INFANT FEEDING PRACTICES AND PREVENTION OF VERTICAL TRANSMISSION OF HIV IN MVOMERO DISTRICT, MOROGORO

BY

MARGARET KESSY

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN HUMAN NUTRITION OF SOKOINE UNIVERSITY OF AGRICULTURE. MOROGORO, TANZANIA.

2005

ABSTRACT

HIV infected mothers are currently advised to avoid all breastfeeding where replacement feeding is acceptable, feasible, affordable, safe and sustainable in response to breastmilk transmission of HIV. However, in Tanzania where most women do not know their HIV status, exclusive breastfeeding and access to safe replacement feeding is unachievable. This study examined the impact of social, economic and cultural constraints on the development of infant feeding interventions to prevent vertical transmission of HIV, in order to inform a successful infant feeding improvement initiatives in the era of HIV and AIDS. The hypothesis of the study was that knowledge of breastmilk transmission of HIV and awareness of HIV status affect infant-feeding practices. Seventy infected and uninfected mothers with children below 18 months were interviewed. The results show that respondents' knowledge of breastmilk transmission of HIV was high, 100% of the infected and 97.1% of uninfected mothers knew about the possibility of transmission of HIV through breastmilk. The mean duration of exclusive breastfeeding was 3.48 and 2.97 months for infected and uninfected mothers respectively. Knowledge of HIV status was not associated with breastfeeding practices. Although infected mothers stopped to breastfeed earlier than uninfected mothers, mean age for cessation of breastfeeding was 6.4 months, far above the recommended age for cessation of breastfeeding to prevent vertical transmission of HIV. The age of the mother was associated with the duration of exclusive breastfeeding ($p<0.05$) but did not contribute to cessation of breastfeeding ($p=0.3979$). Health workers as source of information regarding vertical transmission of HIV was significantly associated with exclusive breastfeeding for four months ($p<0.05$) and to cessation of breastfeeding ($p<0.05$). Number of children below five years contributed to cessation of breastfeeding ($p<0.05$). Factors influencing the attitude of feeding

interventions included mis-information, and myth about vertical transmission of HIV, lack of purchasing power to infant feeding interventions and stigma. Factors influencing breastmilk practices included mothers' health ($p<0.001$), fear of infecting the child ($p<0.001$), insufficient breastmilk ($p<0.001$), beliefs about breastfeeding such as clearance of child's throat ($p< 0.001$) and child cry ($p=0.112$). Integrated approaches to increase awareness of vertical transmission of HIV, change health care seeking behaviour and counteract harmful beliefs about infant feeding may improve attitude and infant feeding practices to prevent vertical transmission of HIV.

DECLARATION

I, MARGARET KESSY, do hereby declare to the Senate of Sokoine University of Agriculture that this work is my original work and has not been submitted for a degree award in any other university.

Signature.....

Date.....28.10.2005.....

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ACKNOWLEDGEMENTS

Praise be to almighty God because without Him this study would not have materialised. My profound gratitude is due to my supervisors, Prof. J. Kinabo and Mrs. K. Kulwa. Their critical but calm guidance and friendship created an atmosphere of hard work with confidence and courage to meet the many challenges associated with this work. I owe them great respect and thanks.

I wish to express my sincere gratitude and great indebtness to my mother Mrs. Modester Mbuya for her untiring moral, material support, love, and advice and for investing her meagre resources in my studies. Furthermore, to my late father, Festo Kessy who laid down the foundation for my education and to my sisters and brothers whose love, charm and care have always been sources of my strength and courage.

I also wish to extend my thanks to the head of the Department of Food Science and Technology Prof. B. Tiisekwa and to all staff in the department for their encouragement and support during the entire period of the study.

Special thanks also goes to Morogoro regional HIV and AIDS program co-coordinator, Dr. Lyimo for providing me with materials for writing this dissertation and Turiani hospital staff, Uluguru mountains agricultural development project (UMADEP) and Dr. Nzota who assisted me in data collection. I would like also to thank my fellow postgraduate students Mr. G. Saga, Ms. S. Kasese, N. Losai, D. Franco, C. Kasambala, E. Maseta, and A. Mneney for their encouragement and assistance.

Lastly, it is not possible to mention every one who helped me in one-way or another. Your assistance is greatly appreciated.

DEDICATION

This work is dedicated to my mother. "*Her children rise up and call her blessed; and her husband also, and he praises her*" (Proverbs 31: 28). Furthermore to my brothers Emmanuel-Jordan, Evance and sisters Rosemary, Lilian and Mary Christer Sia. I love you all. I also wish to extend my dedication to the children who have contracted HIV through vertical transmission.

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LIST OF ABBREVIATIONS

ACC/SCN	United Nations Administrative Committee on Co-ordination-Sub Committee on Nutrition
AIDS	Acquired Immuno-Deficiency Syndrome
COUNSENUTH	Centre for Counselling, Nutrition and Health Care
DHS	Demographic and Health Survey
HIV	Human Immunodeficiency Virus
IFPRI	International Food Policy Research Institute
MOH	Ministry of Health
NACP	National Aids Control Programme
PMTCT	Prevention of Mother to Child Transmission
SSA	Sub Saharan Africa
STD	Sexually Transmitted Diseases
TBS	Tanzania Bureau of Statistics
URT	United Republic of Tanzania
UNAIDS	Joint United Nations Programme on HIV and AIDS
UNICEF	United Nations Children's Fund
VCT	Voluntary Counselling and Testing
WHO	World Health Organisation

CHAPTER ONE

INTRODUCTION

1.1 Background

Breastfeeding practices to meet infants' basic needs for health, growth and development have been promoted as part of child health strategy. However, the emergency of HIV and AIDS poses a threat to these practices. It is estimated that 25 000 children are infected with HIV through breastfeeding each year (Lyamuya *et al.*, 2002). Since the 1980s, when cases of vertical transmission of HIV (passing of HIV virus from mother to a child during pregnancy, delivery or breastfeeding) were documented. health policy makers in many countries, Tanzania inclusive. have struggled to develop appropriate infant feeding guidelines for mothers living with HIV (Preble and Piwoz, 2000).

Currently UNAIDS/WHO advises HIV infected mothers to avoid breastfeeding where replacement feeding is acceptable, feasible, affordable, safe and sustainable (Latham and Preble, 2000). In developing countries, however, exclusive breastfeeding or universal access to safe replacement feeding is not achieved. Furthermore, since the decision to opt for replacement feeding depends on knowledge of HIV status, voluntarily HIV testing and counselling services at antenatal clinics are not well established (Piot *et al.*, 2002). Worse still, most of the women in rural areas and health workers in developing countries, where HIV transmission and vertical transmission of HIV is increasing are unaware that it exists or not sure of its implication (Thapa *et al.*, 1988). Although breastfeeding accounts for only part of vertical HIV transmission, the issue of HIV transmission is of socio economical and public health importance.

Despite the fact that fewer babies born to HIV and AIDS infected women acquire HIV, increasing HIV prevalence among pregnant mothers, high birth and HIV infection rates in Africa contributes to large numbers of HIV infected infants. This exacerbates child mortality due to paediatric AIDS related deaths. This state calls for development of sound policies on HIV and infant feeding (UNAIDS, 1999).

1.2 Problem statement

Breastfeeding significantly improves child survival by protecting against diarrhoea diseases, pneumonia and other potentially fatal infections (Victoria *et al.*, 1987). In addition, it enhances quality of life through its nutritional benefits (Nicoll *et al.*, 1995, ACC/SCN and IFPRI, 2000). Despite the benefits of breastfeeding, some HIV infected mothers will pass the virus to their children through breastfeeding.

In high income countries, formula feeding, substituted for breastfeeding, can reduce vertical transmission. In low-income countries, replacement feeding increases the risk of morbidity and mortality associated with malnutrition and infectious diseases other than HIV (Nishi *et al.*, 2003). In areas of high infant mortality and infectious diseases such as Tanzania, the choice not to breastfeed carries a risk for infant survival and constrained by socio-economic factors of not to breastfeed. In some areas, deaths related to infectious diseases and malnutrition is higher than AIDS related deaths. In such cases, it becomes difficult to suggest appropriate recommendations.

Several studies have concluded that, exclusive breastfeeding followed by early weaning should be explored as recommendation for mothers with HIV. However, exclusive breastfeeding is rarely practised. Therefore research is needed to find out what constraints

are preventing mothers from exclusively breastfeeding for four to six months. Furthermore, concern has been raised about the possible unintended outcome of loss of confidence in breastfeeding spreading to all women (Coutsoudis *et al.* 1999; Preble and Piwoz, 2001; Greiner, 1997, 1999).

1.3 Justification

It is assumed the mothers who know that they are infected with HIV are likely to be more aware of the preventive measures of vertical transmission of HIV and protect their children from infection. Pilot programmes have been predominantly medically based but have reached a stage where they need to consider community attitudes, beliefs and conditions (Burke, 2003). Indeed, prior to introducing these programmes, cultural feasibility study should be conducted (Coreil *et al.*, (1998) cited by Greiner, 1999). Infant feeding recommendations for HIV positive mothers must therefore take into account the local environment and conditions to provide the most accurate information on risks and benefits of breastfeeding and replacement feeding (Nishi *et al.*, 2003).

In that view, the study intended to understand attitudes and practices related to breastfeeding, and perceptions and stigma associated with non-breastfeeding in Morogoro region. This is important in development of appropriate interventions to reduce postnatal transmission of HIV (Preble and Piwoz, 2001).

Morogoro region ranks highly for the cumulative AIDS cases since the emergence of the epidemic in 1983. Moreover, HIV prevalence among mothers attending antenatal clinic in Mvomero was 17.4% in 2003 (Lyimo, C. personal communication, 2003). Area specific research in Morogoro was needed to understand the key constraints that influence the

choice of infant feeding interventions for prevention of vertical transmission of HIV. This study explored the factors influencing the choice of infant feeding interventions to prevent vertical transmission of HIV. It was envisaged that the information emanating from this study would be used to formulate strategies to educate and support mothers, policy makers and the community to improve infant feeding practices.

1.4 Objectives

1.4.1 General objective

The objective of this study was to understand infant feeding practices and knowledge in relation to prevention of vertical transmission of HIV in Mvomero district.

