FACTORS THAT INFLUENCE INFANT FEEDING CHOICES AND PRACTICES AMONG HIV POSITIVE MOTHERS IN MUSOMA MUNICIPAL

BY

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ABSTRACT

The choice of infant feeding method is important for HIV mothers in order to optimize the chances of survival of their infants and to minimize the risk of HIV transmission. The aim of this study was to investigate factors influencing infant feeding choices of methods and practices among HIV positive pregnant mothers in Musoma municipal. A cross sectional design involving a total of 84 HIV positive mothers attending antenatal clinic under PMTCT programme was employed. Structured interviews were administered to all mothers to be studied at ANC (antenatal clinic) while semi-structured interviews were administered to few selected mothers from the sample. Observation method was also employed throughout the study. The choices made were exclusive breast feeding for six months (54.8%), exclusive breast feeding for three months (29.8%) and exclusive replacement feeding (14.2%). There were no significant association (p-value > 0.05) between education level of respondents and choices of infant feeding. Major factors influencing infant feeding choices were economic factors (35.7%), advice from health workers (20.2%), advice from friends and other relatives (19.0%) as well as fear of transmitting HIV to their infants (7.8 %). Misconceptions were noted among mothers knowledge related to HIV, MTCT, PMTCT and infant feeding. There was some discrepancy between infant feeding choice which were made before delivery and actual practices after delivery. Major challenges faced mothers in practicing method of their choice were financial constraints, insufficient milk as well as health related problems among their infants. It is therefore recommended that governments and donors should economically empower HIV positive mothers to improve their economic status as well as to educate them on how best to practice safe breast feeding since it is the most preferred infant feeding choice. The whole community should be educated on PMTCT programmes so that can support mothers to make infant feeding choices.

DECLARATION

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

2ND JUNE 2011

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DEDICATION

To my daughter, Tunu and all mothers in developing countries.

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LIST OF ABBREVIATIONS

AFASS	-	Acceptable, Feasible, Affordable, Sustainable and Safe
AIDS	-	Acquired Immune Deficiency Syndrome
ANC	-	Antenatal Clinic
EBF	-	Exclusive Breast Feeing
HIV	-	Human Immunodeficiency Virus
MTCT	-	Mother To Child Transmission
PMTCT	-	Prevention of Mother to Child Transmission
RF	-	Replacement Feeding
SPSS	-	Statistical Programme For Social Scientists
URT	-	United Republic of Tanzania
WHO	-	World Health Organization
MOH	-	Ministry of Health
TFNC	-	Tanzania Food and Nutrition Center
TDHS	-	Tanzania Demographic and Health Survey
THIS	-	Tanzania HIV Indicator Survey
UNAIDS	-	United National Program on AIDS

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

It was globally estimated that 2.3 million children were living with HIV/AIDS at the end of 2007, out of which 2 million were found in sub-Saharan Africa (UNAIDS, 2008). According to literature (WHO/UNAIDS, 2008), about 90% of those children, were infected by the virus through vertical transmission. This extent of infected children was in line with UNAIDS update of 2005, revealing that, about 700 000 infants were HIV infected every year which explains that an estimate of 5 to 15 percent of children born to HIV positive mothers were infected through their mother's milk (Leshari *et al.*, 2006). The same situation revealed in Tanzania that, mother-to-child transmission of HIV contributes to about 5% of the HIV prevalence (MOH, 2007), which reiterate the estimates made by UNAIDS. Generally transmission is said to occur in various path ways which includes in-utero (intrauterine transmission), at the time of childbirth (intrapartum transmission) and during breastfeeding (postnatal transmission) (Douglas and King, 1992).

Since breastfeeding is one of the major sources of human immunodeficiency virus (HIV) infection in babies born to HIV positive mothers, it represents a public health dilemma. This is especially in countries with a high HIV prevalence rate and where breastfeeding is a norm and essential to child survival (Suryavanshi *et al.*, 2003). In light of this dilemma, several strategies have been put into action in order to reduce postnatal transmission.

So far, the well known Prevention of Mother-to-child transmission (PMTCT) of HIV is the global intervention aimed at reducing mother-to-child transmission of HIV (MOH, 2007). Effective PMTCT consists of three elements which include preventing HIV infection

among prospective mothers, avoiding unwanted pregnancies among HIV positive mothers and preventing the transmission of HIV from HIV-positive mothers to their infants during pregnancy, labour, delivery and breastfeeding (MOH, 2007). The third of these elements/strategies could be achieved through; effective voluntary counseling and testing, the use of antiretroviral drugs, safer delivery practices and the implementation of safer feeding practices. Suryavanshi *et al.* (2003) revealed that both intra-uterine and intra-partum transmission could be substantially reduced through improved drug regimens and modifying infant feeding practices. Among these strategies of reducing postnatal transmission, infant feeding represents a great challenge in the prevention of mother-to-child transmission of HIV (Leshabari, 2007).

National guidelines informing infant feeding counseling in various countries (WHO, 2003), suggest feeding methods that reduce the risk of HIV transmission, and discourage mixed feeding (combining breastfeeding with other fluids and solids). The guidelines emphasize that all HIV-infected mothers should receive counseling. It is supposed to include 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. Despite these suggestions, most studies (Thairu *et al.*, 2005; TFNC, 2005) show that, while HIV-positive mothers commonly make a distinct choice to exclusively breastfeed or exclusively replacement feed during pregnancy, they often end up practicing mixed feeding early in the baby's life. This suggests presence of factors that create a gap between individual mother's choice and her possibility to put the choice into practice. This shows that mothers bear the responsibility of feeding infants, but decisions on practices are often not made in isolation (Sibeko *et al.*, 2009).

Feeding choices and practices may be influenced by several factors including that of economic, social and cultural (Adejuyigbe *et al.*, 2008). Stigma and secrecy surrounding HIV/AIDS make the choice of replacement feeding more difficult particularly in the strong breastfeeding culture (Adejuyigbe *et al.*, 2008). According to Rollins *et al.* (2002), this kind of challenge suggests quality counseling to be central and how to practice successful infant feeding among communities. Few studies (Chopra *et al.*, 2002; Chopra *et al.*, 2005 however, later on reported that the quality of the infant feeding counseling for HIV-positive women was poor and that counseling messages were inconsistent. Another study by (Leshabari *et al.*, 2004) indicated a challenge of few staff to have received sufficient training on counseling in the context of HIV. However, Ehrnst (2005) added that staff shortages as well as lack of time to counsel properly, even for those adequately trained in infant feeding counseling have been barriers to the provision of informed infant feeding choices.

Moreover, Doherty (2006) shows economic constraints to have made replacement feeding difficult especially when there is lack of refrigeration, running water or a ready supply of fuel for boiling water. Such factors may influence HIV-positive mothers to choose breastfeeding or to practice mixed feeding despite their access to formula milk. However in low and middle-income countries, replacement feeding is not considered to be the automatic choice for HIV positive mothers due to difficulties in accessing replacement feeding (Doherty, 2006).

In view of the discussions from various literatures it is revealed that infant feeding in the context of HIV is a difficult issue to achieve for both health workers and mothers. This is the reason why the issue of infant feeding is among the national millennium development goals towards 50 % reduction of infant HIV infection among communities

(UNDP Tanzania, 2007). To achieve this, factors that promote safer infant feeding practices have to be pursued vigorously and discourage those which are responsible for mixed feeding.

1.2 Problem Statement and Justification

Knowledge regarding the risk of transmission of HIV from mother to child through breast-feeding has greatly complicated infant feeding recommendations and choices (Suryavansh *et al.*, 2003). According to Ministry of Health (2005), HIV prevalence in the antenatal population in Tanzania was 9.6% among pregnant women in 2005, while mother-to-child transmission (MTCT) of HIV was said to contribute to about 5% of the HIV prevalence within the Country. Current data show the HIV prevalence in Mara region to be (6.7%) among women aged 15-49 who tested HIV positive (THIS 2007-08). Recommendations of international guidelines insist that women with HIV-infection in developing countries should avoid all breast-feeding when replacement feeding is acceptable, feasible, affordable, sustainable, and safe for their circumstances (Doherty *et al.*, 2006).

The practice of exclusive breast-feeding (EBF) especially during the first months of life is only allowed if replacement feeding methods do not meet the recommended criteria (Doherty *et al.*, 2006). Moreover such recommendations suggest HIV pregnant mothers to be informed about all of the benefits and risks of all infant feeding options and be supported to carry out their infant feeding intentions (Leshabari *et al.*, 2006). According to WHO (2010) current recommendations, mothers known to be HIV-infected (and whose infants are HIV uninfected or of unknown HIV status) should exclusively breastfeed their infants for the first six months of life, introducing appropriate complementary foods thereafter, and continue breastfeeding for the first 12 months of life. Breastfeeding should

then only be stopped once a nutritionally adequate and safe diet without breast-milk can be provided.

Despite the suggestions, most studies of choice of infant feeding method show that while HIV-positive mothers commonly make distinct choices to exclusively breastfeed or replacement feed during pregnancy, they often end up practicing mixed feeding early in the baby's life (Thairu *et al.*, 2005). Such practices create a major risk for HIV transmission from mother to infants of various households, communities and nation at large.

Several factors that are likely to influence HIV positive mothers' choice concerning infant feeding have been well documented in literatures of various countries (Adejuyigbe *et al.*, 2008; Sibeko *et al.*, 2009; Doherty *et al.*, 2006), with exception of Tanzania where limited studies have been conducted. Such studies focused on infant feeding practices in the context of HIV (TFNC, 2005; Leshabari, 2007), counselor's perspectives on antenatal HIV testing and infant feeding dilemmas facing infected women (de Paoli *et al.*, 2002). In addition to the studies, MOH (2005) revealed date on surveillance of HIV and syphilis infection among antenatal clinic attendees. In view of the discussed literature, the extent of HIV problem among women and presence of scanty studies in the field, the current study was meant to investigate the factors influencing the infant feeding choices and actual practices of HIV-positive mothers. Information from this study will help in providing evidence for policy guideline formulation; give assistance to health workers in counseling and providing a basis for interventions aimed at promoting safer infant feeding choices and practices among HIV positive mothers.

