

## **1.0 CHAPTER ONE:**

### **1.1.0 Introduction**

At the end of 2010 an estimated 34 million people (31.6 million – 35.2 million) were living with the Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS), worldwide, up 17% from 2001 (UNAIDS, 2011). Of that, 22.9 million (21.6-24.1 million) people were from sub-Saharan Africa and about 50% of these are women (UNAIDS, 2011). Infection rates among pregnant women in Africa range from 1% in Senegal to over 40% in Botswana. Out of the 2.3 million children living with HIV globally at the end of 2005, 2 million were from sub-Saharan Africa. Thus sub-Saharan Africa continues to bear about 90% of the world's pediatric HIV burden. In Africa, more than 400,000 children under 15 died of AIDS in 2003 alone. The compounding factors include high rates of maternal HIV infection, high birth rates, lack of access to currently available and feasible interventions and the wide spread practice of prolonged breastfeeding [African Network for the Care of Children Affected by AIDS (ANECCA), 2004].

UNAIDS, estimates that by the end of 2010, there were approximately 390,000 (340,000-450,000) new pediatric HIV infections (UNAIDS, 2011). It is estimated that in developing countries, 1600 children are infected daily by their HIV infected mothers. However, in industrialized countries pediatric HIV infection has been controlled. In these settings HIV testing is part of the routine antenatal care. Other major steps include the use of combinations of antiretroviral drugs (ARVs), elective caesarean sections and the complete avoidance of breastfeeding. All these translate into mother to child transmission (MTCT) rates of less than 2% in the developed world.

The transmission risk for a child born to an HIV infected mother in an African setting without interventions for prevention of mother to child transmission (PMTCT) is about 30-40%. The other 60-70% of children although not HIV infected, still have a 2-5 fold risk of mortality as a direct consequence of the mother's HIV disease when compared to children born to uninfected mothers. MTCT accounts for over 95% of pediatric infections in Africa (ANECCA, 2004).

The dangers of breastfeeding must be compared with the risk of not breastfeeding. 30-50% of these exposed children acquire infection through breastfeeding. About half of the breast milk transmission takes place by 6 weeks and three quarters by 6 months. Breastfeeding in addition to its nutritional benefits also provides psychological and child-spacing benefits to infants and mothers, and reduces infant and child morbidity and mortality as a consequence of maternal antibodies that protect them from diarrhea diseases, pneumonia and other infections particularly in their first months of life. Babies who do not breastfeed are six times more likely to die from the above infections than those who breastfeed.

Several factors affect the risk of transmission including the duration of breastfeeding like prolonged exclusive breastfeeding versus mixed feeding, maternal viral load and the condition of the breasts as in the case of sores around the nipple. Poor maternal nutrition is also implicated in the higher rates of MTCT of HIV in developing countries. Most babies are becoming infected with HIV because their HIV positive mothers don't have enough to eat or are not eating the right kind of foods (WHO, 2003).

Factors like not knowing the HIV status have also got its own implications as the majority of HIV positive mothers in Africa don't know their HIV status. Furthermore, poverty and social pressures complicate everything. A mother may lack access to clean water needed to safely prepare breast milk substitutes. Alternatives maybe prohibitively expensive or the family may live too far away from the water supply area with continuous access. Taboos or stigma about alternative feeding also exist. Fearing marginalization, many women may not wish to share their HIV status with their partners, families or community.

Mounting concern over the transmission of HIV during breastfeeding presents HIV positive mothers and the health workers who care for them with a desperate dilemma. Do they risk passing on the virus through breast milk or risk feeding babies with infant formula when AFASS is not feasible. Health workers in different countries have tried to tailor their advice to suit the local circumstances prevailing in their countries. In developed countries like the USA, there is relatively wide access to safe water and infant death due to infectious diseases is less common than it is in Africa. Most pregnant mothers there are tested before or during delivery. Free infant

formula is given and mothers are encouraged not to breastfeed. However, in sub-Saharan Africa the recommendations are less clear. Here in Africa, childhood infectious diseases are common and HIV testing is often not available. Most women have been encouraged to breastfeed regardless of their HIV status.

Most African countries cannot provide alternatives to breast milk for all these women as it is beyond their health budgets. Breastfeeding advocates warn that if African mothers stopped breastfeeding the death rate in under 5 could more than double.

Efforts to expand care and treatment for children must go hand in hand with efforts to rapidly improve the uptake of available interventions for reducing MTCT. Currently, these reach less than 10% of the population in the countries that are most affected. Access to currently available, effective care and treatment remains a major obstacle.

It is against this background that I proposed to carry out a study to determine the effects of maternal factors on infant feeding practices in HIV positive mothers in Kasama. Research objectives and hypothesis were formulated along this line.

### **1.2.0 Background Information**

The first prevention of mother to child transmission (PMTCT) pilot program was launched in Zambia in 1999. This covered six sites and by the end of 2002 it was extended to 64 sites. Currently PMTCT is offered as an integral part of maternal and child health services in most centers. Community sensitization has been a part of the PMTCT program implementation strategy. The Ministry of Health (MoH) is working to increase access to the PMTCT for all pregnant women and their families. This has been through the expansion and integration of PMTCT services into MCH (National Protocol Guidelines-Integrated Prevention of Mother to Child Transmission of HIV). The PMTCT intervention is a 4 pronged approach which is helping out in scaling up this intervention. The strategies involve the following;

- a. Prevention of HIV infection in women.
- b. Prevention of unwanted pregnancy.
- c. PMTCT.

d. Care and support for HIV positive mothers and their children.

Zambia has a severe generalized HIV epidemic with approximately 1.2 million adults and over 150,000 children infected. The HIV prevalence for adult women and in adult men is 18% and 13% respectively. About 89,000 infants are born to HIV positive women and of these 28,000 become infected with HIV annually. Among the infected children, mortality is highest during the first 2 years of life (ZDHS, 2003). Overall HIV prevalence among women attending antenatal clinics in Zambia has stayed relatively stable since the mid-1990s and has remained at 19-20% between 1994 and 2004 among pregnant women aged 15-39 years (Ministry of Health Zambia, 2005).

