations on infant feeding for HIV-infected mothers rather than relying on those designed to cut across all the nations regardless of the socio-economic differences.

- (vi) Since this study looked partially at the nutritional status of the infants born to HIV-infected mothers and found that nearly quarter of their children were malnourished, there is a need to conduct a study to assess the nutritional status of infants fed on EBF against those fed on RF after the age of six months.
  
- (vii) Adherence of the HIV infant feeding guideline especially the practice of EBF had been difficult to some of the HIV-infected mothers. This could have been contributed by the illiteracy rate of some of the mothers as there were others who did not have even formal education. Hence, recommendations formulated for HIV-infected mothers regarding infant feeding options should strictly consider the background of these women in order to make them be more feasible.

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## APPENDICES

## Appendix 1: Studied variables

<b>Variables</b>	<b>Indicator/definition</b>	<b>Objective covered</b>
<b>Mother's level of knowledge</b>	Breastfeeding issues Appropriate time to initiate BF (within an hour after birth or after that) Importance of colostrum to the baby Meaning and benefits of EBF Recommended time/age for practicing EBF Duration for BF Appropriate age for complementation MTCT and PMTCT of HIV issues- Mode of MTCT of HIV Types of infant feeding options Factors related to BF which increase the risk of transmission Ways used by a BF mother to reduce the risk of MTCT	<b>Objective no. 1</b>
<b>Mother's attitude</b>	Feeling on time to initiate BF (strongly agreed, agreed, undecided, disagreed, strongly disagreed) Attitude on feeding colostrum (strongly agreed, agreed, undecided, disagreed, strongly disagreed) HIV-infected mother to practice MF (strongly agreed, agreed, undecided, disagreed, strongly disagreed) Risk involved in practicing MF Infant feeding ways used to reduce MTCT Most feasible IF option for HIV-infected mothers and reasons	<b>Objective no 1</b>
<b>Mother's practices</b>	Time initiated BF Provision of pre-lacteal food Feeding of colostrum to the baby Experience with any breast problem Time she stopped BF Type of food and drinks given to the baby Time introduced complementary food Any risk involved in early complementary feeding to a child Type of IF option chosen	<b>Objective no 2</b>

<b>Factors influences mothers' choice of BF or RF</b>	Constraints faced by the mother Experience with any BF problem (sore/nipple cracks, mastitis, cultural beliefs) Shown on how to position and attach the baby to the breast (correct and incorrect demonstration) If received IF counselling If support and follow given by the Health Workers/Counsellors on how to feed the baby Disclosure of HIV status to the relatives/family	<b>Objective no.3</b>
<b>Nutritional status of the child</b>	Age of the child Weight of the child Mode of delivery	<b>Objective no. 4</b>

## Appendix 2: Definitions of terms used in the study

Terms	Operational definition
<b>Exclusive Breastfeeding</b>	Feeding only breastmilk and prescribed medicine but no water, other liquids or foods to the infants for the first six months of life
<b>Replacement feeding</b>	Feeding infant something other than breastmilk
<b>Mixed feeding</b>	Feeding both breastmilk and other liquids (such as water, tea, formula, animal milk) or foods (such as porridge or rice)
<b>Complementary foods</b>	Any food, whether manufactured or locally prepared, that is added to a child's diet when the child reaches 6 months of age (complementary foods are needed because breastmilk or replacement foods alone do not satisfy the child's nutritional requirements after this age)
<b>AFASS</b>	<p>An acronym that stands for acceptable, feasible, affordable, sustainable and safe.</p> <p><b>Acceptable:</b> The mother perceives no significant barrier(s) to choosing a feeding option for cultural or social reasons or for fear of stigma and discrimination</p> <p><b>Feasible:</b> The mother (or other family members) has adequate time, knowledge, skills, and other resources to prepare feeds and to feed the infant, and has support to cope with family, community and social pressures.</p> <p><b>Affordable:</b> The mother and family, with available community and health system support, can pay for the costs of the replacement feeds-including all ingredients, fuel and clean water without compromising the family's health and nutrition spending.</p> <p><b>Sustainable:</b> the mother has the access to a continuous and uninterrupted supply of all ingredients and products needed to implement the feeding option safely for as long as the infant needs it.</p> <p><b>Safe:</b> Replacement foods are correctly and hygienically stored, prepared and fed in nutritionally adequate quantities; infants are fed with clean hands using clean utensils feeding, preferably by cups.</p>
<b>Colostrum</b>	The thick, yellowish milk the mother produces in the first few days after birth. It is very nutritious and helps to discharge the first stool and to prevent jaundice. It also protects the baby against infections by building the baby's immune system.
<b>Pre-lacteal feeds</b>	Refers to foods or liquids that are given to a newborn baby prior to the introduction of breastmilk.