1.4.2 Specific objectives

1. To assess maternal awareness on vertical transmission of HIV.
2. To identify factors that influence infant feeding practices.
3. To identify existing infant feeding breastmilk replacement in the study area.
4. To assess attitude towards specific infant feeding options.
5. To determine the socio-economic and socio cultural circumstances that influence feeding options.

1.5 Hypothesis

Knowledge on HIV transmission through breastmilk and awareness of HIV status has no significant effect on infant feeding practices.

CHAPTER TWO

LITERATURE REVIEW

2.1 Meaning of HIV and AIDS

Acquired Immunodeficiency Syndrome (AIDS) is the name given to the fatal clinical condition that results from long-term infection with Human Immunodeficiency Virus (HIV). HIV progressively damages the body's immune defence system, preventing the body from protecting itself against infections that would otherwise be rendered harmless. AIDS leads to death of lymphocytes responsible for defending the body against invading microbes thus leaving the affected person susceptible to micro-organisms with which he had previously lived with. The body becomes susceptible to diseases and opportunistic infections (NACP, 2000). These opportunistic infections may develop into illness, which would not normally occur in healthy people (Massele *et al.*, 1991). These opportunistic infections include tuberculosis, kaposis sarcoma (a tumour primarily affecting the skin), pneumonia, diarrhoea, and severe weight loss. Over time, HIV weakens the immune system to the extent that several opportunistic infections are present at once. Death is not caused directly by HIV but one or more of these infections.

2.2 The global situation of HIV and AIDS

Globally, 42 million people are believed to have acquired HIV infection in 2002 of which 3.2 million are children and 38.6 million were adults. It is estimated that 4.8 million people became newly infected with HIV in 2003. Furthermore, it is also estimated that 37.8 million people were living with HIV in 2004 (UNAIDS, 2004).

The spread of HIV epidemic has varied considerably between developed and developing countries, depending on culture as well as other social and behavioural factors. Incidence rates are highest in developing countries where sexual transmission is most common and where health, education, economic and environmental facilities are almost inadequate (UNICEF, 2001).

Women and children continue to bear the brunt of the epidemic in terms of morbidity, mortality and socio-economic impact (URT/UNICEF, 1990). The magnitude of the HIV and AIDS problem in sub-Saharan Africa (SSA) is directly related to the prevalence of HIV infection in women of childbearing age and high fertility rates. For both physiological and socio-cultural reasons, women are four times more susceptible to infection than men (De Cock *et al.*, 2000). Studies show that women 15 to 19 years of age are five to six times more likely to be HIV-infected than men in the same age group.

2.3 The impact of HIV and AIDS in Tanzania

The United Republic of Tanzania is one among the top ten countries affected by the HIV epidemic (Piot and Coll-Seck (1999) cited by Burke, 2003) with a national prevalence rate of 8.09% amongst the adults aged 15 to 49 years. The first cases of AIDS in the country were reported in 1983 in Kagera region. By the end of 1999 there were some 600 000 cases of HIV and AIDS. Nearly 71% of the affected are in the age group of 25 to 49 years and 15% in the age of 15 to 24 years (Lyamuya *et al.*, 2002).

Concerted efforts to control the epidemic started in 1985. Since then, the national response to the epidemic has been diverse and variable both in nature and scope. In spite of the intense prevention activities, 14 112 new AIDS cases were reported in 2001 alone and the

cumulative reported AIDS cases were 144 498. The epidemic is now the leading cause of adult mortality (URT/NACP, 2002) and it is likely to reduce life expectancy by 10 years in the year 2010. Contrary to previous years where increasing or static prevalence of estimates have been noted for both sex. A significant decrease in the prevalence of HIV and AIDS related disease has been witnessed in the year 2002. For females, prevalence decreased from 13.7% to 12.3% for years 2001 and 2002 respectively. The corresponding figures for males were 10.4% to 9.1% respectively (NACP, 2003).

The reported main modes of transmission remained horizontal transmission (adult to adult) in which heterosexual intercourse remains the most common (82.1%) HIV transmission route (Muhondwa, 1991; Masasi, 2000), vertical transmission (mother to child transmission) accounts for 5.9% of all cases. Factors, which increase the risk of HIV transmission through breastfeeding, include maternal viral load, viral type, duration of breastfeeding and the condition of the breast (breast abscesses, mastitis, cracked nipples) and oral lesions (WHO, 2000).

A study conducted in 2002 in six regions of Tanzania found that the overall prevalence among mothers attending antenatal clinic was 9.6% with range of 5.6%. Kagera had prevalence of 5.6% while Mbeya had 16%. Vertical transmission is the most common source of HIV transmission for children and this can occur in the womb, during breastfeeding and most frequently during childbirth. Without intervention, there is about 30% risk that the baby born to an HIV infected mother will also be HIV infected (Marseille *et al.*, 1999). It is estimated that 59 000 children were infected with the virus as a result of vertical transmission of HIV in 1999 in Tanzania and the rate has recently increased to over 72 000 annually (Lyamuya *et al.*, 2002).

Analysis of the trends of infant and under five mortality rates in Tanzania since the 1960s reveals that there has been a significant drop in the rates between 1960 and 1985. However, since the late 1980s the rates have been stagnant (UNICEF 1985; URT, 2002). The 1990s have shown no substantial progress in the reduction of infant and under five mortality. HIV and AIDS together with other communicable diseases and poverty are likely to increase threat to the health of infant and young children with consequent increase in morbidity and mortality rates (URT, 2002). Todate, mortality rates in children below five years of age in Tanzania have increased to 147 deaths per 1 000 live births. About two-thirds of these deaths take place during the first year of life. The mortality rate of children below five years is much higher in rural areas (166 deaths per 1 000 live births in 1999) than in urban areas (Tanzania Bureau of Statistics (TBS), 2000).

2.4 Prevention of vertical transmission of HIV

2.4.1 Identification of HIV positive women

There is growing evidence that people who know their serostatus are more likely to adopt or maintain safe behaviours, either to protect themselves from future infection if they are uninfected, or, if HIV positive to protect their loved ones from infection. Thus, strategies to prevent vertical transmission depend on identification of HIV positive women. This relies on women knowing their HIV status through voluntary counselling and testing (VCT) services (Nicoll *et al.*, 1995). Mothers who are aware of their status and modes of transmission can decide how to feed their children and should be provided with adequate information to do so. Consequently, accurate knowledge about HIV transmission and alternative-feeding options enables women to make informed decisions about the best way to feed their infants under their circumstances.

When it became clear that HIV could be transmitted through breast milk, very few infected women in industrialized countries have chosen to breastfeed their children. This has made transmission of infection at the nipple negligible (Nishi *et al.*, 2003). The reality in developing countries is very different. Between one third and half of all HIV infections in young children is acquired through breast milk. It is estimated that nine out of ten HIV positive women in developing countries are unaware that they are infected (Lhotska, 1998) and by far, the majority of pregnant mothers are not being tested for HIV, so their status is unknown both to themselves and the health workers (Thairu, 2001). They therefore cannot make informed choices about how to feed their children. Testing services may not be available or affordable while stigma and the lack of real or perceived benefits of knowing one's HIV serostatus may reduce motivation to test HIV (Kilewo *et al.*, 2001; Maman *et al.*, 2001).

In addition, lack of proper information on the way that HIV is transmitted makes some people see HIV and AIDS as a shameful disease. Stigma and discrimination stem from the fact that HIV and AIDS is understood to be a sexually transmitted infection associated with homosexual and drug addicts who are often regarded as being an irresponsible group in society.

In impoverished communities, women are often the poorest. A woman's precarious situation is often exacerbated when her husband becomes infected, develops HIV and AIDS related illness and eventually dies from AIDS leaving her widowed. Not only the woman has to care for her husband while sick, but also the family resources may have been spent on caring for him leaving her financially incapacitated. In some communities, when the husband dies, relatives may claim his property and leave his widow and children

destitute. This may force a woman to choose to breastfeed even if she knows about her infection, and knows she might pass it on to the infant this way (Hanna, 2002).

2.4.2 Infant feeding practices to prevent vertical transmission of HIV

Exclusive breastfeeding is widely accepted and adopted as the most appropriate way of feeding an infant from birth to six months. However, with HIV pandemic, infected mothers are advised about the risks and benefits of other infant feeding options.

2.4.2.1 Exclusive breastfeeding

UNICEF estimates that even in the era of HIV and AIDS breastfeeding remains the best possible nutrition for the great majority of babies (UNAIDS, 1999). Some experts speculate that the risks of HIV transmission may be lower when exclusive breastfeeding is practised. This hypothesis suggests that HIV is more likely to pass through the infant's gut wall when it is disturbed (as happen when solids are introduced prematurely or when pathogens are introduced through unhygienic formula feeding prematurely). Several studies evaluating the effect of breastfeeding and formula feeding on HIV transmission and mortality have compared differing patterns of breastfeeding (Preble and Piwoz, 1999). One study has found that the pattern of exclusive breastfeeding (without the addition of water, fluids or foods) for 3 months carried a significantly lower risk of HIV-1 transmission than mixed feeding (breast milk and other foods and liquids) (Coutsoudis *et al.*, 1999) even when followed up until 15 months (24.7% and 35.9%). However, babies that had never been breast-fed had the lowest risk of HIV transmission (19.4%).

A study comparing two groups of infants, one on breastfeeding and the other on formula feeding showed a cumulative probability of HIV infection of 36.7% with breastfeeding and

20.5% with formula feeding making the excess transmission of breastfeeding at 16.2% (WHO, 2000). However, the results of these studies are in contrast with Chopra's observations that breastfeeding is responsible for 1 to 2% of all paediatric HIV infection (Chopra, 1999).

In Tanzania, majority of mothers breastfeed for a relatively long period of over 20 months but the extent of exclusive breastfeeding is low. Nyagawa and Hussein (2004) reports that the rate of exclusive breastfeeding has increased from 23% in 1992 to 32% in 1999. Adherence to this recommended practice is quite high during the first month (58% of Tanzanian infants), but by 2-3 months of age this decreases to only 25.4% of infants and by 4-5 months only 15% of the infants are exclusively breastfed (TBS, 2000).