The Zambia voluntary counselling and testing services were established in 1999 and by 2001, it had 46 sites, mid 2003, 101 sites were operational and this increased to 176 by April 2004. This enabled 386,000 people to visit the VCT sites between October 1999 and May 2003 (NAC, June 2004).

A study done on infant feeding practices in Lusaka showed that of the 140 mothers, 121(86%) knew their status. Out of the people that responded to the question, 48(40%) were HIV positive and 73(60%) were HIV negative. The remaining 19(14%) were waiting to be told or did not want to know the results. The same study also revealed that 85% of the mothers knew of HIV transmission through breast milk and were all breastfeeding. The study also indicated that 25% of the HIV positive mothers had been advised to stop breastfeeding. Of the HIV positive mothers, 12% planned to breastfeed for less than 12 months. Additionally, 31% of the HIV positive mothers planned to breastfeed for 18 months or less while 28% of HIV positive mothers started liquids before 2 months. Complimentary feeds were introduced earlier in HIV positive mothers who intended to breastfeed for a shorter period than HIV negative mothers but did not, (Omari 2000).

The MoH with its partners in its rolling out program has been involved in the training of health staff in PMTCT programs, counselling and provision of drugs for the PMTCT program and also linking PMTCT with ART/care in what is now called MTCT plus.

The goal of the National PMTCT program is in line with the goal set out at the UN General Assembly Special Session (UNGASS) on HIV/AIDS in 2001 to reduce the proportion of infants infected with HIV by 50% by 2010.

### **Kasama**

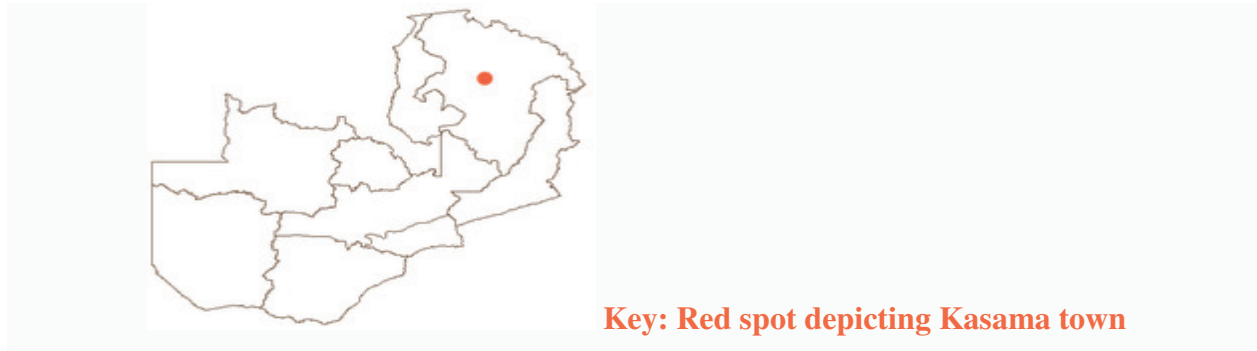
Kasama is the provincial capital of the Northern Province of Zambia, situated on the central-southern African plateau at an elevation of about 1400 m. Its population, according to the 2010 census report is 113, 779. It grew considerably in the 1970s and 1980s after construction of the TAZARA Railway line through the town, and the tarring of the Great North Road from Mpika through Kasama to Mbala. It sits at the centre of a road network which also reaches out to Luapula Province in the west, Mporokoso in the north-west and Isoka in the east. Consequently, it is a commercial hub with banks, markets and other common services. The Chishimba Falls also lies in close proximity of the town.

Kasama is in the heartland of the Bemba tribe whose paramount Chief Chitimukulu has his headquarters some 50 km from the center of Kasama town (Wikipedia).

Domestic water is pumped through pipes by Chambeshi Water and Sewerage Company from Lukupa River which is about 40 km from Kasama. However, most parts of the town experience water shortages. This has resulted in most residents resorting to accessing untreated water from self-constructed boreholes and wells.

Kasama is growing rapidly and is a cosmopolitan area. According to the ZDHS-2002 the literacy levels for Northern Province is about 81.7%. However, more men have attained school education than women.

**Figure 1: Map of Zambia (Spot Shows Kasama Town)**



Furthermore, Kasama is home to a growing population with a lot of per urban settlements. Home deliveries by traditional birth attendants are still done which further restrict the ability of HIV preventive interventions. These factors, in addition to stigma and discrimination surrounding HIV and AIDS are known barriers to accessing PMTCT of HIV and AIDS programme. The HIV seropositivity in Kasama is about 10-14.9% among pregnant women.

### **1.3.0 Study Justification**

Breastfeeding is responsible for about a third of mother-to-child transmission of HIV in resource-constrained settings. Appropriate infant feeding practices have been shown to reduce not only the transmission of HIV but also malnutrition and infectious diseases prevalent in many countries. The efficacy of short-course antiretroviral regimens to prevent HIV transmission around the time of delivery has been demonstrated in industrialized countries and in sub-Saharan Africa.

Nevertheless, in the absence of targeted intervention, the subsequent risk of postnatal transmission of HIV considerably reduces the long term efficacy of per partum antiretroviral prophylaxis. Modifications in infant feeding practices such as complete avoidance of breastfeeding or shortening the exclusive breastfeeding period have been tried.

Several factors could play as influencing reasons for mothers not to comply with certain feeding practices. Among these could be demographics like age, residence, occupation, marital status,

education level etc. Therefore, knowledge of the factors influencing infant feeding choices will help in policy formulations and to make recommendations to policy makers regarding the need to strengthen counselling of mothers. The community should also be actively involved in this fight of preventing MTCT.

#### **1.4.0 Statement of the Problem and Research Questions**

Data from the 2001/2 Zambia sentinel surveillance system show that HIV prevalence among pregnant women ranges from 6.7 in rural areas to 31.8 percent in urban areas. In the absence of interventions to curb transmission to children, studies suggest that the risk of transmission from an HIV infected mother to her child is about 40 percent. Five (5) to 10% of the children will be infected as a result of transmission through pregnancy, 10 to 20% during labour, and 5 to 10% through breastfeeding. Given the high prevalence and the transmission risk of the 520,000 babies born annually in Zambia, approximately 41,000 may acquire the HIV infection. This translates into about 112 new HIV infections in babies per day (ANECCA, 2004).