1.3 Objectives

1.3.1 General objective

To investigate factors that influence choice for infant feeding method and practices among HIV positive pregnant mothers.

1.3.2 Specific objectives

Specific objective of this study are:

1. To assess infant feeding choices made by HIV positive mothers
2. To assess awareness of HIV positive mothers on MTCT and infant feeding practices in relation to what health workers have taught them;
3. To identify the factors that influence infant feeding choices among HIV positive pregnant mothers.
4. Explore infant feeding practices (as per choice previously made) and adherence to that choices.

1.3 Research Questions

1. What types of feeding options adapted for infants?
2. Is what has been leant about MTCT of HIV reflect infant feeding practices?
3. What are the reason(s) for choices made by HIV positive mothers?
4. What are other experiences that have influenced choices and practices of feeding infants?

1.4 Conceptual Framework

In order to meet the information needs of the study objectives and to identify variables for data collection a conceptual framework was developed (Appendix 4). The conceptual framework shows details of the variables and examines their expected relationships.

It groups the variables into dependent and independent variables. On one hand the dependent variable was infant feeding choices, and on the other hand the independent variables were internal personal and social environmental factors.

Internal personal factors include social-demographic (age, education, income, ethnicity), economic status, social-cultural values (knowledge, attitude, belief), stigma associated with formula feed and lack of disclosure. Social-environmental (economic) factors were identified as institutional factors (availability and access to counseling, knowledge of counselor, support from health workers), individual/household income activities; policies in health, agriculture and food security; social factors (family support, stigma associated with lack of disclosure). The formulated framework assumed that each of these factors indirectly influence the choices and practices of infant feeding among HIV positive mothers.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Child Feeding Options for HIV Positive Pregnant Mothers

Infant feeding guidelines related to PMTCT in Tanzania (MOH, 2007) recommended that HIV-positive mothers need to be counseled about all the benefits and risks of all infant feeding options. The guidelines provide three options for infant feeding, which include (a) exclusive breastfeeding for six months or early cessation convenient to the individual mother's situation, (b) replacement feeding with commercial infant formula, and (c) replacement/home modified formula (cow's or goat's milk) (MOH, 2007). Within the guidelines it is also stated that, HIV-positive mothers who choose not to breastfeed should receive education on how to prepare and feed their infants with replacement foods. Moreover it is emphasized that mothers should make final choices about feeding methods and should be supported to ensure optimal nutrition for mothers and children (MOH, 2007).

2.1.1 Breast feeding option

Most times breastfeeding option is influenced by its advantages originated from traditions, culture, economic reasons and knowledge to both infants and mothers. According to literature (Humphrey and Illif, 2001; Binns and Davidson, 2003; Coovadia and Kindra, 2008), advantages of breast-feeding for infant health are well recognized and explained revealing that breast milk contains all nutrients and fluids needed for the wellbeing of infants up to 6 months of age. The milk also contains antibodies from mothers, which help to protect children from diarrhea and acute respiratory infections (WHO, 2003; WHO, 2009). Breastfeeding is considered by far to be the most economic way of feeding infants. It is easy to carry around, always available to feed infants, and is less susceptible to

infection than infant breast milk substitutes (Coovadia and Kindra, 2008). If practiced exclusively and on demand, breastfeeding delays onset of fertility after a pregnancy contributing to birth spacing, which also help to build mother and child bond (Vinter and Elisabet, 1997). Furthermore, breastfeeding is traditionally and socially accepted way of feeding children for the first two years of life in Tanzania. According to TDHS (1992) almost all under fives (95% in urban and 98% in rural areas) were being breast fed while overall, 96% of infants 12 to 15 months of age were still being breastfed. Despite the reasons and importance of breastfeeding, the rise of HIV/AIDS cases seems to have negatively affected the option especially among mothers in Africa. Breastfeeding is now newly focused as a route of transmission of the disease from mothers to children (Spencer *et al.*, 2008).

2.1.1.1 Exclusive breastfeeding

Exclusive breast-feeding is defined in PMTCT guideline as feeding infant with only breast milk and not other liquids or solids, (MOH, 2007; Shirima *et al.*, 2000). This is full breastfeeding for the first six months and thereafter breastfeeding is stopped and a child is fed on other foods. According to the guidelines and other literatures (Agnaesson *et al.*, 2001; Shirima *et al.*, 2000) the definition excludes drops or syrups consisting of vitamin, minerals, supplements or medicines prescribed by healthcare workers. The fact that exclusive breastfeeding carries a lower risk of transmission compared to mixed feeding (Coovadia *et al.*, 2007) gave new hope and set new challenges for promoting exclusive breastfeeding. It has stimulated an increasing attention to the social and cultural factors that affect HIV-positive mothers' decisions and practices of infant feeding (Thairu *et al.*, 2005). Exclusive breastfeeding influences infantile gastrointestinal tract to have less inflammatory stress and less opportunity for viral transmission (Embree *et al.*, 2000). This condition results into babies to suffer fewer episodes of bacterial infection compared with babies

who are mixed fed. Exclusive breastfeeding is nationally and internationally recommended because it protects infants from morbidity and mortality whether or not HIV related (Victoria *et al.*, 1987). It has been reported also by Spencer *et al.* (2008) that HIV exposed infants who were exclusively breastfed for at least 3 months had lower risk of HIV infection than those infants who are mixed fed.

2.1.1.2 Breastfeeding and early cessation

Early cessation of breastfeeding was identified as one of the infant feeding options for HIV positive mothers who find it difficult to avoid breastfeeding completely. Breast milk is mostly stopped to be fed to infants as early as 3 or 4 months after which they are given other forms of feeds such as animal milk or infant formula. In order to minimize the cumulative risk of MTCT, early cessation of exclusive breast-feeding is advised in very specific conditions, that is, if replacement feeding is acceptable, feasible, affordable, sustainable and safe (AFASS) (Orne-Gliemann *et al.*, 2006). Exclusive breastfeeding followed by early cessation by 6 months reduces exposure to risks of transmission of virus through breast milk. This strategy is recommended by World Health Organization, because of the risks of infection and death from early childhood diseases due to replacement feeding (Spencer *et al.*, 2008).

Other breast milk options include; (a) expressed and heat-treated breast milk which involves boiling of the expressed breast milk to 62.5°C for 30 minutes or boiling briefly and cooling it immediately (Israel *et al.*, 2007). In this case, heat is said to destroy HIV at the same time milk retains some nutritional benefits but loses anti-infective factors. Laboratory-based studies of the flash-heating method have shown that it can inactivate HIV (Israel *et al.*, 2007) and render milk microbiologically safe (Israel *et al.*, 2006). (b) Wet nursing is another possibility, which is common in many communities where

breastfeeding is performed by mothers who are not the infant's biological mothers (Israel and Huber, 1999) WHO stresses that the wet nurse should be tested and confirmed to be HIV negative and understand the importance of safe sex, at the same time must follow optimal breastfeeding practices (Lhotska and Norton, 2009).

2.1.1.3 Challenges of breastfeeding

The discovery in 1985 that the HIV virus could be transmitted through breast milk, created a major challenge for the promotion of breastfeeding, particularly in areas where a large proportion of the mothers are HIV-infected and where breastfeeding is a cultural norm (UNAIDS/WHO, 2004; TFNC, 2005). As discussed earlier, breast-feeding is considered a critical route of mother-to-child transmission of HIV (MTCT) in the postnatal period, representing a third of the total risk of MTCT among breast-feeding populations (De Cock *et al.*, 2000).

Given the risk of HIV transmission associated with breastfeeding, it is revealed that, there are those who believe that the simplest and most straight forward approach to prevention is to avoid breastfeeding when mothers are infected (Magoni and Giuliano, 2005). The risk of HIV transmission increases over time, and shorter periods of breastfeeding carry a smaller risk of HIV transmission. Modifications of breastfeeding practices in terms of duration (complete avoidance of breastfeeding or early weaning) aim at reducing the risk of HIV transmission through breastfeeding (Becquet and Newell, 2007).

Insufficient milk is also among challenges of breastfeeding since it is the most reason frequently given by mothers who have given up breastfeeding (Vinter & Elisabet, 1997). The other reason of inability to produce breast milk, which was given by some mothers is however very rare and it has been estimated that it occurs in 1-2 per 10 000 mothers.

Some literature shows that most mothers can feed their babies on breast milk alone for around six months, if breastfeeding is unrestricted; and if the baby is well attached (Vinter & Elisabet, 1997).

2.1.2 Replacement feeding

Replacement feeding (RF) is defined by Tanzania National Mother to Child Transmission of HIV guidelines as feeding of infants with something other than breast milk (MOH, 2007). Replacement feeding means feeding an infant a diet that provides the necessary nutrients while receiving no breast milk. According to the Tanzania national MTCT guidelines replacement feeding can be made by feeding a child home-modified animal milk (feeding only fresh or processed animal milk that is modified by adding water, sugar and micronutrients), or commercial infant formula (feeding only formulated powdered milk made specifically for infants food).

Exclusive replacement feeding with no breast milk given eliminates the risk of postnatal HIV transmission (Coovadia *et al.*, 2007). Nevertheless, parents need to consider their environments to find out if the replacement feed is acceptable, feasible, affordable, sustainable and safe (AFASS) before the decision to use replacement feeding is made. In this case safety is the most critical criterion among AFASS conditions for replacement feeding (Leshabari *et al.*, 2007). In middle-income countries, replacement feeding is not considered to be the automatic choice for HIV positive women as they may not be able to access safe replacement feeding (Doherty, 2006).