Constraints to exclusive breastfeeding include insufficient milk, failure to put the baby on the breast immediately after delivery, failure to breastfeed on demand, concerns about an unsatisfied infant and return to work (Shirima, 2000). In some instances, mothers discard the first yellowish milk (colostrum) and breastmilk from an expectant mother because of the belief that it is not good for the child. Failure to breastfeed on demand could be due to diseases and infections such as HIV and AIDS, tuberculosis and other diseases that may cause the mother and/or the child to be weak and hence fail to breastfeed on demand (COUNSENUTH, 2003). Moreover, working mothers are usually busy and may not be able to practice optimal breastfeeding and are therefore likely to start weaning at a very early age. Mothers' death is another factor that may lead to early weaning of the child especially when there is no other relative or person to wet nurse the child. These constraints contribute to HIV infection to the children because children who are not breastfeed exclusively with other early introduction of solid foods or other liquids appear

to have a higher risk of HIV transmission than exclusively breastfed infants UNAIDS (1999).

2.4.2.2 Modified breastmilk

Modification of breast milk is one of the strategies to lower the risk of transmission of HIV. Some of the strategies or techniques include pasteurisation of milk (process of heating milk to a temperature between 55 and 70 degrees to destroy the HIV virus without materially changing the composition, flavour or nutritive value of the milk) and heat treatment. Heat treatment of expressed breastmilk at 62.5°C for 30 minutes kills the virus and or /and / inactivates viral activity in human milk while retaining immunoglobulins (Lamptey and Gayle, 2001).

2.4.2.3 Modified breastfeeding

The duration of breastfeeding has been shown to have a significant effect on HIV transmission. Extended duration of breastfeeding carries a higher risk of infecting the child. Early cessation of breastfeeding between three to four months reduces the risk of HIV transmission by reducing the length of time during which an infant is exposed to HIV through breast milk (Piwoz *et al.*, 2001). The challenges associated with this modified breastfeeding-exclusive breastfeeding followed by a relatively rapid transition to exclusively replacement feeding is that it conflicts directly with current social-cultural infant feeding practices in Africa. Most women breastfeed for about two years but seldom practice exclusive breastfeeding. Abrupt termination of breastfeeding does occur, but it is most frequently practised in the second year of life, after the child has time to become accustomed to solid family foods.

King and Burgess (1993) and Akre (1996) reported that abrupt switch from exclusive breastfeeding to exclusive replacement feeding without a transition has been shown to have serious health and psychological consequences for both mothers and infants. Infants may suffer dehydration, refusal to eat, malnutrition and lack of attachment. For mothers, abrupt weaning can result in engorgement, mastitis and depression, and can increase mother's risk of unwanted pregnancy. In some settings, where a relative breastfeeds an infant when a mother dies or unable to breastfeed for other reasons, a safe alternative is to find a woman (in the family context) who is willing to breastfeed the infant if such custom is culturally acceptable (Cameroon and Hofvander, 1983). Even with this alternative practice, however, there is a risk of HIV transmission to the infant through breastfeeding if the surrogate mother is infected. There is also a potential risk for transmission of HIV from the infant to surrogate mother, especially if she has cracked nipples.

2.4.2.4 Animal milk

Modified animal milk could be considered as an option for an HIV- positive woman when commercial infant formula is not available or is unaffordable if there is a reliable supply of animal milk, and the families have the resources to modify animal milk (Greiner, 1997). Milk from cow, goat, sheep and donkey are considered as potentially good for the infant.

2.4.2.5 Commercial infant formula

Commercial infant formula based on modified cow milk or soy protein could be considered an option when the family has reliable access to sufficient formula for at least six months of infants' life.

2.4.2.6 Home prepared formula

Home-prepared formula can be made with fresh animal milk, dried milk powder or evaporated milk. It is the reasonable option when commercial milk is not readily available or is too expensive for the family or supplies of animal milk are unreliable or the family cannot afford (Lamptey and Gayle, 2001).

2.5 Determinants and problems of breastmilk replacements

Replacement feeding means providing a child who receives no breast-milk with a diet that contains all the nutrients that the child needs throughout the period for which breastmilk is recommended for at least the first two years of life. From birth to six months of age, milk is essential, and can be given in the form of commercially produced infant formula or home prepared formula made through modifying fresh or processed animal milk. It is important to be familiar with locally available foods in order to provide appropriate recommendations for mothers in specific setting.

In developing countries, Tanzania inclusive, replacement feeding (usually with bottle-feeding) often leads to an increased incidence of diarrhoea, malnutrition and death when strict hygienic precautions are not adhered to (Mosha and Svanberg, 1998). Communities have always had to deal with infant illness and death and with babies who could not be breastfed. Past practices and strategies such as surrogate breastfeeding, or the use of animal milk have been suggested.

Furthermore, women in town are more likely to adopt artificial feeding than in rural areas, a fact associated with higher incomes, unsupported single motherhood, work outside the home, higher educational status (Walker and Rolls, 1994 and Perez-Escamilla *et al.*, 1995)

and contact with formal medical system. Younger and first time mothers are less likely to breastfeed if isolated from traditional support and artificial breastfeeding is available commercially (Palmer *et al.*, (1993) cited by Nicol *et al.*, (1995). The cost of buying enough milk is too high for many low-income families. By choosing replacement feeding, a woman may avoid passing on HIV to the infant. In most developing countries, she will stretch the family budget and time costs for the families. In such circumstance, in order to minimise risks of infecting the infant, yet hide her status from neighbours, friends or family, an HIV infected mother may combine breastfeeding with artificial feeding, which is the worst of all possibilities as it exposes the infant to both sets of risks (HIV infection and infectious diseases) as reported by Preble and Piwoz, (2001) and Ogundele and Coutler (2003). Greiner (1999) suggests that whereas the potential side effect of promotion of replacement feeding for babies of HIV positive mothers pose dangers for other babies, the side effects of exclusive breastfeeding would be beneficial to all.

2.6 Experiences in prevention of vertical transmission of HIV in Tanzania

Various initiatives in response to HIV and AIDS on child survival have been developed in the world. Prevention strategies for vertical transmission of HIV in high-income countries include antiretroviral drugs, elective caesarean sections and avoiding breastfeeding (Dabis *et al.*, 2000). Prevention of vertical transmission of HIV and AIDS faces special challenges in lower income countries such as Tanzania where higher rates of HIV infection amongst childbearing women, fewer HIV counselling and testing services, limited access to family planning services and universal breastfeeding with little safe infant feeding alternatives are common.

Marseille *et al.*, (1999) reports that the cost effectiveness of counselling, testing and short course antiretroviral drugs for pregnant women in Tanzania is high. In addition, there are other factors that may affect people's ability to make use of these interventions are personal factors, such as knowledge and attitudes. They also include factors relating to the quality and coverage of the services and programs aimed at HIV and AIDS prevention as well as societal factors such as cultural norms and social practices that may act as barriers to preventive messages.

In Tanzania, it is estimated that 72 000 babies are infected with HIV every year, among which 25 200 were infected through breastfeeding (Lyamuya *et al.*, 2002) with a subsequent increase in infant and underfive mortality. By April 2000, five centres were established in response to HIV and child survival. These included Bugando Medical Centre, Kilimanjaro Christian Medical Centre, Mbeya referral hospital, Muhimbili Medical Centre and Kagera regional hospital with an attempt to reduce vertical transmission of HIV-1 among the regular catchment population by at least 50%. This was facilitated by establishing Voluntary Counselling and testing (VCT) services in Antenatal Clinics (ANCs), introducing short-course on zedovudine, provision of infant feeding counselling and support.

The main challenges observed included compliance and replacement feeding (Fawzi, *et al.*, 2000). Furthermore, observations from ongoing prevention of mother to child transmission of HIV and AIDS in Kagera show that there is a high rate of loss of follow up (25% of women are lost before delivery and 23% are lost after delivery). Reasons responsible for the high attrition rates were fear of stigma and discrimination, fear of domestic violence and separation, lack of comprehensive care and insufficient community support (Lyamuya

et al., 2002). It has also been observed that the preferred attitude on this has been 'Treat with no test' option and worries about the reaction of their male partner to a positive test.

2.7 Summary of the chapter

The chapter reported the distribution and impact of HIV globally and in Tanzania. It also described causes of vertical transmission of HIV and infants feeding interventions to curb its widespread. Setting specific constraints challenging feasibility of infant feeding intervention to prevent HIV infection to the child is yet to be determined in Mvomero district. Therefore, the study sought to fill the gap.

CHAPTER THREE

METHODOLOGY

3.1 Description of the study area

The study was conducted in Morogoro region. The region lies between latitude 5° 58″ and 10° 0″ to the south of the Equator and longitude 35° 25″ and 35° 38″ to the east of Greenwich Meridian. It has a population of 1 759 809 (URT/Planning Commission, 2002). It occupies a total land of 72 939 square kilometres with a flat landmass surrounded by Uluguru Mountains in the Eastern and Southern parts. The region experiences bimodal rainfall pattern consisting of short rains from November to December and the long rains starting from March to May.

Administratively, it is divided into 6 districts namely Morogoro urban, Morogoro rural, Kilosa, Kilombero, Ulanga and Mvomero (URT, 2003). The study was conducted in Mvomero district. The district has 17 wards, and a population of 260 525 inhabitants of whom 131 256 are males and 129 269 are females (URT/Planning Commission, 2002).

The estimated per capita income of the people of Mvomero in 2001 was about US $ 196 (Tsh. 182 500). More than 85% of the population is engaged in agriculture producing maize, beans, cassava, sorghum, paddy fruits, cardamom, coffee, cotton, sunflower, sisal and sugar cane (URT, 2005). The majority of farmers depend on subsistence crop production and most of the farming activities are done annually for which human labour accounts for 64%, tractor 35%, and ox-cultivator 1%.

Livestock keeping is also carried out. Livestock kept include cattle, goats, sheep, donkey and poultry. Small and medium scale keepers who migrate searching for pastures and water keep about 80% of the livestock. The main tribes include the Luguru, Kutu, Zigua, Kwere, Kaguru, Maasai and Sukuma (URT, 2005).