**Appendix 3: English version questionnaire**

**QUESTIONNAIRE ON ASSESSMENT OF KNOWLEDGE, ATTITUDES AND  
PRACTICES ON BREASTFEEDING AMONG HIV-INFECTED MOTHERS  
WITH CHILDREN IN KIBAHA TOWN COUNCIL**

**OFFICIAL USE**

Name of District..... Questionnaire No.....

Name of PMTCT site..... Name of the section.....

Name of interviewer..... Date of interview.....

<b>SECTION 1: SOCIO-DEMOGRAPHIC INFORMATION OF THE MOTHER</b>			
Q1	How old are you? (Age in complete years)	Years.....	
Q2	What is your current marital status?	1. Married (Monogamy) 2. Married (Polygamy) 3. Unmarried      4. Divorced 5. Widowed      6. Cohabitant	( )
Q3	How many are you in your household? .....	1. Children <5 ..... 2. Those between 5- 10 3. 11 – 17 years ..... 4. 18 years and above .....	( )
Q4	How many children do you have?	Number of children.....	
(a)			
(b)	What position of delivery does this child occupy?	..... born	
Q5	What is your highest level of education?	1. Never gone to school 2. Primary education 3. Secondary education 4. College education 5. University education	( )
Q6	What is your current occupation/activity?	1. Employed      2. Self employed 3. Housewife   4. Others (specify).....	( )
Q7	What is your current main occupation	1. Employed      2. Self employed 3. Petty business   4. Big business 5. Farmer 6. Others(specify).....	( )

<b>SECTION 2: INFORMATION OF THE CHILD</b>			
Q8	How old is your child?(Check the child RCH clinic card no 1)	Age in complete months.....	
Q9	What was the child's birth weight? (Interviewer check RCH clinic card no 1 and record the birth weight)	Birth weight.....	
Q10	What is the sex of your child?	1. Male                      2. Female	( )
Q11	Where did you deliver this child?	1. Hospital      2. Health centre 3. Dispensary 4. Home              5. Others (specify).....	( )
Q12	What was the mode of delivery?	1. Normal spontaneous 2. Normal assisted (vacuum/forceps) 3. operation	( )
Q13	What was the condition of the baby immediately after delivery?	1. Good health      2. Premature delivery 3. Low birth weight baby 4. Had deformity      5. Very weak 6. Had difficult breathing	( )
Q14	Who assisted you during the delivery of the child?	1. Nurse    2. Doctor    3. Village health worker 4. TBA    5. Family members 6. Other (mention).....	( )
Q15	How long after delivery did you hold your baby?	1. Within an hour 2. As soon as I was able to respond ( after C-section with general anesthesia) 3. Other: (How long after birth?) in hours..... 4. Can't remember	( )
Q16	If delayed to hold your baby (>1hr) what was the reason?	1. My baby needed help/observation Y/N 2. I was given an anesthetic    Y/N 3. I was too tired    Y/N 4. My baby was not given to me but do not know the reason    Y/N 5. Other (specify).....	( ) ( ) ( ) ( )
Q17	How did you hold your baby during the first time?	1. Skin to skin contact 2. Wrapped without much skin contact	( )
<b>SECTION 3: ASSESSMENT OF KNOWLEDGE ON BREASTFEEDING, MTCT AND INFANT FEEDING IN GENERAL</b>			

Q1 8	What is the appropriate time to initiate breastfeeding after safe delivery?	1. Within 1 hour 3. After 6 hours 5. Do not know	2. 2-6 hours 4. Others (specify)	( )
Q1 9	What is the importance of yellowish milk (colostrums)?	1. Nutritious Y/N 2. Protection against infection Y/N 3. No importance Y/N 5. Do not know	4. Others (specify).....	( )
Q2 0	Have you ever heard about exclusive breastfeeding?	1. Yes	2. No	( )
Q2 1	What is the meaning of exclusive breastfeeding	1. Answer given- correct 2. Answer given- not correct		( )
Q2 2	What are the benefits of breastfeeding a child exclusively?	1. Good Nutrition Y/N 3. Reduces Chances of MTCT of HIV Y/N 4. Reduces risks of infections Y/N 5. Reduces costs Y/N 7. Do not know	2. Family Planning Y/N 6. Others (mention)..... ...	( ) ( ) ( ) ( )
Q2 3	Where did you hear about exclusive breastfeeding?	1. Health workers/Counselors Y/N 2. Village health workers Y/N 4. Radio/TV/Magazines Y/N 5. Relatives/Friends Y/N	3. TBAs Y/N 6. Other (specify).....	( ) ( ) ( )
Q2 4	For how long is breastfeeding alone sufficient for your baby?	1. 1-3 months 3. 6 months 5. Do not know	2. 4-6 months 4. Others (specify).....	( )
Q2 5	In your opinion, what do you think are the main reasons that hinder HIV-infected mothers from breastfeeding a baby exclusively for the first 6 months?	1. Fear of MTCT of HIV Y/N 2. Lack of information on the importance of EBF to the HIV-infected mothers Y/N 3. Insufficient milk due to poor nutritional Status/condition of the mother Y/N 4. Traditional beliefs and behaviour Y/N 5. I do not know 6. Others (mention).....		( ) ( ) ( ) ( ) ( )
Q2 6	In your opinion, what do you think should be done to	..... ...		