In Africa replacement feeding is less common that is why many HIV positive mothers are choosing to breastfeed (Kiarie *et al.*, 2004). Studies conducted in four African countries by Doherty *et al.* (2006) showed that infants in poor households who are not breastfed are five

times more likely to die from infections in the first two months of life. Such children may as well have a much higher risk of getting diseases that are costly. This means that the risk of not breastfeeding is much higher than the risk of HIV infection through breastfeeding.

A study in Tanzania shows that all alternatives to breastfeeding were considered too expensive, but cows' milk was thought to be the best option for most mothers regardless of their socio economic status (de Paoli *et al.*, 2000). Although cow's milk was the option one of the major problems was found in the preparation as well as in cleaning and sterilizing of infant feeding equipments (Renfrew *et al.*, 2008). In developing countries where breastfeeding is a norm, failure to breastfeed and the use of bottle-feeding may be seen as a flag for women's HIV status which may invite stigma or other negative repercussions (Abdallah, 2005).

2.1.3 Mixed feeding

Although breastfeeding is common in most African settings, exclusive breastfeeding is rarely practiced (Shirima *et al.*, 2000; Leshabari *et al.*, 2007). In this case breast-feeding is usually accompanied with mixed feeds (a combination of water, formula, solids, tea, yoghurts etc), which influence the immature gastrointestinal tract to have a variety of bacteria and food antigen. The resulting inflammatory activity is believed to promote viral penetration and facilitate viral entry into the infant's immune (gastrointestinal lymphatic) system (WHO, 2000; WHO, 2003; WHO, 2009). A study of infant-feeding practices among HIV positive mothers in India showed that, 62% reported to have practiced some mixed feeding during the postpartum period (Shankar *et al.*, 2005). A study in Uganda also indicated that while all HIV-positive mothers started out exclusive breastfeeding, they had switched to mixed feeding by the time their babies were three months old (Bakaki, 2002). Mixed feeding has also been proven conclusively to be associated with increased risk of

MTCT of HIV as the probability of HIV infection in the group of mixed-fed babies had found to be significantly higher than in those who had exclusive breastfeeding or formula feeding as reported in the literature (Coutsoudis *et al.*, 2001; Iliff *et al.*, 2005). A study of nearly three thousand mothers in South Africa confirmed that mixed feeding carries a higher risk of HIV infection than exclusive breastfeeding. This is a reason why mixed feeding is not a choice of mothers, but it is done by default. In addition to this fact, studies done by Mbori-Ngacha *et al.* (2001); Embree *et al.* (2000) have emphasized the importance of exclusive feeding (either breast-milk or formula) by demonstrating the detrimental effect of mixed feeding (breast-milk with other milks).

2.2 Factors Affecting Decision Making on Choices and Practices of Infant Feeding

Making the decision to breast-feed or practice replacement feeding involves consideration of complex issues that are difficult to assess and that can be highly variable over time (Piwoz *et al.*, 2004). A study done in Tanzania (Leshabari, 2007) showed that resource limitation, the stigma of HIV and AIDS, widespread fear of HIV testing and insufficient education present a challenge to adaptation of Prevention of Mother to Child Transmission interventions. Strong beliefs about maternal nutrition, milk production and infant hunger lead to early complementation of food. Breast milk substitutes, especially modified cow's milk are used in the case of breast problems, return to work and pregnancy (Abdallah, 2005). HIV positive mothers who choose not to breastfeed may be assumed to have problems. The high cost of milk and the need for cleanliness and instructions are barriers to replacement feeding (de Paoli, 2003). Formula feeding and heat treatment of milk were considered to be impractical, except for some urban people with salaries, because these processes are complex; expensive and time consuming (Abdallah, 2005).

Quality counseling has been found to be central to successful infant feeding practices (Rollins *et al.*, 2002). Infant feeding counseling equips HIV-infected mothers with skills to cope with problems that may arise during feeding, especially if the mothers choose replacement feeding (Ndimwibo, 2005). A prospective cohort in Zimbabwe (Piwoz *et al.*, 2005), found that implementation of infant feeding education and counseling programmes were the most important predictive factors for exclusive breastfeeding among new mothers in Zimbabwe. The HIV and infant feeding guidelines of the country emphasize that counseling should be based on the principle of informed choice, and HIV-positive mothers should be given the best available information on the risks and benefits of each feeding method. The information was supposed to provide specific guidance in selecting options most likely to be suitable for individual mother's situation (WHO, 2001).

Few studies (Chopra *et al.*, 2002; Chopra *et al.*, 2005) however, have reported that the quality of infant feeding counseling for HIV-positive mothers was poor and that counseling messages were inconsistent. It was also revealed that few staff received sufficient training on counseling in the context of HIV (Koniz-Booher, 2004), which means staff shortages in association with lack of time to counsel properly about infant feeding are further barriers to the provision of informed infant feeding choices (Ehrnst, 2005).

Findings from various studies (de Wagt, 2000) indicated lack of knowledge among health workers on HIV and infant feeding. A study conducted in northern Tanzania (De Paoli *et al.*, 2002) showed that infant feeding options were always not accurately explained, and that counselors believed that most women had no other choice but to breastfeed. Another study, which focused on knowledge, attitude and practices of health workers, on HIV and infant feeding counseling in Nigeria (Adejuyigbe and Odebiyi, 2004) found out that only one out of thirty seven health worker respondents was aware of existence of a national

policy on HIV and infant feeding, but none had been trained on HIV and infant feeding counseling.

2.3 Awareness of HIV Positive Mothers towards HIV, MTCT and PMTCT

Informing HIV positive mothers about HIV, MTCT and PMTCT is important for infant feeding and their health in general. A study in South Africa (Chopra *et al.*, 2005) found that HIV positive mothers had been informed about the advantages of exclusive breast feeding, but only minority had been told about the risk of breast milk transmission when complimentary foods was added. In the same study it was also found that none of the mothers had been properly informed about the advantages and disadvantages of replacement feeding.

Results of a study done by Leshabari *et al.* (2006) showed that, mothers who had been counseled were reported to have difficulties in understanding advantages and disadvantages of exclusive breastfeeding practices compared to mixed feeding. It was reported by the same mothers that they did not feel adequately informed about HIV/IF and that the information was often given on the same day that they received their HIV test results. At this state most mothers were not able to listen and concentrate on explanations provided to them. As the result only two out of ten HIV positive mothers interviewed could recall HIV/IF information from the counseling session. In a related study, by Pool *et al.* (2001) in rural South West Uganda, breastfeeding practices and attitudes were found to be relevant to vertical transmission of HIV. Most women were not aware that HIV could be passed to the child through breastfeeding, except through sexual intercourse and blood. They were aware that the virus could be passed through delivery because of the blood contact. A Ndola study in Zambia (1999) found high levels of knowledge on MTCT transmission of HIV, but reported that there were misconceptions about the mode of

transmission, the blood present in the milk' was seen as a source of infection to the suckling infant.

2.4 Prevention of Mother to Child Transmission of HIV Programme (PMTCT)

Since the mid 1980s when HIV was detected cases of HIV transmission in infants during breastfeeding were documented. Such information and that from various studies (Preble and Piwoz, 1998) was used by health policymakers and program managers to develop appropriate and feasible guidelines on infant feeding for mothers in areas where HIV was present. Results from such efforts generated a general consensus on the facts that HIV can be found in breast milk of HIV-positive mothers and can be transmitted to infants by breastfeeding.

Various initiatives in response to HIV/AIDS on child survival have been developed in the world. A number of prevention strategies for mother to child transmission of HIV in high income countries were implemented, which included using antiretroviral drug, elective caesarean section and avoiding breastfeeding (Dabis *et al.*, 2000). By the year 2001, UNICEF and other UN agencies were supporting 80 programmes to prevent mother-to-child transmission of HIV in 16 countries (UNICEF, 2002). Between April 1999 and July 2001, these programmes reached over 300 000 new clients in antenatal care centers, providing counseling to 220 000 women and HIV testing to 138 000 women.

According to URT (2007), in Tanzania mainland, PMTCT programme provide a package of services to prevent transmission of virus from mother to child. PMTCT services are fully integrated in the MCH, labour and delivery services to support an essential package of prenatal care. The package includes 1) focused visits, 2) birth preparedness, 3) disease detection, 4) prevention and treatment of diseases, 5) counseling on nutrition, including

infant feeding and providing supplementation of micronutrients. Currently 659 out of 5 379 health facilities (Table 1) in Tanzania are providing the core elements of PMTCT services including testing and counseling (TC), antiretroviral prophylaxis, and infant feeding counseling integrated in reproductive and child health services. All 4 referral hospitals, 18 regional hospitals and 120 district hospitals provide PMTCT services (URT, 2007).

Table 1: Expansion of PMTCT services: coverage by region, district and facility type

Attribute	National	PMTCT Coverage	Percent
Number of Regions	21	21	100.0
Number of District	126	120	95.2
Hospitals	219	137	62.5
Health Centers	481	191	39.7
Dispensaries	4 679	331	7.1
Total number of facilities	**5 379**	**659**	**12.2**

Source: TDHS, (2005)

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Description of Study Area

The study was conducted in Musoma municipal, which is located in the northern part of Tanzania. It lies between latitude $1^0$30' south of equator and $28^0$48' East of Greenwich. Moreover, the area of Musoma town is in a slope, which slowly falls down towards Lake Victoria. It lies on altitudes of 1140 and 1320 meters above the sea level. The highest peak is 1320 meters. Scattered hills are found at most in the west and south of Musoma town. The whole town area is a peninsula on the east of Lake Victoria.