In 2003, the district had 115 804 households of which 78% had latrines, 67% had good living houses and 33% had poor living houses. Proportions of households served with clean protected water sources were 48% (URT, 2005). The main causes of mortality are malaria, anaemia, pulmonary TB, pneumonia and clinical AIDS (URT/Planning Commission, 2002).

3.2 Research design

A cross-sectional research design was used whereby data was collected once from the respondents and descriptive analysis was carried out to determine the relationship between variables. This design allows data to be collected at a single point in time and can be used for a descriptive study as well as for determination of relationships between variables. The Sokoine University of Agriculture and National Institute of Medical Research (NIMR) approved the study.

3.3 Study population

The study population included all mothers with children aged below eighteen months and utilising health services at Turiani hospital in Mvomero district.

3.4 Sampling

Mvomero district was purposively sampled because it has rural characteristics and is served by Turiani hospital; a referral hospital delivering services at reduced costs and it is administered by a religious organisation. In addition, an increased HIV prevalence among antenatal clinic attendants has been observed in the district.

3.4.1 Sample selection

The study included thirty-five mothers infected with HIV and AIDS and thirty-five uninfected mothers.

Infected mothers were defined as mothers with children below eighteen months attending Voluntary Counselling and Testing services (VCT) (first visit or revisit), mother and child health clinic (MCH), or whose child had been admitted at the children's ward with symptoms of HIV and AIDS (mother and/or children). Each eligible mother with symptoms such as chronic diarrhoea, persistent fever, kaposi's sarcoma, oral candidiasis, herpes zosters and skin diseases was recruited. Other symptoms included chronic cough, repeated common infections, severe body weakness and enlarged lymph node at more than one site. Apart from these mentioned symptoms, growth charts for the children-attending mother and child health clinic (MCH) were studied. Mothers with children whose weight had faltered for two consecutive months were interviewed (Preble and Piwoz, 2001). A well-trained and experienced medical doctor in HIV and AIDS at the VCT centre identified eligible mothers. The basis for classification and selection of these mothers was that these symptoms usually are associated with HIV infected people.

Mothers, who were physically and mentally healthy enough to participate in the study, were recruited (As assessed by the doctor and VCT counsellor). Each eligible mother was verbally asked for her consent to participate in the study. The VCT counsellor trained in data collection techniques interviewed some few cases. Uninfected mothers were defined as those with no symptoms of HIV and with children of less than eighteen months. These mothers were recruited from MCH clinic.

3.5 Data collection and instrumentation

3.5.1 Data collection instrument

The main instrument used in collecting primary data in this study was a structured questionnaire containing both open and closed-ended questions and was administered through face-to-face interview sessions with respondents. The instrument was designed to capture information regarding awareness of vertical transmission of HIV through breastfeeding, prevention interventions and infant feeding practices (e.g. prelacteal feeds given to the child, type of fluids and foods given to the child and duration of exclusive breastfeeding and breastfeeding).

In addition, attitude and opinion regarding infant feeding options to prevent vertical transmission of HIV was sought. Knowledge of vertical transmission of HIV was obtained by the information on awareness of transmission and prevention of HIV at the time of the interview. Information on infant feeding practices relied on mothers' memory. Attitude was assessed using a likert scale with two alternative levels of agreement or disagreement to each intervention. Therefore, alternative answers were five scales: strongly disagree (1), disagree (2), Indifferent (3), agree (4) and strongly agree (5). For each infant feeding intervention, the least score was 1 and the highest was 5.

3.5.2 Pretesting

To ensure validity and reliability, the first draft of the questionnaire was pre- tested on three of HIV infected mothers and five HIV uninfected mothers. Necessary changes on the questionnaire were made on the basis of pre- testing results before its final administration. This included restructuring and omission of some questions.

3.5.3 Data collection

Infected mothers were interviewed at the children's ward and at the VCT centre while uninfected mothers were interviewed at the MCH clinic. Description of the aim of the research was given to each mother. Mothers were asked for their informed consent to participate in the study. Only those mothers who agreed to participate were recruited.

3.6 Data processing and analysis

The collected data were entered, edited, coded and summarised prior to analysis using the Statistical Package for Social Sciences (SPSS) computer software (Norusis, 1995) in relation to the objectives of the study. For confidentiality reasons, all subjects were assigned to random numbers. There was no use of names in the data analysis or writing names or report writing of the report. The respondents were categorised into groups, infected and uninfected mothers in order to examine knowledge, attitude and practices towards prevention of vertical transmission of HIV. Descriptive, correlation and regression statistics were performed. Descriptive statistics particularly frequencies, percentages, means and standard deviations of various parameters such as background characteristics and infant feeding practices were used in the analysis.

Cross tabulation involving chi- square test was used for bivariate analysis to test associations and relationships between infected and uninfected mothers and to test hypotheses that knowledge on the possibility of HIV transmission through breastmilk and awareness of HIV status has no significant effect on infant feeding practices. T-test was used to compare the means of continuous a variable such as number of months at which exclusive breastfeeding was practised. Differences between variables were considered significant at $p<0.05$.

Pearson correlation analysis was used to establish relationship between background characteristics and infant feeding practices. Logit regression was also employed to analyse the relationship between independent and dependent variables. Dependent variables were infant feeding practices and independent variables included background variables, attitude towards infant feeding options and awareness of vertical transmission of HIV. The following regression model was employed.

$$P(Y = 1) = G(X\beta), \text{ Where,}$$

$P(Y = 1)$ is the probability that the mother would exclusively breastfeed for four months and stop to breastfeed as a result of knowledge of vertical transmission of HIV and prevention interventions.

X is a vector of mother's socio-demographic characteristics and attitude towards early cessation of breastfeeding.

G is a constant term.

B represents regression coefficients for independent variables.

Only 45% of all respondents have attended primary schools, 10% secondary school. About half (55%) of the mothers have no formal education.

4.1.4 Occupation

Agriculture (crops and livestock production) was the most common form of occupation. Nearly 96% of the subjects were engaged in agriculture and about 75% were engaged in business and self-employment. However, 9% of infected mothers earned their living by receiving remittance from relatives compared to none of the uninfected mothers. In addition, most mothers (87%) work near their home and 9% work away from their home.

4.1.5 Household size

Mean household size among the infected mothers was 6.06 ± 1.37 people and that of uninfected mothers was 6.83 ± 1.65 people. The majority of respondents (70%) had between five and seven people in the family. Nearly 63% and 43% of the infected and uninfected mothers had one child aged below five years in the household, respectively. About 44% of all respondents had two children and 3% had three children aged below five years.

The age range of children from the infected mothers was 4 to 9 months and that of uninfected mothers was 7 to 13 months. Moreover, the mean age of children from the infected mothers was 8.83 ± 2.87 months and that of children from uninfected mothers was 10.28 ± 1.88 months. There was a significant difference in mean ages between the children of infected and uninfected mothers ($p<0.001$).

4.2 Knowledge of vertical transmission of HIV

Assessment of knowledge was based on the awareness of whether a child aged below one year can have HIV and AIDS and source of information regarding vertical transmission of HIV. In addition, based on the awareness of how children can get and what can be done to prevent HIV infection to the child during breastfeeding period.

4.2.1 Modes of vertical transmission of HIV

Table 1 shows the distribution of the respondents on the modes of vertical transmission of HIV. All mothers were aware that children below one year of age could get HIV. The most common cited mode of vertical transmission of HIV was through breastfeeding (99%), during pregnancy (97%) and 64% during delivery. The majority of respondents knew that breastmilk could transmit HIV to the infant and there was no significant difference between the two groups of mothers. Other modes were through objects contaminated with infected blood or body fluids (20%) and blood transfusion (17%). It should be noted that the modes of transmission were not mutually exclusive and so did the responses from the mothers.

In addition, sources of information regarding vertical transmission of HIV were sought. The most common mentioned source of information of HIV was health workers (80%), friends (59%), radio (53%) and 37% from neighbours. Other sources included employer (14%), religious members (10%), parent (10%) and from television and partner (1%). The majority of the infected mothers (94%) and 66% percent of the uninfected mothers obtained information regarding vertical transmission of HIV from health workers. About 17% of the infected mothers were informed by their parents compared to 3% of the uninfected mothers.

Table 1: Knowledge of modes of vertical transmission of HIV (%)

Variable	Infected mothers	Uninfected mothers	Total	p value [1]
Modes of vertical HIV transmission				
During pregnancy	94.3	100	97.1	
During delivery	88.6	40.0	64.3	
During breastfeeding	100	97.1	98.6	0.647
Objects contaminated with HIV	2.9	37.1	20.0	
Sources of knowledge				
Health workers	94.3	65.7	80.0	0.003
Spouses/Partners	2.9	0.0	1.4	0.314
Parents	17.1	2.9	10.0	0.046
Peers/Friends	57.1	60.0	58.6	0.808
Employers	11.4	17.1	14.4	0.495
Neighbours	34.3	40.0	37.1	0.621
Radios	48.6	57.1	52.9	0.700
Televisions	0.0	2.9	1.4	0.314
Church/Mosque members	14.3	5.7	10.0	0.232

[1] Chi-square test

4.2.2 Knowledge of infant feeding interventions

Table 2 shows the respondents' awareness of prevention of vertical transmission of HIV during breastfeeding period. While many mothers were able to demonstrate the strategies to protect the child from infection, only few mothers from both groups (10%) indicated that nothing could be done to prevent infection to the child. Over a quarter (27%) of uninfected mothers were convinced that there was nothing the mother could do to reduce the risk of infecting the child compared to 9% from infected mothers ($p>0.01$). Provision of breast milk alternatives was considered as an effective strategy in preventing infection to child by 86% of the infected mothers compared to 91% of the uninfected mothers ($p>0.05$).

About 29% of the infected mothers compared to the 14% of the uninfected mothers mentioned better nutrition for the mother ($p<0.01$) as the means to prevent HIV infection to the child. While 33% of the infected mothers cited exclusive breastfeeding and early weaning as the means to prevent HIV infection to the child compared to less than 6% of the uninfected mothers ($p<0.01$) in preventing vertical transmission of HIV infection. Some of the uninfected mothers (9%) cited modern medicine in preventing HIV infection from the mother to the child. Other measures mentioned by mothers are indicated in Table 2.