HIV infection has become a common complication of pregnancy in many countries, with more than 700,000 children worldwide being infected annually through MTCT. HIV and AIDS is a major cause of infant and childhood mortality and morbidity in Africa. In children under five years of age, HIV and AIDS now account for 7.7% of mortality worldwide. HIV and AIDS already account for a rise of more than 19% in infant mortality and a 36% rise in under- five mortality. Together with factors such as declining immunization, HIV and AIDS are threatening recent gains in infant and child survival and health. Yet, for the most part, HIV infection in children is preventable (UNAIDS, 2006).

For HIV-infected mothers, especially in developing countries, the decision to breastfeed or to give breast milk substitutes like infant formula or modified cow's milk provides a **dilemma**. Research in developed and developing countries of the world, provides strong evidence that human milk feeding decreases the incidence and/or severity of a wide range of infectious diseases including bacterial meningitis, bacteremia, diarrhea, respiratory tract infections and many more. Post neonatal infant mortality rates are also reduced by 21% in breast fed infants (American Academy of Pediatrics, 2005).

The limitations in the Lusaka study were that it did not assess the reasons for the infant feeding decisions in details and secondly there was no assessment of infant HIV status. However, its strengths was that it examined actual infant feeding practices of HIV positive mothers who had been counseled, tested and were receiving ongoing support.

This study will assess in detail the reasons for any infant feeding practices and try and compare with the maternal factors as having influenced this. Some of the maternal factors include socio – demographic variables like age, marital status, education level, occupation and income level, residence.

### **1.5.0. Research Question**

Is there any relationship between maternal social factors and infant feeding practices among HIV positive women?

### **1.6.0. Objectives**

#### **1.6.1. General Objective**

To determine the maternal social factors that influence infant feeding practices among HIV positive women in Kasama, Northern Province.

#### **1.6.2. Specific Objectives**

- a. To determine the maternal social factors associated with breastfeeding?
- b. To identify the different types of infant feeding practices.
- c. To establish the relationship between maternal social factors and the infant feeding choices in HIV positive mothers

### **1.7.0. Research Hypotheses**

1.0 There is no relationship between maternal social factors and infant feeding practices.



## **2.0 CHAPTER TWO: LITERATURE REVIEW**

### **Maternal to Child Transmission of HIV (MTCT)**

Over the past decade, many studies have been carried out to improve our understanding of the HIV-breastfeeding relationship. Several studies have estimated the contribution of postpartum transmission during breastfeeding to the broader spectrum of mother-to-child transmission, which includes transmission before and during delivery (JAMA, 2006). Mathematical models have also been developed to try to compare the risks of mother-to-child transmission of HIV with the additional mortality caused by alternative feeding practices.

Most children born to HIV infected mothers acquire the virus during pregnancy, labour or through breastfeeding. Researchers estimate the rates of HIV transmission from mother to child between 25% and 45% in a developing country and between 15% and 25% in an industrialized country without intervention (AAP vol.6; 2005). Since the mid-1980s, when HIV was detected in breast milk and cases of HIV transmission to infants during breastfeeding were documented, health policymakers and program managers have struggled to develop appropriate and feasible guidelines on infant feeding practices for mothers living in settings where HIV is prevalent especially in third world countries.

In 2006, UNAIDS, WHO and UNICEF issued additional and published guidelines on HIV and breastfeeding to the general public. These were based on the new evidence and experience on the ground.

These guidelines are:

1. The most appropriate infant feeding option for an HIV-infected mother should continue to depend on her individual circumstances, including her health status and the local situation, but should take greater consideration of the health services available and the counselling and support she is likely to receive.

2. Exclusive breastfeeding is recommended for the HIV infected women for the first six months of life unless replacement feeding is acceptable, feasible, affordable, sustainable and safe for them and their infants before that time.
3. When replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance of all breastfeeding by HIV-infected mothers is recommended.
4. At six months, if replacement feeding is still not acceptable, feasible, affordable, sustainable and safe, continuation of breastfeeding with additional complementary foods is recommended, while the mother and baby continue to be regularly assessed. All breastfeeding should stop once a nutritionally adequate and safe diet without mother's breast milk can be provided.
  
5. Whatever the decision, health services should follow up all HIV-exposed infants, and continue to offer infant feeding counselling and support, particularly at key points when feeding decisions may be reconsidered, such as the time of early infant diagnosis and at six months of age.
6. Governments and other stakeholders should revitalize breastfeeding protection, promotion and support in the general population. They should also actively support HIV-infected mothers who choose to exclusively breastfeed, and take measures to make replacement feeding safer for HIV-infected mother who choose that option.
7. National programs should provide all HIV-exposed infants and their mothers with a full package of child survival and reproductive health interventions with effective linkages to HIV prevention, treatment and care services. In addition, health services should make special efforts to support primary prevention for women who test negative in antenatal and delivery settings, with particular attention to the breastfeeding period.
8. Governments and donors should greatly increase their commitment and resources for implementation of the Global Strategy for Infant and Young child Feeding Action and the United Nations HIV and Infant Feeding Framework for Priority Action in order to

effectively prevent postnatal HIV infections, improve HIV-free survival and achieve relevant UNGASS goals.

If a woman is HIV negative, she should breastfeed. If she is HIV-positive, she should consider alternatives. Baby formula is an option only if a mother has access to AFASS. Other possibilities include home-prepared modified animal milk, heat-treated expressed breast milk, milk from breast milk banks or breastfeeding by an HIV-negative woman (wet nursing). If none of these alternatives are acceptable, feasible, affordable, safe and sustainable, it is recommended that mothers breastfeed their children for just six months. However, the longer a child is breastfed the higher the child's risk of contracting the infection. Of course, other things like high viral load and disease stage of the mother play a role in transmission (WHO/UNICEF/UNAIDS, 2006).

### **Infant Feeding Practices in the Context of HIV**

While breastfeeding is the primary guarantee of child survival in countries with deficient hygienic conditions, breastfeeding by HIV infected women significantly increases the possibility of HIV infection among breastfed infants. Among women with HIV infection, the estimated additional risk of transmission from breast milk, over and above the risk during pregnancy and delivery, is about 15% for HIV-exposed babies who are breastfed for up to 6 months and about 20% for babies who breastfeed into the second year of life.