Administratively Musoma municipal is a regional headquarter within Mara region. Mara Region comprises six administrative districts namely Musoma Urban, Musoma Rural, Bunda, Serengeti, Tarime, and Rorya. The region is named after the Mara River. The neighboring regions are Mwanza and Shinyanga (to the south), Arusha (to the south east) and Kagera (through Lake Victoria). To the northern east, it borders the Republic of Kenya. Musoma municipal has a population of 103 497 (Bureau of Statistics, 2002), from wards of Mukendo, Mwigobero, Iringo, Kitaji, Bweri, Nyakato, Kigera, Kamunyonge, Nyamatare, Mwisenge, Buhare and Makoko.

The town's influence extends beyond the regional boundaries of rest of East Africa. This is due to Musoma proximity and well connection by road and water transport network to Kenya and Uganda. The Town is well linked to other centers by both surface and air transport services. Tarmac roads link Musoma to Mwanza and Sirari (Kenya border). Moreover, the town is linked by water transport to Mwanza, Bukoba, Kisumu (Kenya), and Entebbe (Uganda). Musoma is also connected by air to Dar-es Salaam via Kilimanjaro and

Mwanza. Major economic activities include tourism (Serengeti National Park), mining (Gold), fishing along Lake Victoria, agriculture (cassava, maize, sunflower and sorghum) and livestock keeping. Musoma municipal has got one hospital, two health centers and 24 dispensaries (Musoma Town Council report, 2002).

3.2 Study Design

The study employed a cross-sectional design. According to Kothari (2004) the design is suitable for the study in which data was collected at a single point in time and used for describing as well as determining the relationship between variables. This design is also considered to be favorable because of time limit and resource available for data collection. The design is simple and inexpensive in terms of time and resources, flexible, minimizes bias and maximizes the reliability of data and analysis. In this cross sectional study 84 HIV positive pregnant mothers were contacted. However, few selected HIV positive pregnant mothers from their second trimester were followed for a period of three months until delivery to evaluate their feeding practices according to their choices made. The study concentrated on the second trimester of gestation because that was the time when most pregnant women started antenatal clinics.

3.3 Sampling Frame and Eligibility

Study population includes HIV positive pregnant mothers utilizing antenatal clinics in the selected hospitals and health centers in Musoma municipal (under PMTCT) programme. PMTCT is the global intervention aimed at preventing mother-to-child transmission of HIV. Women were eligible for the study if they were between 15 and 49 years old (15-49, is the age range under which those women in reproductive age were found), in their second trimester, identified as HIV positive, physically and mentally healthy enough to participate in the study (as assessed by the doctor and Voluntary Counseling and Testing (VCT)

counselors). The basis for selection of HIV positive mothers is that, they needed to make informed choice of the methods of infant feeding to be practiced after delivery. This was after they were informed on the overall benefits and risks of infant feeding methods.

3.4 Sampling Procedure

Health facilities running PMTCT programme were purposively selected. Purposive sampling is a method of selecting individuals with qualities of interest to the research question (Kothari, 2004). The facilities included one hospital, two health centers and four dispensaries, which are all situated in Musoma municipal. HIV positive mothers in their second trimesters who were first visitors or revisit at particular health facilities for services in PMTCT programme were asked to participate in the study. Selection of the participants from each identified health facility was done by taking into account their availability and willingness to participate until the desired number of mothers was obtained.

3.5 Sample Size

The sample size for this study was estimated based on HIV positive mothers aged (15-49) in Mara region with prevalence rate of 6.7% (THIS 2007-08). The numbers of HIV positive pregnant mothers included in this study were determined by the World Health Organization (1991) formula.

$$N = Z^2 . p (1- p)/ d^2$$

Where, N = sample size when population greater than 10 000

Z = standard normal deviation, set at 1.96 corresponding to 95% confidence level

p = proportion in target population estimated to have a particular characteristic in this case it is 6.7%

q = 1.0-p (1.0-0.067)

d = level of precision (5%)

$N = (1.96^2)\ (0.067)\ (0.933)/\ 0.05^2 = 96$

Although the estimated number of mothers to be included in the study was 96, at the end of the sample selection exercise, a total of only 84 HIV positive pregnant mothers were obtained and participated in interviews for the study. It was not easy to locate HIV positive mothers because some of them did not want to be known by other people. Key informants that participated in this study included six (6) nurses (counselors) in PMTCT programme from selected health facilities.

3.6 Data Collection and Instruments

Methods for data collection used in this study included; structured interviews, semi-structured interviews and observation. All interviews were face-to-face. The use of multiple methods of data collection and instruments was employed because of its advantage of gathering more and extensive information which helped in cross-validating the authenticity of information from a single source (Cohen *et al.*, 2000). Pre-testing of research tools (Kothari, 2004) was conducted to 10 HIV positive pregnant mothers and 2 nurses to ensure quality and validity of these tools.

3.6.1 Structured interviews

These are interviews, which include a set of questions administered through oral or verbal communications in face-to-face interaction between the researcher and the informants (Kothari, 1990). Interview results into more accurate and reliable responses since the interviewer can explain and clarify individual questions (Marshall and Rossman, 1995). In this study the structured interviews were administered at ANC (Antenatal Clinic) of each selected health facility at different time according to arranged schedules to assess the

mothers' intended infant feeding choices, reasons for the choices and their socio-demographic characteristics. Knowledge of mothers towards HIV/AIDS, MTCT and PMTCT was also gathered through this method. The choice of this method of collecting data allows the researcher to enter into persons' interpretation and meanings they make for such perspectives (Patton, 1990).

3.6.2 Semi-structured interviews

These interviews were conducted to generate rich data about individuals' experiences and challenges related to infant feeding. This information was obtained during follow-up of nine selected mothers among respondents after delivery. The selected mothers were followed up for a period of three months after delivery. Visiting of selected mothers was done once per month. The time periods was selected in order to describe unique experiences and challenges related to infant feeding during distinct phases of the postpartum period. Interviews were conducted at clinics (particular health facility) and at mothers' homes or at any convenient place where respondents felt comfortable. All interviews were face- to- face. This method was flexible because questions could be changed or refined in the field and the method allowed a researcher to ask additional questions on the spot. This was very important for soliciting detailed information.

3.6.3 Observation

The information from this method was used to supplement the information obtained from conducted interviews. Observation enabled the researcher to develop a level of details about the participants and record experiences, interactions, relations and social events in the natural setting (Kothari, 2004).

3.7 Data Analysis

Data collected was cleaned, coded, and analyzed using statistical package for social sciences (SPSS) version 12 for window computer programme (SPSS Inc. Chicago). In this statistical package, descriptive statistics such as means, percentages, frequencies and cross tabulation were employed to determine relationships between variables. Cross tabulation give information about two or three interrelated characteristics of data (Kothari, 2004). This study, therefore, involved both quantitative and qualitative data analysis methods. The quantitative data that were gathered through interviews were about mothers' intention on infant feeding choices, reasons for their choices, their socio-demographic characteristics and knowledge of mothers towards HIV/AIDS, MTCT and PMTCT. Such data was tabulated and computed into percentages and frequencies and presented in both narrative and tabular forms (Chapter four). The qualitative data that was collected using semi-structured interviews was interpreted to identify coherent and important themes on other experiences and challenges that mothers faced during infant feeding in relation to their choices.

3.8 Ethical Consideration

Approval was sought from the municipal authorities in Mara region before starting the study. The purpose of the study was explained to individual participants, who gave her verbal informed consent to participate in the study. Only those who agree participated in the study. Good relationship was established with the respondents and informants before conducting the interview. Confidentiality of the data obtained especially those touching very sensitive issues were ensured. Names and addresses from the questionnaires were omitted.

CHAPTER FOUR

4.0 RESULTS

4.1 Overview

This chapter summarizes the findings on the investigation of factors that influence infant feeding choices and practices among 84 HIV positive pregnant mothers. Results presented in this chapter are grouped into subsections, namely socio-demographic characteristics of mothers, child feeding choices made by HIV positive mothers, reason(s) of choices made by HIV positive mothers, awareness of HIV positive mothers towards HIV, MTCT and PMTCT and mother's knowledge on infant feeding counseling. Such results and discussions provide a clear understanding of the influencing factors on HIV positive pregnant mothers' range of choices and practices of infant feeding in the community where the study was conducted.

4.2 Socio-demographic Characteristics of Respondents

The characteristics of mothers who were involved in the study included age, educational levels, marital status, occupation and average income per day as presented in Table 2.

4.2.1 Age of respondents

Age range of the respondents was between 14 and 45 years old with the mean age of 28 ± 7.15. Almost half of the respondents (56 %) were in the age group 20-29 years while 25 % were in the age group 30-39 years. A few (14.13 %) and (4.8 %) were in the age group 19 years or less and 40 years and above respectively.

4.2.2 Education level

Majority of mothers (67.9%) had primary school education, 16.7% had never attended school. A few (13%) had secondary education, 4.8% attained collage education while 2.4

% had informal education (read and write). None of respondents attained higher education level.

Table 2: Socio- demographic characteristics (N = 84)

Characteristics	Number of respondents	Percent
Age distribution		
19 years or less	12	14.3
20-29 years	47	56.0
30-39 years	21	25.0
40 years and above	4	4.8
Occupation of respondents		
Employed for wage	10	11.9
Self employed	2	2.3
Farmer	37	44
Student	5	6
Business	27	32.1
House wives	3	3.6
Marital status		
Married	63	75
Unmarried	21	25
Family income per month (TShs)		
13 000 to 34 000	5	6
35 000	31	36.9
36 000 to 200 000	46	56.1
Level of education		
Informal education	2	2.4
Primary	57	67.9
Secondary	7	8.3
Collage	4	4.8
None	14	16.7

4.2.4 Occupation

Almost half of HIV-positive mothers (44%) were farmers, 32% were involved in small businesses like selling charcoal, vegetables etc. Others (11.9%) were employed for wage, 6% were students, some (2.3%) were self employed and (3.6%) of the mothers were housewives who were not involved in any income generating activities.

