

**FEEDING PRACTICES FOR CHILDREN AGED 0-24 MONTHS
AND FEEDING ALTERNATIVES FOR THOSE BORN TO HIV
POSITIVE MOTHERS AND THEIR ASSOCIATION WITH
NUTRITIONAL STATUS: A CASE STUDY OF KISII DISTRICT
HOSPITAL -KENYA**

By:

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DECLARATION

I Sarah Cherere Obara hereby declare that this dissertation is my original work and has not been presented for a degree in any other university.

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DEDICATION

To my family; husband Dr. L.N. Chege, and children Debra, Cindy and Israel, your love and support is what kept my light burning late at night. Thank you all and may God bless you. To my mother and father who sowed the first seeds of hard work and endurance. To my right hand friend Joan who lifted me up when I was faint, and to Sophie Ngala who fueled my zeal. Last but certainly not least to Prof. J. K. Imungi who kindled my determination to complete this dissertation.

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LIST OF ACRONYMS AND ABBREVIATIONS:

AIDS:	Acquired Immunodeficiency Syndrome
ARV	Antiretroviral
ART	Antiretroviral Therapy
AZT	Azidothymidin
BF	Breastfeeding
CCC:	Comprehensive Care Centre
CI	Confidence Interval
DNA	Deoxyribonucleic Acid
EBF	Exclusive Breastfeeding
FF	Formula Feeding
HIV:	Human Immunodeficiency Virus
HAART:	Highly Active Anti Retroviral Therapy,
IMCT:	Integrated Management of child Health
LBW:	Low birth Weight
MF	Mixed Feeding
MCH:	Maternal Child Health
MTCT	Mother to Child Transmission of HIV
NASCOP:	National AIDS/STD Control Programme
NVP	Nevirapine
OR	Odds Ratio
PCR	Polymerase Chain Reaction
PLWHA:	People living with HIV/AIDS
PMTCT	Prevention Of Mother-To-Child Transmission Of HIV

RF	Replacement Feeding
RNA	Ribonucleic acid
UN	United Nations
TBA:	Traditional Birth Attendant
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNGASS/AIDS	United Nations General Assembly Special Session on HIV/AIDS
UNICEF	United Nations Children's Fund
VCT:	Voluntary Counseling and Testing of HIV
WHO	World Health Organization
ZDV	Zidovudine

OPERATIONAL DEFINITIONS

AIDS (Acquired immunodeficiency Syndrome): the active pathological condition that follows the earlier, non-symptomatic state of being HIV-positive.

AFASS (Acceptable, feasible, affordable, sustainable and safe): These terms refer to the conditions that should be in place for replacement feeding.

Artificial feeding: feeding with breast-milk substitutes.

Bottle feeding: feeding from a bottle, whatever its content, which may be expressed breast milk, water, infant formula, or another food or liquid.

Breast-milk substitute: any food being marketed or otherwise represented as a partial or total replacement for breast milk, whether or not suitable for that purpose.

Care: The behaviors and practices of caregivers (mothers, fathers, sibling, house help, guardian) to provide the food, health care, stimulation and emotional support necessary for a child's healthy growth and development.

Cessation of breastfeeding: completely stopping breast feeding, including suckling.

Colostrum: Is the thick yellow milk secreted by the breasts during the first few days after delivery, which gradually evolves into mature milk at 3-14 days postpartum. It contains more antibodies and white blood cells than mature breast milk.

Commercial infant formula: a breast-milk substitute formulated industrially in accordance with applicable Codex Alimentarius standards to satisfy the nutritional requirements of infants during the first months of life up to the introduction of complementary foods.

Complementary feedings: the child receives both breast milk or a breast-milk substitutes and solid (or semi-solid) food.

Complementary food: any food, whether manufactured food or locally prepared, used as complement to breast-milk substitute.

Cup-feeding: being fed from or drinking from an open cup, irrespective of its contents.

Exclusive breastfeeding: an infant receives only breast milk and no other liquids or solid, not even water, with the exception of drops of syrups consisting of vitamins, minerals supplements or medicines.