Women who are newly infected during pregnancy or lactation have a much higher likelihood of transmitting HIV infection to their infants. The risk of transmission through breast milk among women with recent infection is about 29 % (ANECCA, 2004). Babies continue to be at risk of HIV infection as long as they are exposed to HIV-contaminated breast milk.

Breastfeeding problems (e.g., cracked and sore nipples, mastitis, and breast abscesses) significantly increase the risk of transmitting HIV through breast milk. Good breastfeeding techniques can reduce this risk considerably. Infant formula is recommended for HIV infected women as replacement feeding to prevent MTCT through breastfeeding. This has to be exclusive formula feeding which means giving the baby formula and must never be fed with mother's breast milk (MoH-Botswana, June 2004).

Mixed feeding may be more risky for HIV transmission than exclusive breast-feeding (meaning giving the baby breast milk and nothing else, not even water), possibly because damage to the epithelial integrity of the intestine may facilitate entry of the virus and because breast engorgement, which is more likely to occur with mixed feeding, causes sub-clinical mastitis, a condition that increases the viral load in breast milk. The most difficult challenge has been how to make breastfeeding safer in communities with a high prevalence of HIV where breastfeeding is the traditional mode of feeding.

Replacement feeding includes feeding with a commercial or home prepared formula. From 0 to 6 months, milk in some form is essential for an infant. A baby who is not breastfeeding will need about 150 ml of milk per kg of body weight per day. Feeding an infant for 6 months requires an average of 40 x 500 g tins (or 44 x 450 g tins) of formula. The family must also have the resources such as clean water, fuel, utensils, skills and time to prepare it correctly and hygienically. Home-prepared formula can be used as it is cheap and if there is a reliable supply of animal or other forms of milk. However, this requires a hygiene environment to avoid diarrheal diseases in babies and the family must make an effort to minimize this risk. Therefore, mothers and families should be counseled on proper food hygiene practices (MoH-Botswana, June 2004).

From this it can be said that replacement feeding is recommended where it is acceptable, feasible, affordable, sustainable and safe. Otherwise, exclusive breastfeeding should be employed when the mother is HIV infected during the first few months of life and should then be discontinued as soon as feasible (WHO/UNICEF/UNAIDS/UNFPA, 2006).

Specific guidance and support should be given to the mothers which ever choice they choose. However, where adequate replacement feeding is not possible, exclusive breastfeeding with abrupt cessation or heat treating expressed breast milk should be employed to reduce the risk of breast-milk transmission. Issues associated with exclusive breast-feeding with early cessation includes the benefits of breastfeeding during the most risky time for artificial feeding in environments with poor hygienic conditions and reduces risk of HIV transmission by reducing the length of time the infant is exposed to HIV through breast milk. Exclusive breastfeeding is the option for women who are not in a position to provide adequate and hygienic replacement

feeding to their infants from birth to reduce the cumulative risk of prolonged breastfeeding. It is advisable for an HIV positive woman to abruptly stop breastfeeding as soon as she is able to prepare and give her infant adequate and hygienic replacement feeding (WHO, 2004).

Other circumstances can also determine when the mother can stop breast-feeding and start replacement feeding as in the case of the mother developing signs and symptoms of AIDS (ANECCA, 2004).

After the age of 6 months, breast milk and other forms of milk alone are not adequate to meet a baby's nutritional requirements. It is recommended that an HIV-positive mother exclusively breastfeed for 6 months or provide alternatives. Therefore, for both breastfed and replacement fed infants, complementary foods, in addition to breast milk substitutes, should be introduced when they are 6 months of age (as early as 4 months of age, if there is evidence of growth faltering or the mother has decided to wean before 6 months of age).

Milk should continue to be an important component of the diet, providing up to one-half or more of the nutritional requirements between the ages of 6 and 12 months and up to a one-third of the requirements between the ages of 12 and 24 months. In addition, complementary foods made from appropriately prepared and nutrient-enriched family foods should be given three times per day up to the age of 9 months; between 9 and 12 months, four feedings should be given daily; thereafter, five times per day.

## **Recent Research findings**

### **Global Perspective**

By the late 1990s, a large body of literature was available. However, most of the literature analyzed the same few studies, and/or was based on speculation about a number of biological mechanisms related to transmission via breastfeeding that remained untested. Today, the literature on this subject includes early case reports; studies that estimate the timing of HIV transmission and identify risk factors associated with transmission; observational studies that compare HIV transmission rates in non-

breastfed versus partially-breastfed infants; studies that examine HIV concentrations in breast-milk samples; and several mathematical models that estimate mortality risks associated with different feeding patterns in populations with different assumed characteristics.

In India, a study was done to assess factors that influence the infant feeding decisions of HIV-infected mothers. A total of 101 HIV positive mothers were recruited. All these went through group education and counselling as well as the more intensive post-test counselling. It was found that 44 (44%) intended to exclusively breastfeed and 44 to top feed (diluted animal milk), leaving 13 (12%) women undecided. It was noted that mothers who preferred top feeding tended to be primiparous and more likely to disclose their test results to their in-laws and parents. Of those who chose to breastfeed 56 (60%) did so because it was suggested by the counselor or because they could not afford top milk. A substantial percentage of women were concerned about the social repercussions if they did not breastfeed, whereas 8 (14%) stated they could not ensure hygienic food preparation. Of those women who chose top feeding, the overwhelming majority did so to prevent passing HIV to their newborn. Seven women relied on the doctor's information in making their decision. Of the 94 delivered women who had decided on a specific infant feeding strategy, 16 (19%) decided to change their infant feeding plan. The primary reason mothers intending to top feed changed their decision postpartum was because they could not afford top milk. Mixed feeding was also noticed in this group and infant foods such as honey, water or sugar was given. Mixed feeding occurred during the first 3 days after delivery usually on the advice of the doctors and relatives and was related to the mother's inability to produce sufficient milk for the child, c-section discomfort and problems of feeding top milk during the night (Nishi, 2003).