4.2.3 Marital status

Majority (75%) of the study subjects were married, 38% were not married. Among the respondents, 69.8% were married mothers who lived with their spouses, 30.2% of the married mothers were not living with their spouses, while 25% of the respondents were not married.

4.2.5 Average income per day

Average income of the mothers was 64 380.95 TShs per month with a maximum and minimum income of 200 000 and 13 000 TShs per month respectively. More than half of the respondents (56.1%) had an average income between 36 000 to 200 000 TShs per month, while 36.9% reported to earn an average income of 35 000 TShs per month. A few (6%) of them had an average income between 13 000 to 35 000 TShs per month.

4.3 Child Feeding Choices Made by HIV Positive Mothers

Table 3 summarizes the type of infant feeding choices made by mothers. Majority (54%) of respondents chose to practice exclusive breastfeeding for six months after delivery, while 29% chose to practice exclusive breastfeeding for three months. Only (14%) of them chose replacement feeding with cow's milk while only one respondent (1.2%) chose to practice wet nursing after delivery.

Table 3: Choices of infant feeding methods (N=84)

Choice	Frequency	Percent
Replacement feeding	12	14.2
Exclusive breast feeding for three months	25	29.8
Exclusive breast feeding for six months	46	54.8
Wet nursing	1	1.2
Total	**84**	**100.0**

As presented in Table 4, there were no significant association (p-value > 0.05) between education level of respondents and choices of infant feeding.

Table 4: Association of choices of infant feeding with education levels (N=84)

	Education level					
Infant feeding choice	**Literate**	**Primary**	**Secondary**	**Collage**	**None**	**Total**
Replacement feeding	0 (0.0)	11(13.1)	1(1.2)	0(0.0)	0(0.0)	12(14.3)
Exclusive breast feeding for three month	1 (1.2)	11(13.1)	5(6.0)	3(3.6)	5(6.0)	25(29.8)
Exclusive breast feeding for six month	1 (1.2)	34(40.5)	1(1.2)	1(1.2)	9(10.7)	46(54.8)
Wet nursing	0 (0.0)	1(1.2)	0(0.0)	0(0.0)	0(0.0)	1(1.2)
Total	**2 (2.4)**	**57(67.9)**	**7(8.3)**	**4(4.8)**	**14(16.7)**	**84(100)**

$\chi^2 = 0.152$

4.4 Factors Influencing Infant Feeding Choices among HIV Positive Pregnant Mothers

Table 5 summarizes general factors that influence infant feeding choices among HIV positive pregnant mothers. Several reasons for choices of infant feeding were mentioned by respondents depending on their own situations. About 35.7% of respondents reported their choices to be influenced by economic factors, 20.2% were influenced by health workers. Influence from spouse, friends, parents and other relatives contributed to 19.0% while others (9.5%) decided on their own. There were other (7.7%) respondents who

claimed to fear the transmission of virus to their babies. Attitude and perception about breastfeeding was also mentioned (4.8%) to influence their choices. Paid maternity leave and being a student were also mentioned by respondents to have influenced their choice though their percentage was small (1.2%).

Table 5: Factors influencing choices of infant feeding methods (N=84)

Factors	Responses	
	n	Percentage
Influence from spouse, friends, parents and other relatives	16	18.5.
Economic factors	30	34.5
Influence from health worker	17	19.5
Fear of transmitting virus to the baby	10	11.5
Attitude and perception about breastfeeding	4	4.6
Student	1	1.1
Own decision	8	9.2
Maternity leave	1	1.1
Total	**87***	**100.0**

*Adds to more than 84, the responses (n) were calculated as multiple responses

4.5 Reason(s) of Choices Made by HIV Positive Mothers

Reasons of choices made by HIV positive mothers are summarized in Table 6. Of the 84 mothers involved in the study, 54.8% chose to breastfeed exclusively for six months while 29.8% chose to exclusively breastfeed for three months. Results also show that 20.2% of respondents chose to breastfeed exclusively for six months, and 11.9% of mothers chose to exclusive breastfeeding for three months because of economic problems. For example such mothers could not afford buying cow milk or formula milk. Moreover 9.5% of mothers who also chose to exclusively breastfeed infants for six months and three months reported of being advised by health workers for their choices during antenatal visit. Results also

showed that 14.3% of mothers chose replacement feeding. 4.8% of them feared of transmitting virus to their babies while one respondent (1.3%) who was a student decided to resume her classes after delivery.

Table 6: Reason given for infant feeding choice

Reasons for choice	Infant feeding choice				
	Replacement feeding	Exclusive breast feeding for three months	Exclusive breast feeding for six months	Wet Nursing	Total
Influence from spouse, friends, parents and other relatives	2 (2.4)	3 (3.6)	11 (14.4)	0(0)	16(19.0)
Economic factors	3(3.5)	10(11.9)	17(20.2)	0(0)	30(34.5)
Influence from health worker	0(0)	8(9.5)	8(9.5)	1(1.2)	17(20.2)
Fear of transmitting virus to the baby	4(4.8)	2(2.4)	1(0)	0(0)	7(7.1)
Attitude and perception about breastfeeding	2(2.4)	0(0)	2(1.2)	0(0)	4(4.8)
Student	1(1.2)	0(0)	0(0)	0(0)	1(1.2)
Own decision	0(0)	1(1.2)	7(8.3)	0(0)	8(9.5)
Maternity leave	0(0)	1(1.2)	0(0)	0(0)	1(1.2)
Total	**12(14.3)**	**25(29.8)**	**46(54.8)**	**1(1.2)**	**84(100)**

Number in Parenthesis is Percentages

4.6 Infant Feeding Practices According to Choices Previously Made

Out of the 84 HIV positive pregnant mothers, nine mothers (10.7%) who were in their third trimester were selected to be followed after delivery. Three mothers (33.3%) out of nine planned for exclusive replacement feeding (cow's milk). Six mothers (66.6%) planned for exclusive breastfeeding thee mothers (50%) planned to breastfed for six months while the other three (50%) planned to breastfed for 3 months at antenatal clinic during pregnancy. Among three mothers (33.3%) who planned replacement feeding, two mothers initiated replacement feeding with cow's milk and were still feeding their infants with the same milk for the entire visit. Such mothers did not report giving breast milk to their infants. All mothers (50%) who planned to exclusively breastfeed for three months did it and felt comfortable to breastfeed. For three mothers (50%) who planned to breastfeed for six months two mothers introduced cow's milk in their third week.

4.7 Awareness of HIV Positive Mothers towards HIV, MTCT and PMTCT

Out of 84 mothers, all of them (100%) knew or had heard about HIV/AIDS, while 72.6% reported that HIV/AIDS could not be cured.

Table 7: Knowledge on HIV/AIDS (N=84)

Variable	Variable type	N. of respondent	Percent
Heard about HIV/AIDS disease	Yes	84	100
	Total	84	100
HIV/AIDS be cured	Yes	14	16.7
	No	61	72.6
	I don't know	9	10.7
	Total	**84**	**100.0**

Table 8 summarizes different means of HIV transmission routes as identified and mentioned by mothers in this study. Forty eight percent of them said it could be transmitted through sexual intercourse. 27.2% mentioned the shared use of sharp objects. 13.3% transfusion of infected blood and 8.9% the use of unsterilized needles. A few mothers (3.8%) mentioned mother-to-child transmission of HIV to be among the common routes.

Table 8: HIV transmission routes (N=84)

	Responses	
Transmission route	**n**	**Percent**
Sexual intercourse	68	43.0
Infected blood	21	13.3
Sharing sharps	43	27.2
Mother to child	6	3.8
Unsterilized needle	14	8.9
To attend someone with HIV without wearing gloves	5	3.2
To share utensils with affected person	1	0.6
Total	**158***	**100.0**

*Adds to more than 84, the responses (n) were calculated as multiple responses

Table 9 presents responses of HIV pregnant mothers on various routes that HIV could be transmitted to unborn babies. Out of 84 pregnant mothers, 5.6% said that HIV transmission could occur during pregnancy and 32.6% during labour/delivery. Others, 15.7% were not aware of any route through which HIV could be transmitted to unborn babies. Only one mother (1.1%) mentioned that transmission could occur during sexual contact.

Table 9: HIV transmission route of unborn baby (N=56)

	Responses	
Transmission route	**n**	**Percent**
Transmission during pregnancy	5	5.6
Transmission during labour/delivery	29	32.6
Transmission through breast feeding	7	7.9
Transmission during sexual intercourse	1	1.1
Do not know	14	15.7
Total	**56**	**100.0**

Table10 summarizes the factors for HIV transmission through breastfeeding. The most mentioned causes through which breastfeeding transmits HIV, were cracked nipples (39.6%), infant's mouth sore (26.7%) and mastitis (5%). Some other factors responsible for HIV transmission through breastfeeding that were mentioned by the mothers included the sharing of sharp things, utensils like spoon, cup, prolonged breast feeding and mixed feeding each were mentioned as factors by 1%.