Awareness towards infant feeding interventions to prevent vertical transmission of HIV was categorised either satisfactory or unsatisfactory. About 49% and 6% of the infected mothers and uninfected mothers respectively had satisfactory knowledge on vertical transmission of HIV and the difference was significant ($p<0.001$).

Table 2: Knowledge of infant feeding interventions

Variable	Infected mothers	Uninfected mothers	Total	p value [1]
Are there any preventive measures of vertical transmission of HIV?				
Yes	68.6	97.1	82.85	
Preventive measures for vertical transmission of HIV				
Nothing can be done to reduce HIV infection during breastfeeding	8.6	26.7	10.0	0.002
Give breastmilk only and no other foods up to 4 months	31.4	2.9	17.5	0.002
Feed the child with breastmilk alternatives	85.7	91.4	88.6	0.425
Early weaning	32.9	5.7	19.3	0.004
Take modern medicines	8.6	0.0	4.3	0.077
Better nutrition (for mother and the child)	28.6	14.3	21.4	0.145
Level of knowledge on infant feeding preventive measures				
Satisfactory	48.6	6.1	27.9	0.000
Unsatisfactory	51.4	93.3	72.1	

[1] Chi-square test

4.3 Factors influencing infant feeding practices

4.3.1 Infant feeding practices

Identified infant feeding practices are presented in Table 3. It was established that most children in the study area were breastfed immediately after birth. However, prelacteal feeds (fluids and /or foods given to the child immediately after delivery before breastfeeding) were given to 15% of the infants. About 57% of all respondents gave warm water, sugary water (23.8%) and 19% gave warm sugary water. This practice showed no significant relationship on the two groups of mothers. The median duration of exclusive breastfeeding was 3.48 and 2.97 months for the infected and uninfected mothers, respectively. A higher percentage of infected mothers (66%) had exclusively breastfeed for at least four months from birth compared to uninfected mothers (34%).

By the age of 3 months, 26% of infants of infected mothers were given porridge compared to 9% from uninfected mothers. Moreover, by the end of fifth month, 24% of all respondents gave diluted cows milk to their infants. Porridge was the most important complementary food during the age of four month (68%) for most infants followed by mashed banana and potatoes during the fourth and fifth month (13%).

The study also revealed that 34% of all respondents were not breastfeeding at the mean age of 8.4 months. About 63% of the infected mothers were no longer breastfeeding compared to 6% from uninfected mothers ($p<0.001$). The mean age for cessation of breastfeeding for the infected mothers was 6.40 months and 10.50 months for the uninfected mothers ($p<0.05$). A small portion of the children (10%) stopped breastfeeding quite early, that is before 5 months of their life, 14% had stopped breastfeeding at the age of between five to eight months, and 10.5% stopped at the age 9 months and above.

Table 3: Infant feeding practices (%)

Variables/month	Infected mothers	Uninfected mothers	Total	p-value [1]
Gave prelacteal feeds	10.0	20.0	30.0	0.068
Mean duration of exclusive breastfeeding	3.4	2.9	3.2	0.030
Feeding practices				
Exclusively breastfeeding for at least 4 months	65.7	37.1	51.4	
Not exclusively breastfeeding for at least 4 months	34.3	62.9	48.6	
Types of fluids/foods				
First month				
Water	5.7	0.0	2.85	
Second month				
Water	2.8	5.7	4.275	
Third month				
Water	2.85	8.57	5.71	
Maize/Rice porridge	8.57	25.71	17.14	
Cows milk	2.85	0.0	1.425	
Fourth month				
Maize/Rice porridge	77.0	14.0	68.57	
Cows milk	8.57	11.42	9.99	
Mashed banana	0.0	2.85	1.42	
Commercial/Infant formula	8.57	0.0	4.28	
Fifth month				
Maize/Rice porridge	8.5	2.8	5.7	
Cows milk	17.14	8.57	12.8	
Commercial/ infant formula	0.0	2.85	1.42	
Mashed banana/potatoes	0.0	17.14	8.57	
Whether the child is current breastfeeding				
No	57.1	6.2	31.65	0.000
Yes	43.9	93.8	68.35	
Mean duration of breastfeeding	6.4	10.5	8.4	0.024
Age at which breastfeeding was stopped				
Below 5 months	20.0	0.0	10.0	
Between 5 and 8 months	28.5	0.0	14.2	
Above 9 months	0.0	5.71	2.85	

[1] Chi-square test

4.3.2 Factors affecting infant feeding practices

Factors affecting infant feeding practices are presented in Table 4. Beliefs about child feeding were the main factor affecting infant feeding practices. About 9% of the respondents had introduced water to their children before breastfeeding to clear a child's throat believing that a child's throat should be cleaned before breastfeeding. Furthermore, 71% of the mothers indicated that the reason for early complementation frequently was child cry. About 36% of the respondents introduced other fluids and foods because they believed that when a child cries it is the sign of hunger. Other reasons include weaning (15%) and resuming work away from home (6%). Weaning as the reason for introducing other fluids and foods had a significant influence ($p < 0.05$) between infected and uninfected group with a larger proportion of infected mothers (26%) mentioning weaning as the reason for introducing other fluids and foods than uninfected mothers (6%).

Moreover, 23% of infected mothers removed their children from the breast because of health reasons, family's advice (9%), child refusal (3%) and 46% for fear of infecting the child. It was observed that many infected mothers stopped breastfeeding because they felt that breastmilk was not sufficient for the baby. This was not the case for the uninfected mothers ($p<0.001$).

Table 4: Factors affecting infant feeding practices (%)

Variables	Infected mothers	Uninfected mothers	Total	p-value [1]
Reasons for introducing other fluids and foods				
To resume work	2.9	8.6	5.7	0.303
To wean	25.7	5.7	15.7	0.022
The child was crying	62.9	80.0	71.4	0.112
Mother did not have enough milk	37.1	34.3	35.7	0.803
To clear child's' throat	5.7	11.4	8.6	0.393
Reason for stopping to breastfeed				
Mother was too sick	22.9	0.0	11.45	0.000
Mother did not have enough milk	8.6	2.9	5.75	0.000
Fear of infecting the child	45.7	0.0	22.85	0.000
Advised by family	8.6	0.0	4.3	0.000
Child refused	0.0	5.7	2.85	0.000

[1] Chi-square test

4.3.3 Factors associated with infant feeding practices

4.3.3.1 Factors affecting exclusive breastfeeding

Table 5 presents the correlation results on the factors contributing to the age at which children were exclusively breastfed. The age of the mother was positively and significantly correlated ($r=0.326$, $p<0.001$) with the duration of exclusive breastfeeding. A significant negative correlation ($r=-0.258$, $p<0.05$) was observed between education of the mother (number of years of schooling) and the duration of exclusive breastfeeding.

Table 5: Factors associated with the duration of exclusive breastfeeding

Factor	r	P value
Age of the mother in years	0.326	0.006
Total number of people in the household	0.080	0.511
Total number of underfive children in the household	-0.200	0.097
Number of years of schooling	-0.258	0.031

4.3.3.2 Factors associated with duration of exclusive breastfeeding

Table 6 presents results of logit regression analysis on the factors contributing to duration of exclusive breastfeeding. The results show that health workers as source of information regarding vertical transmission was a significant factor contributing to exclusive breastfeeding for four months (p =0.03).

Table 6: Regression results on factors contributing to exclusive breastfeeding for four months.

Independent variable	B coefficient	Standard error	p value[1]
Marital status	0.1851	0.5729	0.7467
Level of knowledge of modes of vertical transmission of HIV	0.4941	2.4386	0.4811
Level of awareness of prevention of vertical transmission	0.3632	3.0364	0.8764
Contact with health workers	0.4987	1.2103	0.0300
Mothers employment	0.7011	0.8017	1.2450
Radio as the source of knowledge of vertical transmission of HIV	0.2461	22.4189	2.4370
Attitude towards early cessation of breastfeeding	1.0620	0.5351	0.4720
Constant	-0.7838	0.7819	0.7425

[1] Chi-square test
Log likelihood 88.038

4.3.3.3 Factors associated with cessation of breastfeeding

Table 7 presents results of logit regression analysis on the factors contributing to stopping of breastfeeding. Mother's knowledge on breastmilk transmission of HIV and prevention of vertical transmission of HIV negatively (p=0.029) and (p=0.0029) respectively) contributed to cessation of breastfeeding. Health workers as source of information regarding vertical transmission of HIV and the number of children aged below five years in the household were positively and significant factors contributing to cessation of breastfeeding (p=0.040 and p=0.021 respectively).

Table 7: Factors contributing to cessation of breastfeeding

Independent variable	B coefficient	Standard error	p value[1]
Marital status	1.1569	0.7893	1.1427
Age of the mother	0.5393	0.6375	0.3979
Level of education	-0.2243	0.8108	0.7821
Knowledge of breastmilk transmission of HIV	-2.5546	1.1757	0.0298
Level of awareness of prevention of vertical transmission	-2.3651	0.7942	0.0029
Contact with health workers	0.4014	0.241	0.0430
Mothers employment	-1.487	0.648	1.2450
Number of children aged below 5 in the family	0.109	1.843	0.0210
Radio as the source of knowledge of vertical transmission of HIV	-3.4712	-3.4312	2.1748
Constant	-0.2228	0.0092	0.9234

[1] Chi-square test

Log likelihood 87.1482

4.3.3.4 Breastmilk replacement and their risks to the infant

Table 8 presents results of breastmilk replacement in the study area. This was to speculate what infant feeding options an HIV positive mother had if she decided not to breastfeed in order to recommend rational infant feeding option in the study area. Mothers were asked to state the type of breast milk replacement that is used in the community when the mother has died, when a mother is pregnant or when problems occur during breastfeeding. Most of the respondents (90%) mentioned cow milk and home-prepared formulation (91%) made from rice, maize, and mashed banana and potatoes with soup as the replacement feed.