### **African Perspective**

In Cote d'Ivoire, 557 HIV positive mothers who had received perinatal antiretroviral prophylaxis and were offered 2 infant feeding interventions-artificial feeding and exclusive breastfeeding during the first 3 months with early cessation of breast feeding were enrolled into the ANRS 1201/1202 Ditrane Plus study. Of the 47% who initiated breastfeeding, the probability of practicing exclusive breastfeeding from birth was 18% and 10% at 1 and 3 months of age respectively. Complete cessation of breastfeeding was obtained in 45% and 63% by 4 and 6 months of age respectively. Environmental factors such as living with a partner's family were

associated with failure to initiate early cessation of breastfeeding. Acceptability of exclusive breastfeeding was low in urban population (Renaud, 2005).

In Kenya, a randomized clinical trial of breastfeeding compared with formula feeding was conducted between 1992 and 1998. During this trial, it was reported that a three-fold higher infant mortality rate in HIV-infected mothers who breastfed their infants was noticed compared with those who fed their infants with formula. The trial was designed

to assess the rates of mother to child transmission of HIV according to mode of infant feeding. Eighteen of 197 women randomly allocated to breastfeed their infants died within 24 months of delivery compared with six of 200 women allocated to the formula-feeding group. The cumulative 24-month mortality rates were 11% and 4%, respectively, corresponding to a 3.2-fold higher risk of death (95% confidence interval 1.3 – 8.1). Since assessing mortality in mothers was not the primary objective of the trial, this unexpected observation must be interpreted cautiously (Nduati, 2000).

Sociocultural influences on infant feeding decisions among HIV infected women in rural Kwa-Zulu Natal, South African were determined and the findings were categorized into 5 themes. This was through an ethnographic study. The categories included social stigma of HIV. Here, it was noted that in communities where breastfeeding is normative, choosing replacement feeding would have seemed abnormal even prior to the advent of the HIV epidemic. With sufficient public discussion about transmission of the virus through breast milk, choosing to bottle feed is tantamount to announcing that one is HIV positive.

The second category was that of maternal age and family influences which played a role on feeding practices. Here, it was noted that younger mothers had little influence in choosing how to feed their children. Elders in the family had a more critical role in making such kind of choices.

Economic factors also played a role in choosing feeding practices. Those who breast feed did so due to the fact that they could not afford. Mothers who did replacement feeding also complained of the cost and sustainability of the practice.

Beliefs about HIV transmission through breast milk and beliefs about the quality of breast milk compared to infant formula were other categories or factors influencing infant feeding practices (Thairu, 2005).

A prospective cohort study on the method of feeding and transmission of HIV-1 from mothers to children by 15 months of age looked at 551 mother-child pairs. At least some breastfeeding was initiated among 394 (71.5%) mother-child pairs. The other 157 (28.5%) pairs were formula fed from birth. The median duration of all breastfeeding was 6 months. The median duration of exclusive breastfeeding was 3 weeks. Among the 394 mother-child pairs who ever breast fed, 103 were exclusively breast fed for 3 months or longer and 121 infants were never breast fed exclusively. Milk formula, other liquids and solids were used by the group in the mixed feeding group. Among 157 children who were never breastfed, the probability of HIV detection was 0.076 at birth, 0.18 by 6 weeks and 0.194 by 128 days, after which they were tested negative for HIV. Among the 394 children who were ever breastfed, the estimates of the cumulative probability of detecting HIV over time was similar to the never breast fed at birth, but surpassed the never breastfed group by 6 weeks, and continued to diverge over time intervals to reach 0.316 by 15 months. At birth, transmission rates in the never, exclusive and mixed breastfeeding groups were similar. At 6 weeks, never and exclusive breast feeders still had highly similar cumulative probabilities of infection but mixed breast feeders were starting to surpass both groups. Deaths before 3 months of age occurred in seven (5 of which were HIV positive) out of 157 of the never and 15 (10 of which were positive) out of the 394 of the ever breastfed (Coutsoudis, 2001).

From the above study it was concluded that the patterns of breastfeeding influences rate of postnatal transmission of HIV-1. Infants who were exclusively breastfed had no excess risk of MTCT of HIV-1 over 6 months when compared with those who were not breastfed at all but given formula and other foods. Those at greatest risk were infants fed by HIV infected mothers on a mixture of breast milk and other foods and liquids.

An infant's risk of becoming infected with the HIV through breastfeeding is highest during the first few months of life, according to a new study conducted among HIV-infected mothers and



their babies in the African nation of Malawi. A mother's inexperience with breastfeeding may increase HIV transmission risk (Miotti, 1999).

Breastfeeding is the recommended method of infant feeding in Malawi and other developing countries, where alternatives to breast milk are often scarce, unsafe or culturally unacceptable. In the United States, where safe alternatives to breast milk are plentiful, HIV-infected women are advised against breastfeeding their infants (Miotti, 1999).

This study in urban Malawi, Africa measured frequency, timing and risk factors for breastfeeding transmission of HIV. Participants included 672 infants (HIV negative at birth) born to HIV-positive mothers who had not received antiretroviral drugs during or after pregnancy. The cumulative infant HIV infection rate while breastfeeding, from month 1 to the end of months 5, 11, 17 and 23 was 3.5%, 7.0%, 8.9% and 10.3%, respectively. Incidence of HIV infection per month was 0.7% during age 1-5 months, 0.6% during age 6-11 months, and 0.3% during age 12-17 months. Mixed feeding was common, with supplemental foods introduced at a mean of 4 months. These results suggest that the risk of HIV transmission to an infant is highest in the early months of breastfeeding but is present for as long as an infected mothers breastfeeds. Early weaning (e.g. at 4 or 6 months), a strategy which has been proposed to decrease breastfeeding-mediated HIV transmission may be difficult to implement because alternatives to breastfeeding are often scarce, unsafe or culturally unacceptable. In this study, weaning occurred late (median 21 months). Weaning at 6 months would have prevented only half of the post-natal HIV infections, but may have resulted in additional morbidity and mortality.

Subsequent HIV tests conducted over the next two years revealed that 47 of the 672 infants in the study became HIV-infected from breastfeeding. Nearly half (21) of the infections occurred within five months after birth. Another 15 babies became infected between postnatal months 6 and 11, and seven more between months 12 and 17 of follow-up. Only four HIV infections occurred between months 18 and 23. No babies became infected with HIV after they stopped breastfeeding (Miotti, 1999).