HIV-negative: refers to people who have taken an HIV test and who know that they tested negative, or to young children who have tested negative, and whose parents or guardians know the results.

HIV-positive: refers to people who have taken an HIV test and who know that they tested positive, or to young children who have tested positive, and whose parents or guardians know the results.

HIV status unknown: refers to people who either have not taken an HIV test or do not know the result of a test they have taken.

HIV-infected: refers to people who are infected with HIV, whether or not they are aware of it.

HIV testing and counselling: testing for HIV status precedes and followed by counselling. Testing should be voluntary and confidential, with fully informed consent.

Home-modified animal's milk: a breast-milk substitute prepared at home from fresh or processed animal milk, suitably diluted with water and with the addition of sugar and micronutrients.

Infant: a person from birth to 12 months of age.

Macrophage: Is a large -wanderingø phagocytic white blood cell that ingests foreign matter, and plays an important role in resisting infection.

Mixed feeding: feeding both breast milk and other foods or liquids.

Mother-to-child transmission: transmission of HIV to a child from an HIV-infected woman during pregnancy, delivery or breastfeeding.

Neonatal: Describes the period immediately following birth through the first 28 days of life.

Partial breastfeeding: Giving a baby some breastfeeds and some artificial feeds, either milk or cereal, or other food.

Programme: an organized set of activities designed to prevent transmission of HIV from mother to their infants or young children.

Replacement feeding: feeding infants who are receiving no breast milk with a diet that provides the nutrients need until the age at which they can be fully fed on family foods. During the first six months of life replacement feeding should be with a suitable breast-milk substitute should be complemented with other foods.

Substitute: Presented as a partial or total replacement of breast milk weather or not suitable for that purpose.

‘Spillover’: a term used to designate the feeding behaviour of new mothers who either know that they are HIV-negative or unaware of their HIV status ó they do not breastfeed, or they breastfeed for a short time only, or they mix-feed, because of unfounded fears about HIV or misinformation or of the ready availability of breast milk substitutes.

Wet-nurse: Refers to the breastfeeding of an infant by someone other than the infant’s mother.

ABSTRACT

Poor breastfeeding and infant feeding practices have adverse effects on the health and nutritional status of children, HIV being one of the major confounding circumstances in infant feeding. Against the backdrop of this realization, efforts are therefore required to protect, promote and support appropriate infant feeding practices.

The study was designed to assess the infant feeding practices and feeding alternatives available for children of the untested mothers and those born to HIV positive mothers, and the factors determining choice of infant feeding alternatives. The Mother-to-child transmission (MCTC) knowledge level of mothers and the general nutrition status of the children were also assessed.*

The study was cross sectional and explanatory. It was carried out in Kisii District hospital on a sample of 186 children aged 0-24 months with their respective mothers or caretakers as respondents. A previously pre-tested and structured questionnaire was used to collect data on: infant feeding practices; breast milk alternatives; MTCT knowledge of the mothers; anthropometry of the children; socio-economic and demographic characteristics of the households; morbidity; and nutritional status. In addition focus group discussions, key informant interviews and observations were used as supplementary methods of data collection.*

Simple descriptive statistics, bivariate analysis (chi-square test) and multivariate logistic regression analysis were performed on the data using SPSS (version 12.01) and Epi Info (version 6) software.*

In general there were significant differences in the infant feeding practices by the non tested mothers from those of the HIV positive mothers. The main complementary foods given were cow milk, uji, meat, pulses and eggs. The HIV positive mothers gave significantly more meat, legumes and eggs than the non-tested mothers.*

On 19.5% of the children below the age of 2 months were exclusively breastfed. The practice of giving pre-lacteal (cow milk and herbal concoctions) was common.