Nearly 51% of the respondents cited goat milk, surrogate breastfeeding by the mothers' relative as means to feed such a child (34%) and commercial infant formula was the least mentioned (20%). In addition, respondents were also asked if there were any dilemmas in using breast milk replacement. Sixty percent of the respondents mentioned poor growth, child weakness (33%), child malnutrition (27%) and illness (14%) to be the associated dilemmas with the provision of infant replacement feeds. Other dilemmas are summarised in Table 8.

Table 8: Breastmilk replacement and risks associated with their use (%)

Variable	Infected mothers	Uninfected mothers	Total	p value [1]
Feeding options to a child whose mother is not breastfeeding				
Surrogate breastfeeding	17.1	51.4	34.3	0.003
Infant /commercial formula	88.6	74.3	81.4	0.124
Cow milk	88.6	91.4	90.0	0.680
Goat milk	60.0	32.9	51.4	0.151
Home prepared formula	88.6	94.3	91.4	0.393
Risk involved in provision of breastmilk replacement				
Child malnourishment	17.1	37.1	27.1	0.06
Child suffering from illness more often	11.4	17.1	14.3	0.49
Child might not grow well	65.7	57.1	61.4	0.461
Child would be weak	37.1	28.6	32.9	0.44
No risks at all	5.7	11.4	8.6	0.39
Will affect child's intellectual ability	0.0	8.6	4.3	0.07

[1] Chi-square test

4.4 Attitude towards infant feeding interventions

4.4.1 Acceptability of infant feeding interventions

It is important to assess the acceptability of infant feeding interventions in view to recommend cultural specific and economically feasible infant feeding options to prevent vertical transmission of HIV. Table 9 presents results of the respondents' attitude towards infant feeding interventions to prevent vertical transmission of HIV. Most of the respondents were not in favour of heated breastmilk (97%), followed by surrogate breastfeeding (84%), commercial infant formula and goat milk (81%).

Nearly 67% of the respondents did not favour on early cessation of breastfeeding while 41% did not like feeding cow milk. While one hundred percent of the infected mothers were not in favour surrogate breastfeeding, 68% among uninfected mothers did not favour surrogate breastfeeding ($p<0.001$). However, few respondents preferred goat milk (13%), cow milk (59%) and early cessation of breastfeeding (33%) while fewer were in favour of surrogate breastfeeding (16%), heated breastmilk (3%) and commercial infant formula (16%).

Table 9: Acceptability of infant feeding interventions (%)

Feeding options	Infected mothers	Uninfected mothers	Total	p value*
Commercial infant formula				
Disagreement	82.8	82.8	82.8	0.624
Undecided	2.9	0.0	1.4	
Agreement	14.3	17.2	15.7	
Cow milk				0.500
Disagreement	40.0	42.8	41.4	
Agreement	60.0	57.2	58.6	
Goat milk				0.563
Disagreement	82.9	80	81.45	
Undecided	2.9	8.6	5.75	
Agreement	14.2	11.4	12.8	
Heated breastmilk				0.246
Disagreement	100	94.3	97.15	
Agreement	0.0	5.7	2.85	
Surrogate breastfeeding				0.000
Disagreement	100	68.6	84.3	
Agreement	0.0	31.4	15.7	
Early cessation of breastfeeding				0.154
Disagreement	60.0	74.3	67.1	
Agreement	40.0	25.7	32.85	

* Chi-square test

4.4.2 Reasons for the negative attitude towards infant feeding interventions

Table 10 shows reasons negative attitude towards infant feeding interventions.

Table 10: Reasons for negative attitude towards infant feeding interventions (%)

Option/Reason	Infected mothers	Uninfected mothers	Total	p value [1]
Cow's milk				
Can not afford	85.7	76.9	81.5	0.130
Goat's milk				
Not available where I live	22.9	17.1	20.0	0.634
Not familiar with	57.1	51.4	54.3	0.682
Commercial				
Can not afford	77.1	68.6	72.9	0.130
Surrogate breastfeeding				
Fear of child to mother transmission of HIV	57.1	51.4	54.3	0.001
Fear of loosing the child to surrogate mother	8.6	5.7	7.1	0.003
Not acceptable to family	2.9	14.3	8.6	0.000
Fear of Stigma	42.9	8.6	25.7	0.000
Expressed breastmilk				
It is very inappropriate method	60.0	57.1	58.6	0.800
Boiling breastmilk destroys the vitamins and the quality of the milk	40.0	17.1	28.6	0.030
The option is useless because the milk would still be contaminated by HIV virus	25.7	34.3	30.0	0.430
Early cessation of breastfeeding				
Not acceptable by family because the child is still very young	22.9	11.4	17.1	0.080
Shouldn't breastfeed at all because breastmilk contain HIV virus	0.0	25.7	12.9	0.006

[1] Chi-square test

4.4.3.1 Animal milk and commercial infant formula

A high proportion of the respondents (82%) reported that the high cost of cow milk and commercial infant formula (73%) as the reason for not favouring these options. Moreover, nearly 54% of the mothers indicated that they were not familiar with and had no access to goat milk (20%) as the reason for not preferring goat milk.

4.4.3.2. Modified breastfeeding

About 54% of the mothers feared that the child might infect surrogate mother. However, 26% feared that the HIV positive mother would be suspected of being HIV infected and hence stigmatised. Nine percent of the respondents indicated that the option would not be acceptable by the family and 7% feared loosing a child to the surrogate mother. There was a significant association between infected and uninfected mothers on these reasons for not favouring surrogate breastfeeding.

4.4.3 2.1 Expressed and heated breastmilk

About half of the mothers (59%) felt that it is very inappropriate to boil mothers milk (the option is quite unusual). Some thought the option is useless because the milk still gets infected even after boiling (30%). Twenty nine percent of the mothers thought that heated breastmilk could destroy the quality of breastmilk.

4.4.3.2.2 Early cessation of breastfeeding

Seventeen percent of the mothers thought that withdrawal of breastfeeding at an age of four months is culturally not acceptable to the family. Moreover, a quarter of mothers from the uninfected group thought that the child should never be breastfed at all because of the

fact that the breastmilk contains the HIV virus compared to none in the infected mothers ($p<0.01$).

4.4.4 Opinion towards breastfeeding and HIV

4.4.4.1 Opinion towards a mother who does not breastfeed

Table 11 presents the results of opinion given by respondents towards a mother who does not breastfeed. Respondents were asked what reactions an HIV positive mother would receive from family if she were not breastfeeding. Fifty seven percent of infected mothers and 60% of uninfected mothers indicated that the family would think that such mother is a prostitute.

Forty percent of infected mothers and 74% of uninfected mothers indicated that the family would think that such mother is mad ($p<0.01$). Twenty percent of infected mothers compared to about 57% of uninfected mothers indicated a mother who does not breastfeed would be rejected by her family ($p<0.01$). Few mothers from both groups indicated that the family would get hurt psychologically (*kuona uchungu*).

In addition mothers were asked what reactions an HIV positive mother would receive from neighbours if she were not breastfeeding. Nearly 58% of infected and 51% of uninfected mothers indicated that the mother would be suspected of being HIV positive and therefore stigmatised. Nearly 14% of infected and 49% of uninfected mothers indicated that neighbours would think she has a problem. Other reactions are summarised in Table 11.

Table 11: Opinion towards a mother who does not breastfeed (%)

Variable	Infected mothers	Uninfected mothers	Total	p value [1]
Family's reaction				
Would think she is a prostitute	57.1	60.0	58.6	0.800
Would think she is mad	40.0	74.3	57.1	0.004
Would think she wants to be modern	17.1	8.6	13.0	0.263
Would reject her	20.0	57.1	38.6	0.001
Would support	31.4	11.4	21.4	0.041
Would think she has problems	5.7	22.9	14.3	0.040
Family would suffer/Get hurt	5.7	2.9	1.4	0.550
Neighbour's reaction				
Would think she is a prostitute	62.9	80.0	71.4	0.112
Would think she is mad	20.0	42.9	31.4	0.030
Would think she wants to be modern	28.6	25.7	27.1	0.780
Would reject her	0.0	2.9	1.4	0.314
Would support her	8.6	37.1	22.9	0.004
Would think she has problem	14.3	48.6	31.4	0.002
Would think she is HIV infected/Stigma	57.6	51.4	54.3	0.630
Would despise the mother	8.6	11.4	10.4	0.690

[1] Chi-square test

4.4.4.2 Opinion on whether HIV and AIDS infected mother should breastfeed

Table 12 shows the mothers opinion on whether HIV and AIDS mother should breastfeed. More than half (66%) of the mothers disapproved breastfeeding in this case. About 17% of the mothers indicated that breastfeeding by HIV positive mother would transmit HIV and AIDS to the child and 33% indicated that breastfeeding would transmit more viruses to the child. About 16% of mothers approved breastfeeding but cautioned that breastfeeding should be stopped when mothers develop AIDS symptoms. Other reasons are presented in Table 12.

Table 12: Opinion on whether HIV and AIDS infected mother should breastfeed

Whether HIV mother should breastfeed	Infected mothers	Uninfected mothers	Total	p value [1]
No	54.3	77.1	65.7	0.090
Yes	45.7	22.9	34.3	
Reasons for disapproving breastfeeding				
Would transmit HIV virus to the child	22.9	11.4	17.1	0.006
Would transmit more HIV viruses to the child	17.1	48.6	32.9	0.017
Good for mothers health	2.9	11.4	7.1	0.06
Good for child's health	5.7	8.6	7.1	0.09
Not fair if the mother is breastfeeding while knowing is HIV infected	0.0	14.7	7.4	0.017
Reasons for approving breastfeeding				
Makes no difference how the child is fed	5.7	11.4	8.6	0.038
Breastfeed but stop when clinical symptoms of AIDS occur	22.9	8.6	15.7	0.256
Fear of suspicion of HIV serostatus and stigma from neighbours	5.7	2.9	4.3	0.346
Fear of rejection from family	11.4	2.9	7.1	0.265

[1] Chi-square test

CHAPTER FIVE

DISCUSSION

5.1 Knowledge of vertical transmission of HIV

Mother's knowledge of the vertical transmission of HIV was relatively high. Most respondents were aware that a child below one year could be infected with HIV. These findings are similar to the findings observed by the National Bureau of Statistics of Tanzania (TBS) in which over 80% of women surveyed knew about vertical transmission of HIV (TBS, 2000). Moreover, the majority of women knew about the possibility of HIV transmission through breastfeeding. The study results on this issue also corroborate that of Omari *et al.*, (2003). Also Tanzania Commission for AIDS (TACAIDS) and TBS (2004) found that majority of mothers in Tanzania mainland were aware of breastmilk transmission of HIV in the survey done in 2003 to 2004.