	ensure HIV-infected mothers are exclusively breastfed for the first 6 months?	... ..... ... ..... ...	
Q2 7	How many times per day should a child be breastfed?	1. 8-10 times    2. 5-7 times 3. 1-4 times 4. As need arises (frequent and demand feed) 5. Do not know	( )
Q2 8	What is the appropriate time to commence complementation?	1. 1-3 months    2. 4-5 months 3. 6 months    4. Above 6 months 5. I do not know	( )
Q2 9 (a)	Is there any possibility of MTCT of HIV? <b>If Yes, go to question 29 (b)</b>	1. Yes                      2. No    3. Do not know	( )
(b)	When can HIV pass from mother to child?	1. During pregnancy    Y/N 2. During labour and Delivery Y/N 3. During BF    Y/N                      4. Do not know	( ) ( )
(c)	Do all HIV-infected mothers pass the virus to their children?	1. Yes                      2. No	( )
Q3 0	If BF contributes MTCT of HIV, what factors increase the risk?	1. Duration of BF Y/N    2. Mixed feeding Y/N 3. Nipple cracks/fissures Y/N    4. Mastitis Y/N 5. High maternal viral load Y/N 6. Bad position and attachment of the baby during BF    Y/N 7. Others (specify).....	( ) ( ) ( ) ( )
Q3 1	Which ways can be used for a breastfeeding mother to reduce the risk of MTCT of HIV? (mention)	1. .... 2. .... 3. .... 4. ....	
Q32 (a)	Mention any 2 types of infant feeding options which you know	1. .... 2. ....	
(b)	Can you explain briefly on those feeding options you	1. Yes                      2. No	( )

	have mentioned?		
(c)	If yes, First feeding option	1. Explanation given- correct 2. Not correct	( ) ( )
	Second feeding option	2. Explanation given- correct 2. Not correct	
Q3 3	Where did you get information on infant feeding options?	1. Health service providers Y/N 2. Family Members Y/N 3. CBOs Y/N 4. NGO's Y/N 5. Other (mention).....	( ) ( )
<b>SECTION 4: ASSESSMENT OF ATTITUDE ON BREASTFEEDING, MTCT AND INFANT FEEDING IN GENERAL</b>			
Q3 4	How do you feel about initiating breastfeeding within 1 hour after delivery?	1. Strongly agree 2. Agree 3. undecided 4. Disagree 5. Strongly disagree	( )
Q3 5	How do you feel about feeding the baby the first yellowish milk (colostrums)?	1. Strongly agree 2. Agree 3. undecided 4. Disagree 5. Strongly disagree	( )
Q3 6	What is your attitude regarding HIV-infected mothers to practice EBF for the first six months?	1. Strongly agree 2. Agree 3. undecided 4. Disagree 5. Strongly disagree	( )
Q3 7 (a)	How do you feel as a HIV-infected mother practicing mixed feeding?	1. Strongly agree 2. Agree 3. undecided 4. Disagree 5. Strongly disagree	
(b)	Is there any risk you feel involved in practicing mixed feeding?	1 Yes 2. No	( )
(c)	If yes, what are they?	..... ... ..... ...	
Q3 8	In your opinion which infant feeding ways do you feel can be used to reduce the risk of MTCT of HIV? (mention)	..... ..... ..... .....	
Q3	Which infant feeding	1. EBF & early cessation before 3 months	( )