Miotti and colleagues speculate that mothers who are relatively less experienced with breastfeeding are more likely to have sub clinical mastitis, an inflammation of the mammary

tissue, and thereby a higher HIV transmission rate. The researchers note that in another recent study conducted among a separate population of women in Malawi, they found that sub clinical mastitis was associated with higher HIV levels in breast milk and higher HIV transmission to breastfeeding infants (Miotti, 1999).

Early weaning has been proposed as one possible strategy to limit HIV transmission through breast milk. Although discontinuing breastfeeding after six months would have prevented half of the HIV infections seen in the study, such an approach would increase the risk for illness and death from the respiratory and diarrheal diseases that antibodies and other factors in breast milk help protect against." The researchers concluded that breastfeeding recommendations for HIV-infected women in developing countries must carefully balance the risk of HIV transmission with the well-known nutritional and health benefits of breastfeeding. Recommendations may be most usefully made at the level of the individual mother, since communities in developing countries include women from varied socioeconomic strata who have different access to safe-milk alternatives (Miotti, 1999).

Two new studies support the hypothesis that combination antiretroviral drug therapy may reduce the risk of mother-to-child HIV transmission through breastfeeding, findings that could have significant implications in the developing world. Researchers in the first study found mothers pass antiretroviral medications on to their breastfeeding infants in concentrations high enough to prevent infection. The second study showed levels of HIV RNA in breast milk are lower in mothers taking antiretroviral therapy than those who are not. Without antiretroviral therapy for an HIV-infected mother or her baby, transmission of HIV-1 through breast milk occurs in approximately 9 to 16 percent of breastfed infants. In the developing world, many HIV-infected mothers breastfeed rather than use formula due to the high cost of formula, lack of a safe water supply, and cultural norms (Shapiro, 2005).

In the first study, the researchers measured the concentrations of three antiretroviral drugs, nevirapine, lamivudine, and zidovudine, in the blood and breast milk of 20 HIV-infected women, and in the blood of their uninfected breastfeeding infants. All of the mothers had been receiving this combination of antiretroviral therapy continuously for at least six weeks prior to the start of

the study, and all of the infants received a single dose of nevirapine and continuous zidovudine therapy after birth (Shapiro, 2005).

At either two or five months after delivery, all three drugs taken by the mothers were found in breast milk in concentrations similar to or higher than those found in the mothers' blood. In samples of the infants' blood, the investigators observed high, inhibitory concentrations of nevirapine that were above those thought necessary to protect against HIV infection. Dr. Shapiro and colleagues hypothesized that the presence of antiretroviral drugs in breast milk may reduce mother-to-child transmission through either direct inhibition of HIV replication in the breast milk, or by preventing infection from taking hold in the infant.

The high drug concentrations raised the possibility of some risks, as well as benefits, however. Such levels may be high enough to cause adverse effects associated with the drugs, such as rash, Neutrogena, and anemia, and to lead to the emergence of drug-resistant virus.

For the second study, the researchers examined the ability of combination antiretroviral therapy to reduce HIV-1 RNA and DNA levels in breast milk. They measured these levels in two groups: 26 women who received nevirapine, lamivudine, and zidovudine beginning during pregnancy or postpartum and 25 women from an earlier time period with comparable HIV disease, who did not receive antiretroviral therapy because it was unavailable to them at the time they were breastfeeding.

The results indicated that antiretroviral therapy suppresses HIV RNA in breast milk and may therefore reduce mother-to-child transmission of HIV during breastfeeding. Eighty-eight percent of the women receiving antiretroviral therapy had fewer than 50 copies/ml of HIV-1 RNA in their breast milk, compared with 36 percent of the women not taking therapy. This represents a statistically significant difference.

However, there was no such difference for HIV-1 DNA, which some studies suggest also contributes to mother-to-child transmission. One possible explanation for this lack of association between antiretroviral therapy and HIV DNA levels, the investigators hypothesized, may be the short duration of treatment in the study (a median of 98 days). Combination antiretroviral therapy may reduce HIV DNA in breast milk more slowly than HIV RNA, thus raising the risk

that, when treatment duration is short, HIV DNA-associated transmission may occur despite the use of therapy.

Shapiro and colleagues concluded, "As drug costs decrease, maternal antiretroviral therapy may be a realistic strategy to maximize prevention of mother-to-child transmission in areas where formula feeding is not safe or feasible" (Shapiro, 2005)

### **Zambian Perspective**

A study that was done in Ndola found that adding PMTCT counseling and voluntary counseling and testing (VCT) into routine consultations at rural health centers enhanced mothers' knowledge of infant feeding options and improved their ability to make decisions in the best interests of themselves and their infants. The study was done to provide sensitive yet effective infant feeding counseling to mothers (Ndubani, 1999)

A rapid assessment of the UN supported PMTCT pilot sites in Zambia showed that most HIV positive mothers made an informed choice between exclusive breastfeeding for 4-6 months or replacement feeding. The providers demonstrated a good knowledge of advantages and disadvantages of exclusive breastfeeding for 3-6 months, wet nursing, infant formula and expressed heat treated milk as the infant feeding choice for HIV positive mothers. However, most providers showed a bias towards infant formula for HIV positive mothers and did not ascertain the clients' specific circumstances like enquiring about money to buy formula; if mother had access to adequate water and fuel supply; if mother had disclosed her status to the partner, family or friends. It was noted during the same study that the community did not believe in exclusive breastfeeding followed by cessation of breastfeeding. The community believes that this act and the use of replacement formula lead to inadequate feeding of children (Kankasa, 2002).

Identified psychosocial and socio-anthropological factors that affect the uptake of PMTCT services may be related to the;

1. Client as a result of misconceptions and myths associated with the HIV testing process in these communities.

2. Spouse leading to low participation of men in reproductive health matters as they do not attend the antenatal clinics.
3. Health service delivery as clinics may take too long and in the process discourage the women since this tends to interfere with other activities; Health workers might be deliberately or accidentally discriminating against HIV positive mothers.
4. Socio-cultural factors such as stigma, discrimination and prejudice within the community when one is known to be HIV positive all play a role.