Complementary foods mainly cow's milk and uji were introduced early at a mean age of 2-3 months due to perceived milk insufficiency. Up to 85.4% of the children had been breast fed. Slightly more than half of the mothers introduce breast milk within the first 24 hours of delivery. Breast feeding was mainly on demand and continued to the second year (median 23 months) of life of the infant.*

There were significant differences $p < 0.05$ between the level of use of the infant feeding alternatives by the HIV positive mothers and by the non- tested mothers. The main alternatives were wet nursing, breast milk, cow milk. Cow milk was the most popular alternative and wet nursing was significantly more acceptable to the HIV positive mothers than the non tested mothers. The HIV positive mothers had a higher MTCT knowledge level than the non-tested mothers. The maternal MTCT knowledge was poor at 19.6 among the non tested mothers and a bit higher among the HIV positive mothers at 39.4%. The choice of infant feeding alternative was influenced by a number of factors including: cultural attitudes, health and nutrition education and knowledge on MTCT.*

Exclusive breastfeeding was significantly associated with nutritional status of the child in regards to the underweight status of the child. Children who were not exclusively breastfed had a higher likelihood of being underweight. Immunization status of the child also had significant association with the nutritional status of the child.* Marital status of the mother has significant association with wasting and underweight status. Age of the index child also has a significant association with wasting and underweight status.*

The nutritional status of the children born to the non tested mothers indicated that: 9.9% were severely stunted, 0.8% was severely wasted and 6% were severely underweight. However the nutritional status of children born to the HIV positive mothers indicated that 46.4% were severely stunted, 28.6% were severely wasted, and 35.7% were severely underweight.*

There were significant differences ($P < 0.05$) in the morbidity patterns of the children born to HIV Positive mothers in comparison to the non-tested mothers. Anaemia and pneumonia were significantly more prevalent among children born to HIV positive mothers than among those born to the non tested mothers.*

The two main predictors of the nutritional status were age of the child, and exclusive breastfeeding. The nutritional status of children born to HIV positive mothers was significantly poorer than that of the children born to untested mothers.

The level of use of alternatives was significantly higher among the HIV positive mothers than among the non tested ones.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Globally about 30-40 million men, women and children are infected with HIV, 28.5 million of them from Sub-Saharan Africa (UNAIDS, 2002). Each day more than 6000 young people aged 15-24 years are newly infected with HIV. It is estimated that there are 10-15 million AIDS orphans worldwide, 83 percent of them from Sub-Saharan Africa. Women take up more than half the number of people living with HIV/AIDS (PLWHA). In Kenya since the first AIDS case was reported in early 1980s, the epidemic has expanded in alarming proportions. The current female to male ratios in Kenya is 1:9 one of the highest Africa, while 10 percent of all PLWHA are children (NASCOP 2002).

Increasing numbers of children who have HIV infection, especially in the countries hardest hit by the pandemic. In 2002 an estimated 3.2 million children less than 15 years of age were living with HIV/AIDS, a total of 80,000 were newly infected and 610,000 died.

About 70-80 percent of HIV transmission is through sexual contact. Besides HIV can be transmitted through parenteral contamination, and perinatal (mother to child) modes. In children 90 percent of HIV transmissions are as a result of mother to child transmission during pregnancy, delivery and breastfeeding (Preble and Piwoz, 2000). The remaining 10 per cent is from blood contamination or sexual abuse. According to a sentinel survey done 30% of women attending antenatal care were diagnosed HIV positive. (NASCOP 2004). In Kenya 1 million children are born every year. Therefore this parallel puts about 300,000 newborn infants at risk of HIV every year.

Since in developing countries total of transmission varies between 25-45 percent, hence between 75000 ó 135,000 are actually infected with HIV. However, not all mothers access health care hence more undiagnosed cases go unattended. By far the main source of HIV infection in young children is Maternal to Child Transmission (MTCT). The virus may be transmitted during pregnancy labour and delivery, or by breastfeeding.

HIV/AIDS however transmitted has been estimated to account for about 8% of deaths in children below 5 years of age in Sub-Saharan Africa. In areas where the prevalence of HIV in pregnant women exceeded 35% the contribution of HIV/AIDS to childhood mortality was as high as 42%. (Lancet, 2002). Rates of MTCT range from 14-25% in developed countries and 13-42% in developing countries, where breastfeeding is more common.