Table 10: Factors for HIV transmission through breastfeeding (N=76)

	Response	
Factors for transmission	**n**	**Percent**
Cracked nipples	40	52.6
Mastitis	5	6.6
Infant mouth sore	27	35.6
Sharing sharp things	1	1.3
Sharing utensils like spoon, cup	1	1.3
Prolonged breast feeding	1	1.3
Mixed feeding	1	1.3
Total	**76**	**100.0**

Table 11 summarizes responses made by mothers on major ways to reduce mother-to-child transmission (MTCT). The most ways mentioned were the use of antiretroviral drugs (33.3%), avoidance of breastfeeding (28.6%) and avoidance of mixed feeding (13.1%). Some other ways (1.2%) to reduce MTCT of HIV which were also mentioned included HIV blood testing, avoiding sexual intercourse, seeking advice from health workers, and breast feeding for a short time.

Table 11: Ways to reduce transmission of the virus to baby (N = 84)

Ways	Frequency	Percentage
Use of antiretroviral drug	28	33.3
Testing blood for HIV	1	1.2
Avoid breast feeding	24	28.6
Avoid mixed feeding	11	13.0
Breast feeding for six months	4	4.8
Do not know	13	15.5
To avoid sexual intercourse	1	1.2
To seek advice from the health workers	1	1.2
To breast feed for a short time	1	1.2
Total	**84**	**100.0**

Table 12 shows the results of association between respondents' education level and their knowledge on different ways of reducing mother to child transmission of HIV by using chi-square test. Result indicate that, there were statistical significant association between respondents education level and their knowledge on ways to reduce MTCT (at $p<0.05$).

Table 12: Association of mothers' knowledge on ways to reduce mother to child transmission and their level of knowledge (N=84)

Ways to reduce MTCT	Level of education					
	Illiterate	Primary	Secondary	Collage	None	Total
Use of antiretroviral drug	0 (0.0)	17(20.2)	5(6.0)	3(3.6)	3(3.6)	28(33.3)
Testing blood for HIV	1(1.2)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(1.2)
Avoid breast feeding	0(0.0)	17(20.2)	0(0.0)	1(1.2)	4(4.8)	22(26.2)
Avoid mixed feeding	0(0.0)	6(7.1)	2(2.4)	0(0.0)	3(3.6)	11(13.1)
Breast feed for six month	0(0.0)	3(3.6)	0(0.0)	0(0.0)	1(1.2)	4(4.8)
Do not know	1(1.2)	10(11.9)	0(0.0)	0(0.0)	3(3.6)	14(10.7)
To avoid sexual intercourse	0(0.0)	1(1.2)	0(0.0)	0(0.0)	0(0.0)	1(1.2)
To seek advice from health workers	0(0.0)	2(2.4)	0(0.0)	0(0.0)	0(0.0)	2(2.4)
To breast feed for short time	0(0.0)	1(1.2)	0(0.0)	0(0.0)	0(0.0)	2(2.4)
Total	**2(2.4)**	**57(67.9)**	**7(8.3)**	**4(4.8)**	**14(16.7)**	**84(100)**

$\chi^2 = 0.002$ /Number in Parenthesis is Percentages

4.7.1 Mothers' disclosure of HIV status

Table 13 shows that, the percentage of mothers who disclosed their HIV status to their relatives was 75%. Those who disclosed to their spouse were 39.7%, others (36.5%) disclosed to their mothers, friends (4.7%) and a few mothers (3.1%) disclosed their HIV status to other family member like father, brother, sister, aunt and children. There were 25% mothers who did not disclose their status to any of the family members.

Table 13: Mothers' disclosure of HIV status to their relatives (N=84)

Variable	Frequency	Percent
Disclosure of HIV status		
Yes	63	75.0
No	21	25.0
Total	**84**	**100.0**
Type of relative disclosed to		
Mother	23	36.5
Farther	2	3.1
Spouse	25	39.7
Friend	3	4.7
Brother	2	3.1
Sister	2	3.1
Aunt	3	4.7
Children	3	4.7
Total	**63**	**100.0**

There were no statistical significant association between respondents disclosure and their choice of infant feeding (at $p>0.05$) as shown in Table 14.

Table 14: Association of mothers' infant feeding choices with their disclosure of HIV status (N=84)

	Disclosure of HIV		
Infant feeding choices	**Yes**	**No**	**Total**
Replacement feeding	10(11.9)	2(2.4)	12(14.3)
Exclusive breast feeding for three month	18(21.4)	7(8.3)	25(29.8)
Exclusive breast feeding for six month	34(40.5)	12(14.3)	46(54.8)
Wet nursing	1(1.2)	0(0.0)	1(1.2)
Total	**63(75.0)**	**21(25.0)**	**84(100)**

$\chi^2 = 0.819$

4.8 Mothers' Awareness on Infant Feeding Counseling

The percentage of mothers who were aware of infant feeding counseling was 73.8%, while others (26.2%) were not aware. Mothers who reported to have attended the infant feeding sessions during antenatal visit were 65.5%, while 34.5% never attended the counseling session as shown in Table 15. Those who did not attend infant feeding counseling reported to have attended normal counseling which involved discussions on general HIV knowledge, transmission route, safe sex, risk behaviors for HIV but not on infant feeding related issues.

Table 15: Mother's awareness on infant feeding counseling (N=84)

Variables	Number of mothers	Percent
Aware of Infant feeding counseling		
Yes	62	73.8
No	22	26.2
Total	**84**	**100.0**
Attending infant feeding session		
Yes	55	65.5
No	29	34.5
Total	**84**	**100.0**

4.8.1 Advantages and disadvantages of breastfeeding

Regarding the advantages of breastfeeding, most mothers (58.9%) said that breast milk contains all nutrients that their infants needed. Some of them (22.3%) reported that breast milk was available all the time when infants needed and a few of them (17.1%) said breast milk contains antibodies for infant protection against diseases as reported in Table 16. For mothers who identified disadvantages of breastfeeding, 57.7% of them mentioned a risk for HIV transmission through breast feeding for those mothers who were contracted with HIV while others (42.3%) said that some mothers produce insufficient milk for their infants.

Table 16: Advantages and disadvantages of breast feeding (N=84)

Breast feeding	Response	
	n	Percent
Advantages		
Contain all nutrients infant need	66	58.9
Available all the time when needed	25	22.3
Contain antibodies which protects infant from infection	19	17.1
No advantages when you are infected with HIV	2	1.7
Total	**112***	**100.0**
Disadvantages		
Risk for HIV transmission	41	57.7
Not enough for child growth	30	42.3
Total	**71****	**100.0**

*Add to more than 84 the responses (n) were calculated as multiple responses
** Less than 84 other could not respond to some questions

4.8.2 Advantages and disadvantages of replacement feeding

As shown in Table 17, the percentage of mothers who considered replacement feeding to be advantageous when a mother cannot breastfeed was 58.9%. Some mothers (12.2%) said that replacement feeding helps eliminate the risk of HIV transmission while others (14.4%) responded that if replacement feeding is well prepared it may contain all nutrients needed by infants. Twenty two percent of mothers considered preparation of replacement feeding to be time consuming; others (42%) mentioned the danger of food contamination that may harm infants. High costs of buying formula feeds or cow's milk was also mentioned by 20% of mothers as disadvantages of replacement feeding.

Table 17: Advantages and disadvantages of replacement feeding (N=84)

Replacement feeding	Response	
	n	Percent
Advantages		
Help when mother cant breastfeed	53	58.9
No risk of HIV transmission	11	12.2
Contains all nutrients infant need	13	14.4
Help a child to grow well	1	1.1
No advantage	4	4.4
Total	**81****	**100.0**
Disadvantages		
Does not contain all nutrients infant need	20	20.0
Time consuming for preparation and feeding	22	22.0
Child might get infected if not well prepared	42	42.0
A child will lack protection against disease	1	1.0
It is expensive	15	15.0
Total	**100***	**100.0**

*Add to more than 84 the responses (n) were calculated as multiple responses
** Less than 84 other could not respond to some questions

4.8.3 Opinions of mothers on early complementary feeding

Table 18 presents opinions of mothers on early complementary feeding. Out of 84 mothers, 54.8% of the mothers reported that breast milk was not enough; others (11.9%) reported that a child will not grow well without porridge and porridge is good for infants. About 21.4% of the mothers mentioned ignorance as the cause of early complementary feeding and 10.7% had no opinion. A few mothers (1.2%) feared of transmitting virus to their children.

Table 18: Early complementary feeding (N=84)

Opinions	n	Percentage
Breast milk is not enough	46	54.8
Ignorance	18	21.4
Porridge is good for infant	10	11.9
Do not know	9	10.7
Fear of transmitting virus to her child	1	1.2
Total	**84**	**100.0**

CHAPTER FIVE

5.0 DISCUSSION

5.1 Choices of Infant Feeding Methods and Its Influencing Factors

This study establishes that exclusive breastfeeding for six months was the preferred method by the HIV mothers while few respondents made replacement feeding. Overall, there were many factors/reasons reported by respondents to have influenced their choices of infant feeding methods though demographically they seem not to differ much. The preference for exclusive breastfeeding by the mothers in this study was from breastfeeding being the family and community norm. This was also in line with the findings of a similar study in Nigeria Adejuyigbe *et al.* (2008) which reported that family and community norms makes it difficult for mothers in Nigeria as in most developing countries to choose not to breastfeed.

Mothers in this study reported many other factors that have influenced their choices. Mothers who chose exclusive breast feeding (for six months & three months) reported to have financial constraints. For example, they could not afford buying cow's milk or milk formula. This was because mothers in this study were mostly engaged in subsistence farming and sometimes sidelined with small business, which have little income not enough to support family needs. A few mothers were employed as primary school teachers, secretaries, sellers in shops, bar maids and house maids with their average income of Tsh 64 380.95 per month, which agrees with TDHS report (2004/2005) showing that majority of Tanzanians live within the poverty line and cannot afford to meet food requirements. Due to this reason of poverty, infected mothers who participated in the study were forced to continue breastfeeding their babies despite the risk of infection.