9 (a)	option do you feel is the most feasible for HIV-infected mothers?	Y/N 2. EBF for six months Y/N 3. Expressed and heat treated breast milk Y/N 4. Commercial infant feeding formula Y/N 5. Animal milk (Specify)..... Y/N 6. Other (mention).....	( ) ( )
(b)	Why do you feel that the chosen feeding option is the most feasible?	1. Reduce MTCT Y/N 2. For protection against disease Y/N 3. Nutritious Y/N 4. Other (specify).....	( ) ( ) ( )
<b>SECTION 5: ASSESSMENT OF PRACTICES ON BREASTFEEDING AND INFANT FEEDING IN GENERAL</b>			
Q4 0	When did you initiate breastfeeding after delivery?	1. Within 1 hour 2. After 1 hour- mention hours..... 3. N/A (for those who are in replacement feeding)	( )
Q4 1	Was your baby given anything before initiating breastfeeding?	1. Yes 2. No 3. Don't know 4. N/A	( )
Q4 2	If yes, what was given?	1. Cows milk Y/N 2. Plain water Y/N 3. Infant formula Y/N 4. Thin porridge Y/N 5. Glucose water Y/N 6. Other fluids (Specify).....	( ) ( ) ( )
Q4 3	Did you feed your baby the first yellowish milk (Colostrum)?	1. Yes 2. No 3. N/A	( )
Q4 4	If no, why?	1. It is dirty Y/N 2. It will harm the baby Y/N 3. Culturally unacceptable Y/N 4. Other (Specify).....	( ) ( ) ( )
Q4 5	How are you feeding your baby now?	1. Exclusive breastfeeding 2. Predominant bf i.e. bf and small amount of water or water based food 3. Breastfeeding and other foods 4. Stopped breastfeeding and feed on other food 5. Other (specify) 6. N/A (those on RF)	( )
Q4 6	If practicing EBF, how long do you intend to exclusively	..... months	

	bf your baby? (in months)		
Q47	If you intend/intended to exclusively bf for less than 6 months, what are/were the reasons?	..... .....	
Q48	Do you/did you experience any breast problems?	1. Yes                                      2. No	( )
Q49	If yes, what is/was the problem? If no, go to Q 51	1. Nipple crack/Sore nipples Y/N 2. Mastitis (painful breast and fever) Y/N 3. Engorgement Y/N    4. Blocked duct Y/N 5. Painful nipple Y/N    6. Others (mention).....	( ) ( ) ( )
Q50	How are you treating/did you treat the problem? (probe)	1. Nipple crack/Sore nipples ..... 2. Mastitis.....3.Engorgement..... 4. Blocked duct ..... 5. Painful nipple .....	
Q51	If stopped breastfeeding, when did you stop? (in months) If still on EBF, go to Qn 61	When the child was ..... months	
Q52	Why did you stop breastfeeding?	1. The child had become big Y/N 2. To reduce the HIV transmission Y/N 3. I did not have enough milk anymore Y/N 4. I was advised to stop Y/N 5. Other (mention).....	( ) ( ) ( )
Q53	If you were advised to stop, who gave you the advice?	1. A health worker/Doctor    2. Husband 3. Family member(s)    4. Others (specify).....	( )
Q54 (a)	If not practicing exclusive breastfeeding, what type of food or liquids are you giving your baby now?	1. Infant formula Y/N    2. Animal milk Y/N 3. Juice Y/N                      4. Water Y/N 5. Thin porridge Y/N 6. Glucose water Y/N    7. Others (Specify).....	( ) ( ) ( )
(b)	When did you start to introduce those foods?	When the baby was .....months	( )
	How do you feed	1. By bottle                      2. Cup and spoon	( )

(c)	your baby the specified foods?	3. Cup only      4. Others (specify).....	
Q5 5	Why did you decide to give the child other foods/drinks?	1. To reduce the HIV transmission Y/N 2. Breast milk was not enough Y/N 3. My condition was not well due to my HIV Status Y/N 4. Because of the breastfeeding conditions/problems Y/N 5. Others (specify).....	( ) ( ) ( )
Q5 6	How many times per day do you/did you often feed your child? (day and night)	1. Once      2. Twice      3. Thrice 4. Four times      5. Five times 6. More than 5 times	( )
Q5 7	If did not opt EBF, what type of milk did you choose?	1. Commercial infant feeding (infant formula) 2. Animal milk (specify)..... 3. Other (mention).....	( )
Q5 8	How long do you intend to feed your baby with cow's milk/ formula only? (in months)	..... months	
Q59 (a)	What kind of complementary foods are normally given to the baby	1. .... 2. ..... 3. .... 4. ....	
(b)	When did you start to give such fluids/foods? (In months)	Months.....	
Q60 (a)	Are there any risks involved in early complementary feeding to a child? (before 6 months)	1. Yes.....go to Qn 60 (b) 2. No.....go to Qn 61	( )
(b)	What are the risks? (List them)	1. ..... 2. .....	
<b>SECTION 6: CONSTRAINTS FACED BY THE MOTHER ON PRACTICING INFANT FEEDING OPTIONS</b>			
Q6 1	When did you diagnose that you are	.....	