If a mother is infected with HIV, it may thus be preferable to replace breast milk to reduce the risk of HIV transmission to her infant. The risk of replacement or alternative feeding should be less than the potential risk of HIV transmission through infected breastmilk, so that infant morbidity and mortality from other causes do not increase. The risk of HIV infection through breastfeeding needs to be weighed against the great dangers posed by artificial feeding. If the only consideration were to prevent HIV from infecting the child through breast milk, the recommendation would be for the infected mothers not to breastfeed, and usually to use infant formula. This is what is widely recommended to HIV Infected mothers in industrialized countries and affluent mothers in non- industrialized countries. For infected mothers living in poor conditions in developing countries however, it is important to consider very carefully the risks related to not breastfeeding and whether there are alternative feeding methods (Latham, 1999; WHO/UNICEF, 1992).

In a rural community where access to clean water and sanitation is inadequate, where families are too poor to afford enough fuel to prepare food and to sterilize feeding bottles or to buy sufficient infant formula, deaths from diarrhea and respiratory infections could far out-number those from HIV. The problem is further aggravated by cultural or social stigmas that a community may attach to substitute feeding and to HIV/AIDS in general.

There is need for intensified research to guide formulation of and/or influence policy and intervention programs on this matter. Hitherto there has not been good data available on the relative risks and benefits of different feeding options (Morrison, 1999). We do not know which options would save the most lives, be of least cost to society, and have the fewest negative effects. Health workers and policy makers in are not sure or well informed to decide on what appropriate actions or advice to give to a mother who is HIV positive on how to feed her infant (Latham, 1998).

Despite the huge amount of work done on HIV/AIDS including on MCTC, there still remain some important gaps in knowledge in areas related to appropriate feeding for infants of mothers infected with HIV-1. Such gaps result into a good deal of confusion in the minds of health workers, and policy makers are often uncertain about policy recommendations.

Some feeding options that are appropriate for mothers living in advantaged positions may be totally. The fourth millennium development goal MDG calls for a two-thirds reduction between 1990 and 2015 in deaths of children aged less than 5 years. Less than 10% of HIV infected pregnant women have access to appropriate health care. (UNAIDS 2006)

It is this fraction of infants that have become a major challenge to health professionals and policy makers alike. It gives a glimmer of hope to role that HIV transmission can be reduced from 25-45 percent to near zero. This endeavor requires a complete package of health care including maternity and family planning; increased antenatal care; VCT services for HIV possible use of ART drugs; and safe alternatives to HIV infected mothers breast milk.

Multidisciplinary efforts are required to curb the rapid spread of HIV. This study is to explore the prevailing feeding practices, while acknowledging that reduction of postnatal HIV transmission through breast milk is particularly problematic in resource poor settings as there are completing risks which are individual and context specific.

1.2 STATEMENT OF THE PROBLEM

Some feeding options that are appropriate for mothers living in advantaged positions may be totally inappropriate for mothers whose families are less privileged. Some suggested infant feeding methods in theory have merit, but little investigation has been done to determine their feasibility, in practical terms, and in different settings.

All evidence suggests that mixed breast and formula feeding is the most dangerous - feeding option for the young infant because it results in greater risks both of HIV and other infections. It has been noted that the regimens supporting formula feeding to reduce MTCT of HIV need especially to consider risks of non- compliance in

different settings. Even in an elaborate urban clinical trial in Kenya, in which women were assigned either to breastfeed or formula feed, it was reported that there was poor compliance in the formula group (Nduati et al., 2000). It was difficult to assure exclusive formula feeding even by mothers who had agreed to participate in the trial, where infant formula was provided free, punctuated with occasional free counselling. The question that arises is what then, is the likelihood of compliance elsewhere where expensive formula needs to be purchased, piped water is lacking and very limited counselling is given.

A major concern is that formula feeding from the day of birth will result in great increases in child morbidity, malnutrition and mortality. There are no reliable data from poor families in Sub-Saharan Africa because almost all babies are breastfed. But, data from other developing countries (Brazil, Pakistan and Philippines) show that infants who are not breastfed are likely to have mortality rates from diarrhea, acute respiratory infections, and other infectious diseases 5-6 times higher than breastfed babies in the first two months of life (Victoria et al., 1999).