The choice of replacement feeding by few respondents observed in this study was in line with a study by Kiarie *et al.* (2004). It revealed that in Africa, replacement feeding is less common and many HIV positive women choose to breastfed. Such findings also match with those found from a study done by Orne-Gliemann *et al.* (2005), where many HIV-infected mothers in Zimbabwe declared having opted for breast-feeding due to financial constraints. Another study by Sibeko *et al.* (2009) also revealed that many women in developing countries were financially constrained in getting access to clean water or sanitation; they could not afford the formula and therefore, failed to refrain from breastfeeding. In contrast with the current study, findings by Doherty *et al.* (2003) in South Africa and Leroy *et al.* (2007) in Abidjan showed higher proportion of mothers who chose replacement feeding. The difference is explained by the fact that infant formula was supplied free of charge in both of the studies in South Africa and Abidjan.

Health workers' advices were also reported as reasons for choosing exclusive breastfeeding. This implies that health workers were very important in helping mothers to make appropriate choices with regard to mothers' situations. This shows the importance of health workers to have right information concerning infant feeding choices. In the same line, studies by de Paoli *et al.* (2002); Piwoz *et al.* (2006) reported that in many sub Saharan African countries more often communities take recommendations of health providers as the final word. In other countries, however it is reported that, advice by health workers has contributed to sub-optimal feeding practices (Akuse and Obinya, 2002). Being key people in influencing mothers' infant feeding choices (Seiden *et al.*, 2000; Semega-Janneh, 2001), health workers can help to reduce rates of postnatal transmission of HIV and increase child survival by providing HIV-infected mothers with accurate information on infant feeding that captures the risks and benefits of different feeding options.

Influences from spouses, friends, health workers and parents on the other hand were frequently reported as reasons for infant feeding choices in mothers who planned to exclusively breastfeed than mothers who planned to exclusively replacement feed. This implies that replacement feeding was difficult to practice both in terms of economic power, knowledge of feed preparation, which includes the issue of hygiene and the time for feed preparations.

This study also indicated that one among reasons given for choice of replacement feeding was fear of transmitting the virus from mother to the infant if breast fed. Respondents who gave such a reason reported death of their infants who were on breast. These findings were in line with that of Adejuyigble *et al.* (2008), where it was revealed that mothers with previous children deaths presumed to be due to their HIV status. In this case the desire to have an HIV-free child was associated with the intention to use exclusive replacement feeding. The implication is that infant feeding choice was very complex which involved many aspects discussed earlier on. In contrast to other studies (Adejuyigble *et al.*, 2008; Doherty *et al.*, 2006), mothers in the present study did not report on stigmatization as one of the influencing factors for feeding choices.

5.2 Infant Feeding Practice Experiences

Overall results indicated that, there was some discrepancy between infant feeding choices which were made before delivery and actual practices after delivery. Infant feeding practices of most HIV-positive mothers were according to the choices previously made, but with fewer adherences due to a series of challenges that they faced in sustaining their feeding options.

5.2.1 Replacement feeding

Results shows that one mother among those who chose replacement feeding managed to practice exclusive replacement feeding (with modified cows' milk), but complained that her infant sometimes refused to drink milk and several times the infant had constipation. This suggest that the mother might not have had enough knowledge about safe procedures for the preparation of milk; and the steps needed to calculate and mix the appropriate quantities of milk with water and sugar based on the baby's age. The dilution of cow's milk is important due to its higher contents of nutrients, which are meant for calves and not for human infants. Lack of this knowledge may endanger health of infants. Such experiences are in line with those of Doherty *et al.* (2006) who reported two deaths of formula-fed infants both of whom died from infections. Such experiences were suspected to be caused by unsafe preparation and handling of formula milk, which contributed to deaths of infants.

Some other mothers were reported to have switched from cow's milk to breastfeeding at third week because of child refusal to drink milk, and the crying of the child all day. This also might have been caused by poor preparation of milk. This practice could also be termed as mixed feeding which is dangerous and considered as a risk factor for postnatal HIV transmission.

5.2.2 Breast feeding

Results from this study show that all three mothers who planned to exclusively breast feed for three months did it. Such mothers mentioned a number of factors that were associated with successful breast feeding. They said they felt comfortable to breastfeed because breast milk is good for infants. They also believed in the advantages of breast-feeding. These factors are in line with other studies associated with greater success in exclusive breast-feeding (de Paoli *et al.*, 2001).

One mother with twins introduced cows' milk at third week postpartum together with other fellow mother who started giving porridge, in addition to breast milk. Both mothers complained to have insufficient breast milk as the reason of crying of their infants. This finding is in line with the study done in Northern Tanzania by Leshabari *et al.* (2007) where HIV positive mothers introduced light porridge with cows' milk at around two months. They did so because they believed that their milk was not enough to make their babies grow fat and shiny as expected by kin and neighbors. Doherty *et al.* (2006) also reported, of the mothers who were still exclusively breast-feeding at first week, but three had stopped by sixth week.

Lack of adherence to infant feeding choices before delivery and actual practices after delivery was also observed in a prospective cohort of HIV positive women in Kampala, where 11% of the women who had chosen to practice formula feeding reported to have breastfed their children at least once (Magoni *et al.*, 2005). Similarly, in a randomized trial of HIV positive women in Nairobi, 30% of the mothers who were randomized to practice formula feeding breastfed their infants at some point leading to biased estimates of effectiveness of the feeding mode in preventing MTCT (Nduati *et al.*, 2000).

Introduction of other feeds during breast feeding as shown in this study and other discussed studies is an important risk factor for HIV transmission. This is explained by the fact that feeding with other foods than breast milk increases the gut permeability making it easier for the HIV-virus to enter the gut mucosa of the infant. Breast milk left in the breast when a mother gives other food to infant than breast milk increases the risk of sub clinical and clinical mastitis, which again is a risk factor for postnatal transmission of HIV. This case was also found in this study where one mother who was still breast feeding was

complaining on mastitis. Lack of knowledge on proper positioning of an infant during breast feeding is also said to be another course of mastitis.

5.3 Awareness of HIV Positive Mothers towards HIV, MTCT and PMTCT in Relation to Counseling.

The study has established that majority of the mothers were aware of HIV AIDS and its transmission routes, but only a few of them were reported to be aware of mother to child transmission as the route of HIV transmission. This finding is in line with that which was reported in URT (2007) where 44% of young women were found to be aware of important elements of HIV/AIDS transmission. Most of this general awareness was reported to be from either community facilities such as schools, hospitals, relatives and friends. A study by Coovadia (2000) revealed the awareness might have been from various programmes on related knowledge that are being broadcasted through different media.

From this study, HIV positive mothers 'awareness was related to the main topics more often discussed by health workers during counseling. Their main focus has been on the choices of infant feeding methods important for HIV positive mothers in order to optimize the chances of survival of their infants and to minimize the risk of HIV transmission. The health workers therefore counseled the mothers about the importance of testing, knowledge on transmission routes, how to stay free from HIV, MTCT (Mother-to-child) of HIV and the importance of breast feeding and less often on replacement feeding.

Mother's knowledge on mother to child transmission routes was considered to be low. Few mothers knew that HIV positive pregnant mothers could infect unborn child during delivery. Majority of the mothers were aware that mother-to-child transmission could be through breast feeding but the factors for transmissions were not well known by all

respondents. This indicates that knowledge on mechanism through which HIV can be transmitted from mother to child is still low in most of the community where the study was conducted. Such results were also observed in the study done by Belachew and Jira (2007).

Awareness on the preventive measures of mother-to-child transmission was also poor among the mothers; only few were able to locate them correctly. HIV positive mothers had some knowledge on advantages and disadvantages of breast feeding and replacement feeding. Some misconceptions were noted in mother's knowledge. The misconceptions observed in this study were such as HIV/AIDS can be cured, transmitted through sharing utensils with affected person or to attend someone with HIV without wearing groves, sexual contact being one of the mothers to child transmission route and the issue of insufficient breast milk. Mothers' perceptions of 'insufficient milk' and an 'unsatisfied baby' were also cited as reasons for women not to exclusive breastfeed. The misconception above and lack of information among mothers interviewed indicate the gap in their knowledge. Overall, respondents in this study were illiterates, had primary school education with few having secondary and college education. This level of education among mothers could be the reason for this gap in their knowledge.

There are studies that have also shown that awareness on HIV transmission did not match with feeding choices and practices among mothers (de Paoli *et al.*, 2002). Such studies clearly show that choices of infant feeding methods are not only affected by awareness of the facts, but may also involve beliefs of the mother, partner and community about mothering and nurturing. Furthermore the choices may also be influenced by social networks (Adjuyigbe *et al.*, 2008). A study in India by Suryavansh *et al.* (2003) indicated that all breast feeding mothers knew of the risks of HIV transmission, but they chose not to exclusively formula feed because they could not afford milk formula.

Further. there were some challenges affecting counselors in their counseling work as reported by nurses. Such challenges included lack of nurses especially who were trained on PMTCT as it was reported that in absence of trained nurse any other nurse could carry out infant feeding counseling. Other challenges include lack of facilities for example rooms for counseling, some mothers fail to give their real situation hence difficult to counsel. In addition to this, there was no any support that was reported to be given to HIV mothers apart from counseling or sometimes referral of the mothers to other organizations. A qualitative study in Moshi. Kilimanjaro region (de Paoli *et al.*, 2002), investigating counselors' infant feeding advice to HIV positive women, concluded that infant feeding options were not accurately explained and that informed choices of infant feeding methods, as recommended in the guidelines, was seriously compromised by inadequate information, directive counseling, lack of time, and lack of follow-up support.