A higher proportion of HIV infected mothers had accurate knowledge of vertical transmission of HIV compared to the uninfected mothers. This was also true for the knowledge towards prevention of transmission of HIV. Very few mothers (4.3%) knew about modern medicine as one of preventive measures against vertical transmission of HIV. Similar results are reported by TACAIDS/TBS (2004) who observed that few mothers knew that a doctor or a nurse can give to a pregnant woman infected with the virus to reduce the risk of HIV infection to unborn baby.

Health workers, friends and other community members were the most common source of information on vertical transmission of HIV. These results are similar to findings in Kenya that women are likely to receive information through their community networks such as

health facility, friends, and neighbours (Kenya National Bureau of Statistics, 1999). Thus the use of these networks may be effective in increasing awareness about vertical transmission among women.

Few mothers had misconceptions particularly on the modes of prevention interventions. Some mothers indicated that nothing could possibly be done to rescue the child whose mother is HIV positive from being infected for the belief that the child would have already been infected during pregnancy. This is probably because of the fact that many health care providers in SSA may have no accurate information to share with HIV positive mothers as noted by Kuhn *et al.*, (1999) and have no enough time to provide education and counselling about HIV related issues to their clients (Burke, 2003). There should be motivation and creation of enough time to enable health workers to disseminate accurate and timely information on vertical transmission of HIV. This is not only because of their responsibilities but also because they are in good position to offer advice to mothers.

5.2 Factors affecting infant feeding practices

Results show that exclusive breastfeeding is not optimally practised in Mvomero district. The majority of mothers do not exclusively breastfeed their children for four months. Lack of exclusive breastfeeding has also been reported in many communities in Tanzania (Tanzania Demographic Health Survey, (TDHS), 1996). In the present study, some mothers tend to give water and earlier complementation than recommended as observed by Nyagawa and Hussein (2004); Agnarsson *et al.*, (2001); Kavishe, (1993), Nyagawa (1993) and Shirima (2001).

Giving foods and fluids other than breast milk to the infant before about six months of age is usually unnecessary and may entail risks, for example making the infant more vulnerable to diarrhoeal and other infectious diseases. It also decreases the frequency and intensity of sucking and that, as a consequence, breast milk production also decreases (TDHS, 1996). The question of exclusive breastfeeding by HIV infected mother is quite controversial because of the fact that breastfeeding for 4 to 6 months is rare. Mothers usually give some water, cow milk, cereal porridges and other foods in addition to breastfeeding (King and Burgess, 1993). This is because in many communities, breast milk is not always considered to be in itself a sufficient food. Although there might be a small portion of children who might need supplemental feeding at the age of 2 –3 months, caution is needed when introducing such fluids and foods to an infant earlier than 4 months, especially if it is done in unhygienic conditions as is often the case in developing countries (Cameroon and Hofvander, 1983).

Moreover, when solid foods are introduced prematurely or when introduced through unhygienic preparation, they disturb the infant's gut wall. This is likely to increase the risk of HIV transmission through breastfeeding (Preble and Piwoz, 2001). However, few infected mothers mentioned weaning as a reason for the introduction of foods and fluids. This is because early weaning may reduce the risk of vertical transmission of HIV.

In the present study it was observed that, over 90% of children were fed porridge made from maize and rice. The porridge was supplemented with sugar and citrus fruits such as lemon and orange. Although staple breast milk replacements are not good to the health of infant, many mothers in this study introduced fluids/foods such as watery porridge below recommended age of four months. These findings are similar with those of Agnarsson,

(2001) who reported that in many traditional societies mothers put great faith in local staple. The introduction of cereals can interfere with the absorption of breast milk, which is normally low in concentration of iron. This can result into iron deficiency and anaemia to infant. Moreover, the problem of watery porridges for children in Tanzania is a serious one, and may be contributing to the high levels of childhood malnutrition.

Furthermore, mashed potatoes and bananas in vegetables and fish soup were fed to 10% of the children. Only few mothers were able to give cow milk (which is recommended to supplement breastmilk after six months of age) to their infants (Pipes and Trahms, 1997). Indeed, the results show that only few infants (24%) had received cow milk from which 11% in the fourth month and 13% during the fifth month. This is probably because many families are too poor to afford cow milk. However, few had introduced commercial infant formula to their children (6%) at an age of forth and fifth month. Some factors affecting infant feeding practices in this study included;

5.2.1 Beliefs about infant feeding

Bad beliefs about infant feeding practices were observed in this study. Mothers introduced fluids to their infants earlier than the recommended age because of the belief that child's throat should be cleaned after suckling as breast milk tend to accumulate in the throat (*"kukereketa kooni"*). Perception that breast milk is not enough was reported by most mothers in the study area, which was based on the crying and hunger of the infant. This could be probably due to the high level of illiteracy among respondents. Indeed, 45% of the respondents had not attended formal education. In addition, this may be due to traditional norms about infant feeding. Counteracting these beliefs and increase awareness about infant feeding in the community may be necessary to increase the duration of

exclusive breastfeeding, a safe and cost effective intervention for prevention of vertical transmission of HIV through breastfeeding.

5.2.2 Education of the mother

Education is an important social factor. Maternal education can break traditions; enhance or facilitate adoption of the alternative practices in child feeding, and increasing the capacity of the mothers to manipulate their environment. However, in this study, education of the mother was negatively associated with duration of exclusive breastfeeding. Education of the mother (number of years of schooling) had a significant influence on duration of exclusive breastfeeding, such that mothers with higher education, exclusively breastfed their children for shorter periods than mothers with lower or no education at all. These findings are similar with studies in Nigeria (Igbedioh, 1994) and in Kuwait (Amine and Al Awadi, 1990) where better educated mothers exclusively breastfed for duration shorter than the less educated mothers. Mothers with low level of education are likely to be employed in an informal sector. Therefore can have contact with their children for many hours and they are likely to introduce supplements later than more educated and formally employed mothers. Similar findings are also reported by Walker and Rolls (1994) who reported that mothers with higher education level are more likely to be employed in modern sector, usually away from home, hence the need to introduce supplements earlier.

5.2.3 Age of the mother

The age of the mother had a significant association with duration of exclusive breastfeeding such that younger mothers exclusively breastfeed for shorter periods than older mothers. This is probably because experienced mothers are more comfortable to

breastfeed than younger mothers. This finding is consistent with that of Serenius *et al.*, (1988).

5.2.4 Information about HIV and PMTCT of HIV

Moreover, 66% of infected mothers breastfed for at least four months compared to 37% of uninfected mothers. This means that few children from uninfected mothers had received other foods and fluids earlier than from infected mothers. This is probably because of knowledge of HIV status among infected mothers and that exclusive breastfeeding for at least for months may lower the risks of breast milk transmission of HIV infection to their children. These findings are in contrast with observations from Omari *et al.*, (2003) who reported that HIV and AIDS infected mothers were introducing other fluids and foods earlier than uninfected mothers.

In this study, HIV infected mothers were likely to stop breastfeeding earlier than uninfected mothers. While most of the children whose mothers were infected stopped to breastfeed when the infant was four months old, none of the children from uninfected mother-stopped breastfeeding before the age of 9 months. While uninfected mothers mentioned child refusal, infected mothers had stopped breastfeeding for the concerned about vertical transmission. Consequently, the hypothesis that knowledge of HIV status has no significant effect on infant feeding practices is rejected ($p<0.001$). Similar results are reported by Kuhn *et al.*, (1999) who observed that women who know their HIV status are likely to abstain from breastfeeding than uninfected ones.

Moreover, knowledge of the possibility of transmission of HIV through breast milk contributed negatively to cessation of breastfeeding. These observations are similar to

those made by De Paoli *et al.*, (2001), who observed that knowledge of HIV transmission through breastfeeding was not associated with breastfeeding practices. Therefore, mothers' knowledge of breast milk transmission of HIV has no significant effect on infant feeding practices adopted by women. This is probably because in African settings, Tanzania inclusive, mothers themselves do not make decision about infant feeding but rather advocated by mother's husband and close relatives. Therefore, the efforts to promote infant feeding interventions to prevent vertical transmission of HIV will require the support of families.

Further, health workers as the sources of information were found to be a contributing factor towards cessation of breastfeeding. In rural communities health workers are respected and trusted and their paternalistic attitudes held by many health care providers. Thus, the potential utilisation of health facilities for improvement of infant feeding practices towards prevention of vertical transmission of HIV is also an attributive factor in the cessation of exclusive breastfeeding at four months.

Moreover, radio, as the source of information on vertical transmission of HIV was not associated with cessation of breastfeeding probably because women in developing countries particularly in rural areas play multiple roles in the household with no or little time for recreational activities such as listening to the radio. Thus, the use of radio messages as one way of communication may not be effective for women.

5.2.5 Parity and occupation of the mother

The number of children aged below five years was associated with cessation of breastfeeding because mothers with more than one child aged below five years were more

likely to stop breastfeeding earlier than those with one child. It was also observed that mother's employment and source of income (working away from or at home) was not associated with cessation of breastfeeding. The lack of significant association may be due to the small study sample size and that few mothers in the study area are formally employed.

5.2.6 Decision about infant feeding

In Tanzania, like in many other African countries, it is the infant's father, the woman's mother in law and often the woman's own mother who make the decision about infant feeding (Thairu, 2001). In the present study, it was observed that family members also contributed to cessation of breastfeeding by HIV infected mothers because some of them had been advised by family members to stop breastfeeding because of the fear and concern about vertical transmission of HIV to the infant through breast milk. Education to increase awareness about breastmilk transmission and prevention of vertical transmission of HIV should therefore reach the general population to help to improve infant feeding.