### **3.0 CHAPTER THREE: RESEARCH METHODOLOGY**

#### **3.1 Study Design**

The study was designed to explore maternal social factors influencing infant feeding choices. The study design used was a cross – sectional study of descriptive nature. This aimed at quantifying the distribution of certain variables among the study population. It covered social characteristics of respondents such as age, education and marital status etc. This design helped to describe the phenomena and allowed for data collection from study subjects to show the association between the dependent and independent variables. The dependent variable in this research is ‘infant feeding practices’ and the independent variable in this research is ‘maternal social factors’ as listed below.

##### **3.1.0 Definition of Variables**

###### **3.1.1. *Independent variables:* Maternal social factors**

###### **a) Demographic variables:**

1. Age
2. Residence
3. occupation/Income level
4. marital status, Parity
5. Level of education
6. Source of water for domestic use
7. Members of the Household and Religion

###### **b) Knowledge about PMTCT**

1. PMTCT prophylaxis or ART
2. Disclosure
3. Source of Nutrition Information
4. Type of counselling.

### 3.1.2. *Dependent Variables*

1. Infant feeding practices
2. Length of exclusive breast feeding
3. Knowledge on MTCT

## 3.2 Study Area

The study was conducted in Northern Province, Kasama District at 2 clinics- the Kasama Urban clinic and the Location clinic. These were the sites with the highest numbers of mothers under the PMTCT programs. Kasama District had been chosen for conveniences sake.

## 3.3 Study Population/Target Population

The study recruited HIV positive mothers under the MCH programs in Kasama from the 2 clinics (Kasama Urban Clinic and Location Clinic). The study population was 1,525 HIV positive mothers in Kasama District.

## 3.4 Sampling Procedure

Purposive sampling was employed to select 2 PMTCT sites based on the prevalence of HIV amongst pregnant mothers in these areas (each PMTCT site acted as a cluster). Systematic random sampling was then applied in selecting respondents from each site. The sampling frame was the list of all mothers attending the PMTCT program from these two clinics in Kasama.

### 3.4.1 Sample size determination

Determination of the required minimal sample size of the total number of mothers to be interviewed was based on the following formula:

$$N = \frac{Z^2 p (p-1)}{D^2}$$

Where:

**N**=total number of mothers to be interviewed

**P**= Proportion of HIV positive pregnant women in Kasama

**Z**=1.96 reliability coefficient for the normal distribution to the significant level 0.05

**D**=0.05 degrees of precision at 95% level of confidence

$$N = \frac{1.96^2 (0.15 \times 0.85)}{0.05^2} = 196 \text{ mothers}$$

Therefore, a total of 200 HIV positive women were recruited for this study with the following numbers Kasama Urban Clinic (102) and Location Clinic (98) in Kasama District.

### **3.5 Inclusion Criteria**

HIV positive women with infants aged 0-12 months among the general population were recruited. The age range for the mothers was 18-40 years.

### **3.6 Exclusion Criteria**

Women who did not meet the above criteria were excluded.

### **3.7 Data Collection**

The study applied quantitative (semi-structured Questionnaires) research tools. The questionnaire was piloted and adjustments were made to the relevance of the study.

### **3.8 Data Processing**

Information obtained from the questionnaires was checked, verified and entered into Epi-info and imported into SPSS. Editing and tabulation of data was done immediately after data collection procedures. The data was coded before entry and analysis.

### **3.9 Analysis and Presentation**

Descriptive and statistical analysis was carried out in accordance with the study objectives and hypothesis. Quantitative data was analyzed by computer using the Chi-square statistics to test possible relationships between the independent and dependent variables at the 5% level of significance. Qualitative data was categorized and analyzed, and also presented in form of tables. The measures of central tendency (mean, mode, median and variance) were calculated. Study results were presented using various tables, charts and graphs.



### **3.10 Minimization of Errors and Biases**

The questionnaire was pre-tested and appropriate adjustments made to ensure achievement of the study objectives. Systematic random sampling procedure was used to eliminate selection bias. The research assistants were familiarized with the study objectives and thoroughly trained on how to administer the questionnaires. The questionnaire was administered individually and in private to avoid influences from third parties and eliminate prestige bias. Field editing of the data was carried out whenever possible. Data verification was done soon after the questionnaire had been administered.

### **3.11 Ethical Considerations**

1. Ethical clearance was obtained from the University of Zambia – Ethics Committee, DHMT and PHO.
2. Confidentiality of participants was kept at all levels of the study.
3. The objectives of the study were explained to the respondents.
4. The respondents had the option to participate or to decline at any time.
5. Written informed consent was obtained from the mothers after the study procedure had been explained to the mothers.
6. All data obtained was securely stored and no cost was incurred by the selected respondents (as the principal investigator carried all costs).

The respondents were assured of full and free access to their results.

### **3.12 Study Limitations**

The major limitation of this study was the financial constraint. The researcher would have been happy to conduct the study on a large scale and involve more participants in many more clinics within Kasama District. The selected sample size was one which could be easily managed within the resources which were available and time frame.

## **4.0 CHAPTER FOUR: FINDINGS**

### **4.1 Introduction**

In this chapter I will begin by presenting detailed statistics of the 200 (N) interviewed will first be done in this chapter. Bivariate analysis in terms of raw frequencies in relation to demographic characteristics, economic characteristics, PMTC, and infant feeding practices of the sample population will be done.

After presenting the bivariate analysis on demographic characteristics, economic characteristics, and PMTC, this chapter will then look at how infant feeding practices are influenced by socio demographic characteristics using the chi square test of association to look for association between infant feeding practices and maternal socio– factors. In wrapping up the findings of the research, the chapter then again uses the chi square to look for association between infant feeding practices and factors that affect infant breast feeding practices among HIV positive mothers.

These findings, it must be noted, do not claim to be exhaustive or generalizable to Kasama as a District or Zambia as a country owing to the small sample size employed.

After presenting the findings of the research, a discussion will be presented in brief detail outlying some of the salient themes that emerged in the research. Although the data analysis was mainly guided by the research questions, consistent with a data driven approach to data analysis, findings also examine other themes that emerged from the data that were not explicitly elicited by the research questions. Nonetheless, only those themes that are relevant to the overall aims of the study have been presented in further detail including those themes that are deemed tangential to the study objectives. It is hoped that the elaboration of these themes will help in giving the study more context and nuance.