Of more concern still, is what impact not breastfeeding will make on the infected mother's social standing, health, fertility and vertical transmission to subsequent children. If large numbers of women do not breastfeed because of fears of HIV transmission, there may be a spill over effect and gains made over the years through efforts to protect, support and promote breastfeeding could be reversed. Where significant number of mothers opts not to breastfeed, it is imperative that studies are undertaken to evaluate the consequences. Studies on possible stigmatization of women who may opt not to breastfeed need careful consideration.

For individual women who opt not to breastfeed, studies need to be done on the fertility implications, because they are much more likely than those who do to have an early pregnancy, which may place the next infant at risk of both HIV, and of becoming an orphan (Stecklov, 2000).

1.3 JUSTIFICATION FOR THE STUDY

HIV is currently a global pandemic which has a multifaceted effect in the way in which it has affected humanity. No single approach has been successful hence multidisciplinary and multi-sectorial efforts are required to deal with it to be able to have effective interventions. This study is one of such kinds of efforts aimed in the prevention of vertical transmission of HIV. In the study area Kisii District (Central); a report released by the medical officer of Health indicated that 14 % of the pregnant mothers at the District hospital are HIV positive. Hence there is need to limit MTCT by using appropriate locally prepared and also appropriate commercial infant feeding options.

1.4 OBJECTIVES

1.4.1 Main Objective:

The main objective of this study was to assess the infant feeding practices of children aged 0-24 months and feeding alternatives available, for infants born to HIV Positive mothers in Kisii district, Kenya.

1.4.2 Specific objectives

1. To determine the socio-economic and demographic characteristics of the families of non-tested mothers and HIV positive mothers.
2. To determine the feeding practices of the children aged 0-24 months.
3. To determine the infant feeding alternatives for the infants born to the HIV positive mothers.
4. To determine the nutritional status of the infants aged 0-24 months.
5. To determine maternal knowledge on Maternal To Child Transmission of HIV
6. To determine the factors determining the HIV Positive mothers choice of the feeding options.
7. To determine the prevailing morbidity/disease patterns of the children.

1.5 HYPOTHESES

Based on the objectives this study tested 3 null hypotheses

1. There exists no difference between the feeding practices and alternatives for children from non-tested mothers and those from HIV Positive mothers.
2. The relationship between infant feeding practices and nutritional status of children aged 0-24 months is not significant.
3. There is no difference between the morbidity patterns of children born to the non-tested mothers and those born to the HIV Positive mothers.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 HIV AND AIDS DEFINED

Human immunodeficiency virus (HIV) belongs to a class of viruses called retroviruses, which attacks and impairs the body's natural defense system against disease and infection (FANTA 2001). HIV attacks white blood cells with help of surface protein called CD4. HIV invades lymphocytes and macrophages resulting in deficiency in cell-mediated immunity, this condition deteriorates further into advanced stages of life threatening illnesses and is said to have AIDS (Acquired Immune Deficiency Syndrome) (WHO 2004).

The commonest AIDS defining features and opportunistic infections include Pneumocystis Carinii Pneumonia (PCP); cerebral toxoplasmosis; Cryptosporidium diarrhea; (Peters et al 1991). In the developing countries Tuberculosis (TB), invasive bacterial infections, diarrhea and wasting are common. Other infections include Herpes simplex, Herpes Zoster and oral thrush.

2.1.1 Malnutrition Risk of HIV Infected Children and Children Born to HIV Infected Women.

The risks associated with not breastfeeding vary with the environment and with the individual circumstances of the mother and family. Studies have shown that lack of breastfeeding compared to any breastfeeding exposes children to increased risk of malnutrition, diarrhea and pneumonia especially in the first months of life. In poor countries not breastfeeding during the first two months of life is associated with a sixth fold increase in mortality from infectious diseases a risk that drops to a less than three fold by six months and continues to decrease with time.

Every year up to 55% of infant deaths from diarrheal disease and acute respiratory may result from inappropriate feeding practices. Low birth weight and stunting are common among children born to HIV infected mothers (Caster born et al., 1991). Some studies reports lower birth weight but not shorter mean length among children born to women

infected with HIV (Agostoni et al 1998). As many as 50 percent of children with HIV fail to thrive. Although uninfected infants born to HIV infected women start with lower birth weights; they show rapid catch up growth by the third month (Agostoni et al., 1998).