5.2.7 Attitude towards early cessation of breastfeeding

Positive attitude towards early cessation of breasfeeding did not contribute to exclusive breastfeeding for four months. It should be noted that the mean age of cessation of breasfeeding was found to be 6.4 months. This is far above the recommended ideal age of 3 to 4 months for reducing the risks of HIV transmission through breastfeeding (Piwoz *et al.*, 2001). This implies that knowledge of vertical transmission and awareness of HIV status are necessary but not sufficient to ensure reduction of vertical transmission of HIV. Probably mothers had feared that cessation of breasfeeding earlier than expected may

reveal their HIV status, and therefore result into stigmatisation and rejection from family members.

5.2.8 HIV/AIDS status

A higher percentage of the infected mothers than those who were uninfected reported that they stopped breastfeeding earlier than recommended duration because of insufficient supply of breast milk. This is probably because the capacity to breastfeed for HIV positive women may be further reduced if they are symptomatic and sick whereby some infected and uninfected people in Dodoma region had mentioned failure to breastfeed because of insufficient breastmilk among infected mothers (Burke, 2003). Few infected mothers were too sick to breastfeed. This is probably because of breast inflammation, cracked or sore nipples and mastitis diseases associated with HIV and AIDS infection.

The risk that breastmilk replacement feeding poses to the health of the infant in this community is real. Respondents' insights revealed that the children who are not breastfed in this community affect health of the child. In addition, higher infant death related to malaria, diarrhoea and other infectious diseases are high in the study district (URT/MOH, 2000). Of concern is that the overall infant and underfive mortality rate from infectious diseases is significantly higher than AIDS related deaths in the region. In such circumstances, coupled with traditional norms about breastfeeding and the image of mother who does not breastfeed, limit breastmilk replacement feeding interventions in the study area. Therefore, promotion of replacement feeding may pose dangers for not only infants of HIV positive mothers, but also for other infants (Greiner, 1999). Considering that half of the Mvomero households have no access to safe water. Nevertheless, promotion of exclusive breastfeeding would be beneficial to all. Programmes aiming at improving infant

feeding practices could include strategies to counteract negative beliefs about breastfeeding, be proxy for increasing duration and practice of exclusive breastfeeding to prevent vertical transmission of HIV.

5.3 Attitude and opinion towards selected infant feeding interventions.

The attitude of mothers towards different infant feeding options showed that acceptability of the infant feeding options was greatly influenced by poverty and traditional norms about breastfeeding. Stigma was also a major barrier that hinders the acceptability of interventions to prevent vertical transmission of HIV. Accurate information of HIV and its transmission may increase awareness of vertical transmission of HIV. Consequently the increased awareness may reduce stigma and increase the acceptance of infant feeding interventions.

Some mothers from both groups believed that it is useless to boil breastmilk because the milk is already infected and nothing could be done to remove the virus from the milk. While goat milk was found to be unfamiliar to nearly half of the mothers, the cost of commercial infant formula and cow milk was found to be too high. Heated breastmilk was perceived as taboo and incompatible (unusual) with local beliefs. Surrogate breastfeeding could be suggested but the fear of testing and fear of a surrogate mother transmitting HIV to a child cannot be ignored.

Moreover, not to breastfeed in Mvomero district poses social risks to women including stigma, rejection, humiliation and suspicion that she is a prostitute. There is also a risk that any mother who does not breastfeed from birth has problems and is HIV positive. These

results are similar to those of Nishi *et al.*, (2003), that HIV and AIDS infected mothers were breastfeeding despite their serostatus to avoid social repercussions.

Thirty two point nine percent of respondents indicated that HIV infected mothers should not breastfeed because of the fact that she might transmit more viruses to the child in case she is already infected during pregnancy. In addition, 15.7% others thought that the mother should breastfeed but should stop breastfeeding when clinical symptoms of AIDS begin to appear. This position is arguable because being infected with HIV does not mean that a person has AIDS (Panos, 1992). A person with HIV (with or without symptoms of AIDS) can infect the other, including the child through breastfeeding.

Although the risk of HIV transmission through breastfeeding can be eliminated by avoiding breastfeeding, in this study, mothers who do not breastfeed are regarded and HIV infected and despised. Similar results were observed by Nigel, Rolling of the University of Kwazulu Natal where by non breastfeeding mothers in South Africa were regarded as bad and non caring (Boyley, 2004). For this reason, avoiding HIV transmission by not breastfeeding may not achieve the greater goal of optimizing overall child survival.

In that view, women should be sensitised/motivated enough to know the importance of testing for HIV before deciding to get pregnant. This will reduce the level of anxiety and frustration caused by any method of infant feeding adopted for reduction of vertical transmission of HIV. This is because women are the one who primarily assume responsibilities of infant feeding as reported by Thairu (2001) and Charles *et al.*, (1999).

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The findings presented a general picture of factors that hinder adoption of infant feeding practices to prevent vertical transmission of HIV. The research findings therefore, call for pragmatic solutions to improve infant feeding in the region. However, while this study compares two groups of mothers (infected and uninfected), this approach is deficient in that it tends to suggest that all children from HIV infected mothers may benefit from mothers response to the suspicion of HIV serostatus and/ or knowledge of their HIV status. Future research needs to compare among only infected mothers on the pattern of infant feeding (from intentions to practice) to prevent HIV infection to their infants.

The infant feeding practices for prevention of vertical transmission of observed in this study are far from recommended. No strong association was found between infant feeding practices and mothers being informed of the possibility of breast milk transmission of HIV and knowledge of HIV status. Inadequate knowledge on the part of the mother with regard to infant feeding practices was observed.

Feeding with animal milk and home prepared formula from locally available cereals such as rice and maize, following four to five months of exclusive breastfeeding seems a most realistic option in the study area. This would be culturally acceptable and economically affordable and have a vital option for the infant and mother from stigma and rejection from the family and community. To ensure those mothers' decisions to adhere to safe infant-feeding interventions (free from stigma, risks of contamination, malnutrition and HIV

infection to the child) in Mvomero is smooth and effective the following recommendations should be considered.

6.2 Recommendations

Following the objectives, hypothesis, and results, the following recommendations are put forward;

i) There is a need to increase awareness about HIV and AIDS among young women and men to prevent future mothers from being infected with the virus.

ii) There is a need to expand Voluntary Counselling and Testing services in rural areas to enable HIV infected expecting mothers to plan on how to feed their infants.

iii) Government and donor agencies supporting child health improvement programs should continue to promote exclusive breastfeeding from 4-6 months and termination of breastfeeding in two years.

iv) There should be provision of nutrition education to mothers in the community on the importance of exclusive breastfeeding for 4-6 months.

v) There should be training and sensitisation of key people in the community e.g. midwives and local leaders to promote and support exclusive breastfeeding.

vi) There should be training of health workers on vertical transmission of HIV to improve their skills in counselling HIV infected mothers about infant feeding options to prevent vertical transmission of HIV transmission.

vii) Health workers should continue to promote exclusive breastfeeding and counteract negative beliefs about infant feeding and prevention of vertical transmission of HIV.

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APPENDIX

QUESTIONNAIRE

INFANT FEEDING PRACTICES AND PREVENTION OF VERTICAL TRANSMISSION OF HIV IN MVOMERO DISTRICT, MOROGORO.

RESPONDENT IDENTITY/NAME_____

A: BACKGROUND CHARACTERISTICS

Instruction: Please fill in the blanks or circle the letter bearing the correct answer where applicable.

1.Age of respondents in years.....

2. Marital status.

Single.....1

Married.....2

Separated /divorced..... 3

Widow.....4

3. Number of people in the household

Age group	Number
0-5	
Above 5 years.	
Total	

4. Age of the index child in months.....

5. Which level of education have you reached? (The number of years gone to school).....

6 (a). What is/ are your sources of income/Occupation

.....

(b). Location where mother works

Home.....1

Home and away from home.....2

Away from home.....3

B: INFANT FEEDING PRACTICES

7. Did your child receive any other fluids/food in addition to breast milk during the first day after delivery before the breast-feeding?

Yes.....1

No.....2

8. If yes, what fluid /food did you give to the child immediately after delivery before thebreastfeeding?.....

9. How long have you exclusively breast feed this child? (In months).....

10. Are you currently breast-feeding?

Yes.....1

No.....2

If yes, go to question no. 13

11. If no, when did you stop breast-feeding? ..... (In months)

12. Why did you stop breast-feeding?

.....

13. List type of fluids/ foods used to feed your child and the age at which they were introduced.

Age (months)	Fluids/Foods

14. Why did you introduce other fluids and foods to the child?

.....

C: AWARENESS /KNOWLEDGE OF VERTICAL HIV TRANSMISSION

15. Can HIV infect a child?

Yes.....1

No.....2

Don't know.....3

16. If yes, where do you get information about vertical transmission HIV?.....

17. When can HIV pass from a mother to her child?.....

18. Do you know whether HIV could be transmitted from mother to child through breast-feeding?

Yes.....1

No.....2

Don't know 3

Other (specify) 4

19. Can an HIV mother do anything to reduce the risk of transmission of HIV to her child during the breast-feeding period?

Yes.....1

No.....2

Don't know.....3

20. If yes, what would breast feeding mother do to reduce the risk of a child becoming infected with HIV during the breastfeeding period?.....

21. Would you list different feeding options to an infant whose mother is not breast-feeding?.....

22 (a). Are there any risks involved in providing replacement feeds to a child?

Yes.....1

No.....2

23 (b). If yes, what are the risks?

.....

D: ATTITUDE TOWARDS SELECTED INFANT FEEDING OPTIONS

24. Which of the following infant feeding interventions would you find feasible? For each of the following infant feeding option, ticks from (1) strongly disagree to strong agree (5) according to the acceptability of each option.

FEEDING INTERVENTIONS	RATING					REASONS
	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	
a). Commercial infant formula						
b). Cow milk						
c). Goat milk						
d). Heated breast milk						
e). Early cessation of breastfeeding (4 months)						
f). Surrogate breastfeeding						

25. If an HIV positive mother decides on her own NOT to breast feed, how her family react?.....

26. If an HIV positive mother decides on her own NOT to breast-feed, how will her neighbours react?..... .....

27 (a). In your opinion, should an HIV and HIV positive mother breastfeed?

Yes.....1

No.....2

27 (b). What are your reasons? .....