### **4.2 Socio- Demographic Characteristics of the Respondents**

This section of chapter 3 describes the socio- demographic characteristics of the respondents who participated in this study in detail. It also includes the economic and other characteristics of the respondents that participated in this study.

The socio- demographic characteristics of the respondents who participated in this study are therefore presented in table 1 on the next page.

Looking at the age distribution of the respondents, the majority of the respondents were between the ages of 20- 24 years. The youngest person interviewed was 18 years with the oldest was 40 years of age at the time data was being collected for this study. This means the majorities of the respondents in the study population were within the child bearing age and were in the age group where most people are considered to be sexually active. In terms of their marital status, approximately 80% (n=159) of the participants were married as compared to 12% (n=23) who were single.

Results from the study shows that only 8.5% of the mothers interviewed had never been to school, while 37.5% had at least reached primary level. The rest had secondary and tertiary education. When asked about their religious background, all the respondents or 100% (N = 200) indicated that they were Christians. This is considering the fact that Zambia is a “Christian nation”.

**Table 1: Demographic Characteristics of the Respondents**

<b>Demographic Characteristics</b>			
	<b>Frequency [N=200]</b>	<b>Percent</b>	
<b>Age group of mother</b>			
20 years	8	4.0	
20-24 years	51	25.5	
25-29 years	57	28.5	
30-34 years	41	20.5	
35-39 years	35	17.5	
40 years	8	4.0	
<b>Marital status</b>			
Single	23	11.5	
Married	159	79.5	
Divorced	9	4.5	
Widowed	3	1.5	

Polygamous	6	3.0
<b>Education</b>		
Not been to school	17	8.5
Primary	75	37.5
Secondary	93	46.5
Tertiary	15	7.5
<b>Religion</b>		
Christian	200	100.0

### 4.3 Economic Characteristics of the Respondents

This section of chapter 3 describes the economic characteristics of the respondents pertinent to the study.

Economic and other characteristics of the respondents are presented in table 2 below.

Results of the survey show that respondents were interviewed from two facilities in Kasama with almost an equal representation, which was Kasama General Hospital (51%, n=102) and Location Clinic (49%, n=98). The usual place of residence of the study sample was such that more women interviewed were urban based with 62% (n=124) indicating they came from an urban area compared with 38% (n=76) who indicated that they came from a rural setting. When asked about their main sources of water, 62% (n=124) said that their main source of water was tap water where as 67% (n=66) indicated a well as their main source of water. About 4% (n=7) relied on a stream as a main source of water. When asked about their employment status only, 34% (n=68) of the people interviewed reported that they were employed. The average income of the respondents was about ZMK 964,000.000 with the highest paid getting ZMK 2,000,000.00 and the lowest paid getting ZMK100,000.00 a month at the time this study was being conducted.

**Table 2: Economic and Other Characteristics of the Respondents**

<b>Economic and other characteristics</b>		
	<b>Frequency [N=200]</b>	<b>Percent</b>
<b>Name of clinic</b>		
Kasama General	102	51.0
Location Clinic	98	49.0
<b>Usual residence</b>		
Urban	124	62.0
Rural	76	38.0
	<b>Frequency [N=197]</b>	<b>Percent</b>
<b>Water source for domestic use is tap</b>		
Tap	124	62.0
Well	66	67.0
Stream	7	3.5
	<b>Frequency N=200]</b>	<b>Percent</b>
<b>Currently employed</b>		
Yes	68	34.0
No	132	66.0
	<b>Frequency [N=68]</b>	<b>Percent</b>
<b>Employer</b>		
GRZ	37	57.8
Private Company	5	7.8
NGO	22	34.4

**Table 3: Descriptive Statistics of Economic Characteristics of the Respondents**

	Statistics							
	N	Mean	Median	Mode	Std. Deviation	Minimum	Maximum	
<b>Age of mother (Years)</b>	200	29	28	24	5.930	18	40	

#### 4.4 PMTC Information

This section of chapter 3 describes the PMTC information and other HIV information about the respondents pertinent to the study.

As can be seen in table 4 below which shows knowledge about PMTC information and sources of that knowledge, 53% (n=106) of respondents indicated that they had received PMTC prophylaxis services, while 45% (n=90) received knowledge on ART services. Only 2% (n=4) did not receive any of the PMTC information. Of the 196 respondents who had been tested, about 99% (n=193) were attended to by a counselor during the testing period. Majority of respondents at 91% (n=182) indicated that they had adequate knowledge about HIV/AIDS, and as such were able to protect themselves and others, compared to 9% (n=18) respondents who did not. About 89% (n=177) of the mothers interviewed indicated that they received enough information about breast feeding practices in relation to PMTCT. Of the valid responses about PMTC information, most of them did so from nurses (73%, n= 146) and the rest received information about PMTC from relatives (4%, n=18) and nutritionists (6.5%, n=13). None of the respondents ever reported that they heard about PMTC from medical doctors (0%, n=0).

**Table 4: PMTC Information**

	Frequency [N=200]	Percent
<b>PMTCT/ART Service received</b>		
PMTCT prophylaxis	106	53.0

ART	90	45.0
Non	4	2.0
<b>Frequency [196]</b>		
<b>Was attended to by counselor during testing period</b>		
Yes	193	98.5
No	3	1.5
<b>Has adequate knowledge of HIV/AIDS to be able to protect self and others</b>		
Yes	182	91.0
No	18	9.0
<b>Received enough information about breast feeding practices in relation PMTCT</b>		
Yes	177	88.5
No	23	11.5
<b>Frequency [181]</b>		
<b>From where received information about breast feeding practices in relation PMTCT?</b>		
Doctor	0	.0
Nurses	146	73.0
Nutritionist	13	6.5
Relative	18	4.0
None	23	11.5

#### **4.5 Infant Feeding Practices among Respondents**

This section of chapter 3 describes types of the infant feeding practices of the respondents relevant to the study.

Figure 2 and 3 below show the infant feeding practices of the respondents at the time of the study.

When asked if they were breast feeding or not, almost half 49% (n=99) of the 200 HIV positive mothers indicated they were breastfeeding their infants (figure 3).