Slow linear growth in HIV- infected children is due to several factors, including the rate of HIV replication. This has a reciprocal relation to the rate of growth. Underlying diseases seems to be a major factor in children's growth in resource constrained areas. Other factors that cause malnutrition include persistent diarrhea and mal-absorption inadequate energy and micronutrient intake. HIV infected children are unable to consume adequate foods due to many factors like gastrointestinal dysfunction; effects of medications they are on; lack of appetite. Maternal vitamin A deficiency influences linear growth during the first year of life, and also increases mortality and morbidity (Semba, Miotti, Chipangwi et al., 1997).

Poor growth in infants is associated with poor survival. Growth failure in HIV infected children is associated with retarded cognitive development and functional deficits such as delayed sexual development among boys.

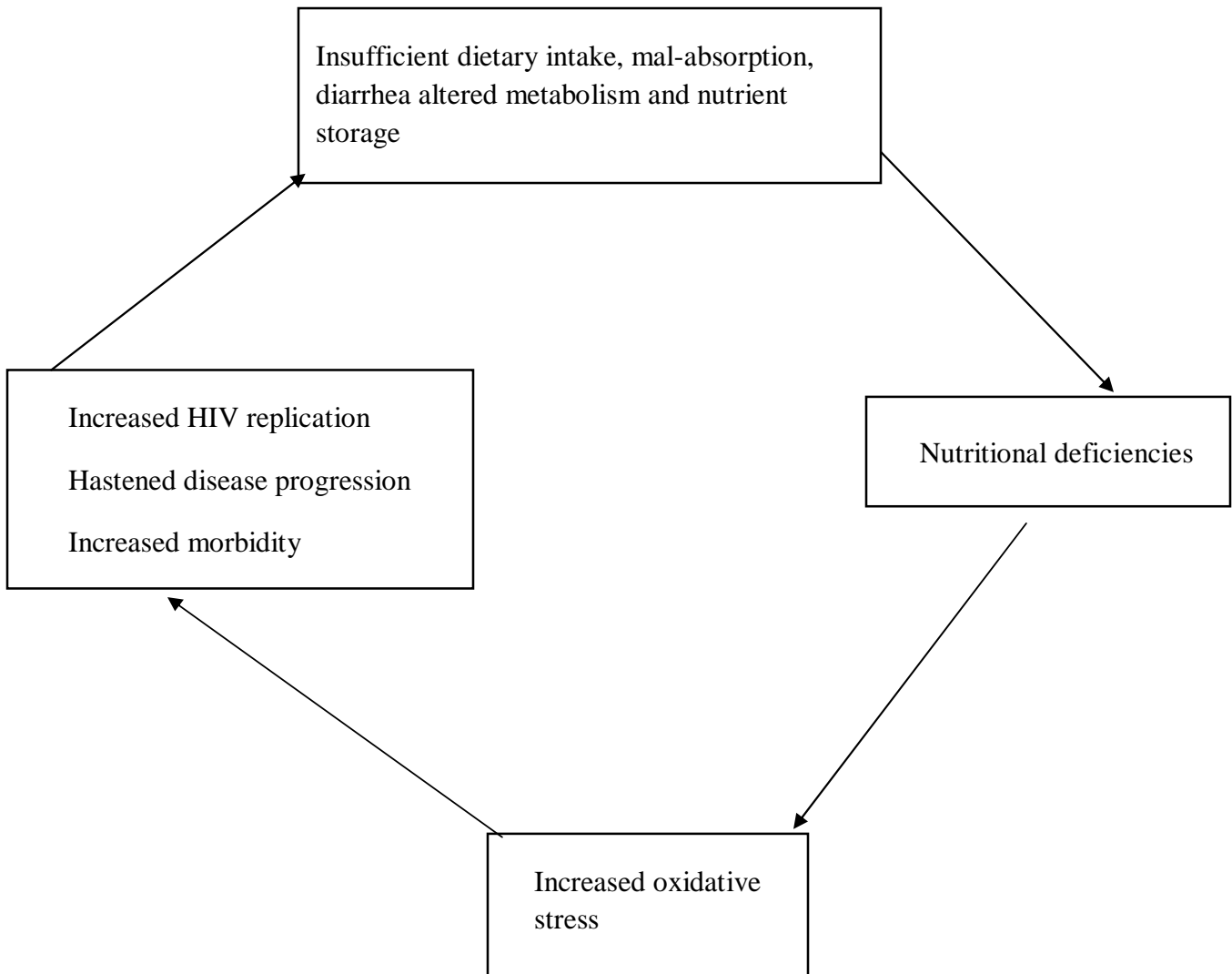


Figure 2.1 Effects of nutritional status on immune function and determination of HIV progression into AIDS.

Source: Semba & Tang (1999)

2.1.2 HIV Prevalence in Kenya.

Kenyan annual sentinel surveillance shows that 9% in urban areas of adults aged 15-49 are infected with HIV and the rates in women are nearly double the rates of men. However, the same surveys show that HIV infection peaked at 10% in the late 1990s and has been declining in many parts of the country, due to behavioral change. Death rates from HIV have reached about 150,000 in 1990s but currently they have dropped below 100,000 per year.

The number of people living with HIV in Kenya includes about 1.1 million adults between 15-49 years; another 60,000 ages 50 and over; and approximately 100,000 children. Urban populations have higher HIV prevalence 10 per cent than rural populations 6 per cent. Regional variations are significant. Prevalence in Nyanza province is 15 per cent in adults and 10 percent in Nairobi. Adult prevalence in other provinces ranges around 5 percent, with the exception of Northeastern province where prevalence is less than 1 percent.

New infections in young women have significantly declined in the last 5 years but HIV prevalence in girls 15-19 old is 6 times higher than in boys of the same age group, despite lower levels of sexual activity the rates in pregnant teens are even higher (NASCO, 2005). A significant portion of new infections in adults in Kenya today more than half takes place in the family; and are estimated 7.5 percent of married couples are discordant for HIV; one partner is infected with HIV and the other is not.