However, in this study nurses declared that PMTCT programme was advantageous in reducing the risk of MTCT of HIV if mothers adhered to what they were taught.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

1. From the study it can be concluded that, choices of infant feeding methods and their practices among HIV-positive mothers in the context of PMCT was influenced by many factors. Such factors included knowledge of MCTC, which lead to fear of transmitting virus to infants, economic status, social-cultural attitudes and beliefs, information attained from health workers, experiences of mothers on physical/health related problems of their infants and advice from spouses and friends. Most mothers chose to exclusively breast feed for six and three months due to facts of norms of community and family and economic reasons. Some mothers chose and used cow's milk as replacement feeding because it was most practicable breast milk alternative in the area. Although cow's milk is culturally acceptable, common/familiar and relatively accessible (produced or purchased) to many, the knowledge of preparation before use was poor.

2. Based on economic constraints, social-cultural reasons and inadequate knowledge among most mothers, neither exclusive breast feeding nor replacement feeding choices was seen to be the best options for some mothers. This has been the reason why such HIV-positive mothers failed to adhere to their choices. As a result most of the feeding practices involved were either changed from exclusive breastfeeding to replacement or from replacement feeding to breastfeeding or a mixture of the two. Such practices are said to put infants in more danger of dying from malnutrition, diarrhea, HIV and other infections.

3. Majority of HIV-positive mothers had demonstrated awareness and some knowledge on HIV, MTCT, and PMTCT in relation to what they were taught by health workers. The mothers had less knowledge due to either their low level of education, beliefs and attitudes or ineffective counseling from health workers. Apart from counseling sessions which the mothers attended during antenatal visit and other advice during normal antenatal visit there were no any other follow-up supports, as per Tanzania PMTCT guidelines, which emphasize follow-up and support for mothers who make choices of infant feeding methods.

6.2 Recommendations

Based on the findings of the study the following recommendations were drawn:-

1. Government and donors need to emphasize on follow -up and support for mothers after birth in maintaining their choices of infant-feeding methods as per Tanzania PMTCT guidelines, also creating a safe work environment for health workers.
2. Further efforts are also needed to optimize counseling on choices of methods of infant feeding, identifying issues that influence failure to practice and adhere to feeding choices and increase the implementation of the recommendations.
3. Research on infant-feeding practices and HIV transmission is important to improve the understanding of the risks of morbidity and mortality for these infants among populations in various communities.
4. Whole community needs to be knowledgeable on prevention of mother-to-child transmission of HIV (PMTCT) so that they can be supportive to mothers who make choice.
5. The number of health workers and counseling facilities must be increased or improved in antenatal clinics to make sure that health workers have enough time to counsel mothers properly.

6. Counseling of HIV positive mothers on all infant feeding options before making choice is important.
7. Governments and donors should greatly increase their commitment to economically empower HIV positive mothers to engage in income generating activities to improve their economic status.

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APPENDICES

Appendix 1: Interview for study survey

INFORMED CONSENT

Introduction

Hello my name is .....I am a Master's degree programmme student at Sokoine University of Agriculture, Department of Food Science and Technology. I am conducting a research study on the factors influencing choice and practices for infant feeding among HIV positive pregnant women. I am going to ask you some question concerning this topic, your responses will be completely kept confidential; your name will not be written on the form and will never be used in connection with any of the information you provide. You don't have to answer any question you don't want to answer, however your honest answer to these questions will be useful in general health of our children and to free them from HIV. I would appreciate your participation in this study, as your view is important.

Do you have any questions about the study?

Are you willing to participate?

Interviewer signature certifying that informed consent has been given verbally.

Interviewer name.....Signature.....

Date of interview.....

Interviewee name.....Signature.....

Date.....

Facility name.....

Type of facility Hospital/ Health Centre/ Dispensary.....

Section I: Socio-demographic characteristics

S/n	Question	Coding categories	Skip	Code
101	How old are you?	1.19 years or less 2.20-29 years 2.30-39 years 3.40 years & above		
102	To which ethnic group/tribe do you belong?	1.Gita 2.Kuria 3.Jaruo 4.Others		
103	What religion are you?	1.Adventist 2.Catholic 3.Protestant 4.Muslim 5.Others		
104	Have you ever attended school?	1.Yes..... 2.No	105	
105	What is the highest level of school you completed?	1.Literate (read & write) 2.Primary 3.Secondary 4.Tertiary		
106	What is your occupation?	Woman / Spouse 1.Employed 2.Farmer 3.Student 4.Busness 5.Others		
107	Family income per month	1.<1000-Extrime poverty 2. 1000-poverty 3. >1000-better life 4. Others specify		
108	Marital status	1.Unmarried 2.Married.....	109	
109	If married are you currently living with your partner?	1.Yes 2.No		
110	Number of pregnancy including the current one?	1.One 2.Two 3.Three 4.Four & above		
111	The number of antenatal care visit in the current pregnancy?	1.At least two 2.Less than two		

Section II: Women's knowledge towards HIV, MTCT and PMTCT

No.	Question	Coding categories	Skip	Code
201	Have you ever heard of HIV or disease called AIDS?	1. Yes 2 .No 88. I don't know 99. No response		
202	Do you know how HIV is transmitted?	1. Yes..... 2. No 99. No response	203	
203	If the answer is yes in 302 above, mention the route of transmission	1.Sexual intercourse 2.Infected blood 3.By sharing sharps 4.Mother to child 5.Injection by unsterilised needle 6.Others (specify)		
204	Can HIV/AIDS be cured?	1.yes 2.no 88.Idont know 99.No response		
205	Can a pregnant woman with HIV/AIDS transmit virus to her unborn baby?	1.Yes..... 2.No 88.I don't know 99.No response	206	
206	When do you think an HIV/AIDS positive women transmit the virus to her unborn baby? Circle more than one answer	1.During pregnancy 2.During labour/delivery 3.Through breastfeeding 88.I don't know 99.No response		
207	Can a woman with HIV/AIDS transmit virus to her new born child through breast feeding?	1. Yes ..... 2. No 88.I don't know 99.No response	208	
208	If the answer is yes, how (explain)	1.Cracked nipples 2. Mastitis 3. Infant's mouth sores 4. Others (specify)		
209	What can a woman do to reduce transmission of the virus to her baby?	1.Use antiretroviral drug 2.Avoid breast feeding 3.Avoid mixed feeding 3.Others (specify)		
210	Do you know any thing about PMTCT programme?	1.Yes 2.no		
211	Is your HIV/AIDS status known	1. Yes..... 2. No	212	
212	If yes, to whom is it known?	1.Mother 2.Farther 3.Spause 4.A friends 5.In laws 6.Others (specify)		

Section III: Women's knowledge on Infant feeding counseling

No	Questions	Coding categories	Skip	Code
301	Have you heard of infant feeding counseling?	1.Yes 2.No 88.I don't know 99.No response		
302	Have you ever attended an infant feeding counseling session?	1.Yes 2.No 88.I don't know 99.No response		
303	How long the session does takes?	1.10 min 2.20 min 3.30 min 4.45 min 5. Others (specify).....		
303	If yes above, what method of infant feeding did you choose to practice?	1.Replacement feeding 2.Exclusive breast feeding for three month 3.Exclusive breast feeding for six month 4.Wet nursing 5. Others (specify).....		
304	What made you choose (circumstances) determined your choice of feeding mode?	1.Influence from spouse 2.Influence from friends 3.Influence from other relatives 4.Economic problems 5.Influence from health workers 6. Others (specify).....		
305	What are the advantages and disadvantages of replacement feeding?	**Advantages** 1.It helps when mother can not breastfeed 2.No risk for HIV transmission 3.It contain all nutrients infant need 4. Others (specify)..... **Disadvantages** 1. Does not contain all the nutrients the infant need 2. Time consuming in preparation and feeding 3.Child might get infected if not well prepared 4. Others (specify).....		
306	What are the advantages and disadvantages of breast feeding?	**Advantages** 1.Contain all the nutrients the infant need 2.It is available all the time when it is needed 3.Contains antibodies which protect infant from infection 4. Others (specify)..... **Disadvantages** 1.Risk for HIV transmission 2.It is not enough for child growth 3.Time consuming to breastfeed 4. Others (specify).....		
307	On your opinion, why most lactating women introduce porridge and other food during breast feeding?	1.Breast milk is not enough 2.A child will not grow well 3.Porridge is good for infant 4. Others (specify).....		

Appendix 2: Checklist questions for nurses (counselors)

Name of facility.....

Type of facility.....

1. Is there any available guidelines or teaching guide/manual for counseling session?
2. According to guidelines what information are you supposed to deliver to HIV positive mothers?
3. How many counseling session does an HIV positive woman supposed to attend before and after delivery?
4. What problems are you facing in delivering services to HIV positive pregnant women?
5. Is there any support from health workers for mothers apart from counseling?
6. Have you attended any training on MTCT and its prevention strategies?
7. What can you say about the PMTCT programme? Do you consider it to be beneficial? Explain
8. What can you say about:

   A. Breastfeeding

   B. Replacement feeding and there importance to child health?

Appendix 3: Interview guide for few selected HIV positive women after delivery

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

Location..... / Facility name.....

Introductions: Explain the purpose of the interview again. make the respondent relax, assure confidentiality of information they provide and thank them for their time. Make them feel that information they are going to provide is important to help the general health of our children and to free them from HIV.

1. Actual feeding Practices: Breast feeding / Replacement feeding/Others (observe)
2. Ask if the feeding practice observed reflects the choice made before
3. If not adhered to the choice. What are the reasons for not adhered to choice made before
4. What kind of support do you get from

   A. Family

   B. Health workers
5. What challenges do you face with the infant feeding choice adapted?

Appendix 4: Factors influencing choice and practices for infant feeding among HIV positive women