	HIV- positive? (Year and Month)		
Q62 (a)	Did you disclose your HIV serostatus to your relatives?	1. Yes.....go to Qn 62 (b) 2. No.....go to Qn 62 (c)	( )
(b)	Who are they? (mention them)	1. ..... 2. .....	
(c)	If not, give reasons	..... ...	
Q63 (a)	Are you facing any constraint on infant feeding option of your choice?	1. Yes..... go to Qn 63 (b) 2. No..... go to Qn 64	( )
(b)	Mention the constraint(s)	1. ..... 2. .....	
Q6 4	If option of your choice is exclusive BF were you shown how to position and attach the baby to the breast?	1. Yes..... go to Qn 65 2. No..... go to Qn 66 3. N/A..... go to Qn 66	( )
Q6 5	Could you demonstrate how properly to position and attach the baby to the breast?	1. Demonstrated well 2. Not demonstrated well	( )
<b>SECTION 7: SERVICES PROVIDED IN THE PMTCT AND OTHER INSTITUTION TO SUPPORT INFANT FEEDING</b>			
Q66 (a)	Did you get infant feeding counseling?	1. Yes..... go Qn 66 (b) and (c) 2. No..... go Qn 67	( )
(b)	When did you get such service?	1. Before pregnancy    2. During pregnancy 3. During delivery    4. After delivery	( )
(c)	Where did you get it?	..... ..... ...	
Q6 7	Were the procedures of the chosen feeding option demonstrated to you?	1. Yes..... go to Qn 68 2. No..... go to Qn 69	( )
Q6 8	If yes, how do you see the procedures?	1. Can you practice them? Y/N 2. Are they understandable? Y/N	( ) ( )

		3. Are they of benefit to you? Y/N 4. All of the above 5. None of the above	( )
Q6 9 (a)	Do you get support and follow up from the health worker on how to feed your baby?	1. Yes 2. No	( )
(b)	If yes, what support did you get regarding exclusive BF?	1. Proper position and attachment Y/N 2. Dangers of mixed feeding Y/N 3. Preventing breast conditions Y/N 4. Breastfeeding on demand-day and night Y/N 5. Duration of breastfeeding Y/N 6. Other (specify)..... .....	( ) ( ) ( ) ( )
Q7 0	What are you doing to protect your baby from getting HIV? (probe to find out whether the mother is practicing safe sex, and about avoiding mixed feeding)	..... ... ..... .....	
Q7 1	What is your opinion on improving infant feeding on PMTCT?	..... ... ..... ...	
<b>SECTION 8: NUTRITIONAL STATUS OF THE CHILD</b>			
Q7 2	What is the age of the child today? (confirm by looking at the clinic card)	Age in months.....	
Q7 3	What is the weight of the baby today? (If not shown in the card weigh the child)	Weight in grams.....	
Q7 4	What is the weight of the baby for the: Last 2 months	Last months..... Last 2 months.....	

**THANK YOU FOR YOUR COOPERATION**

**Appendix 4: Observation guide**

Name of District..... Observation guides No.....

Name of PMTCT site..... Name of the section.....

Name of interviewer..... Date of interview.....

<b>POSITION AND ATTACHMENT</b>			
Q1	If breastfeeding a child less than 3 months observe the following positioning, attachment and scissor holding	Positioning 1. Correct 2. Incorrect	( )
		Attachment 1 Correct 2. Incorrect	( )
		Scissor holding 1 Yes 2. No	( )
Q2	How long does a baby feed per each breast?	.....	
<b>BREAST CONDITIONS</b>			
Q3	Any sign of cracked nipples	1. Yes 2. No	( )
Q4	Any sign of engorgement	1. Yes 2. No	( )
Q5	Any sign Mastitis	1. Yes 2. No	( )
Q6	Any sign of breast abscess	1. Yes 2 No	( )
Q7	Painful nipple (mother show signs of pain when breastfeeding)	1. Yes 2. No	( )
Q8	Others (specify)	..... .....	
<b>ANY ABNOMALITIES</b>			
Q9	Does the baby have any deformity which causes difficulties in breastfeeding	1. Yes 2. No	( )
Q10	If yes, what kind of deformity?	..... .... ..... ....	
Q11	Does the baby have any sores in his/her mouth which interfere with breastfeeding?	1. Yes 2. No	( )
Q12	Does the baby have any thrush/fungi infection in his/her mouth which interferes with breastfeeding?	1. Yes 2. No	( )