2.1.3 MTCT of HIV

Replacement feeding is the only way to completely avoid postnatal HIV transmission. However when weighed against the low (less than 1% per month) but ongoing risk of HIV transmission through breastfeeding. Breast feeding substantially reduces the risk of infant mortality from other infectious diseases and malnutrition on average by 4 to 6 fold in the first 6 months and close to 2 fold in the second 6 months of life.

Exclusive breastfeeding is recommended for HIV infected women for the first 6 months of life unless replacement feeding is acceptable, feasible, affordable, sustainable and safe

(AFASS), for them and their infants before that time. When replacement feeding is AFASS then avoidance of breastfeeding by HIV infected women is recommended.

At six months if replacement feeding is still not AFASS continuation of breastfeeding with additional complimentary foods is recommended, while the mother and baby continue to be assessed. All breastfeeding should stop once a nutritionally adequate and safe diet without breast milk can be provided.

HIV can be passed from mother to her infant during the second and third trimesters of pregnancy, during labour and delivery and through breastfeeding. 24 percent to 45 percent of HIV infected mothers will transmit HIV to their infants, by all transmission modes (Dabies et al., 2000). However, this risk can be reduced near zero by use of HIV counseling, ARTS, Elective caesarian section; and use of safe breast milk alternatives. There is a 10-20 percent risk of transmission of HIV through breastfeeding; MTCT of HIV is responsible for more than 90 percent of HIV infections among children (UNAIDS/ WHO 1998).

Without antiretroviral prophylaxis or other effective interventions for pregnant women with HIV infection breastfeeding for 2 years or more can double the overall risk of MTCT of HIV to about 40% (Nduati et al 2000).

Replacement feeding prevents breast milk transmission of HIV but in resource-limited settings, the risk of death from artificial feeding must be weighed against the risk of HIV infection.

Breastfeeding can offer among many benefits: protecting baby from infections by providing protection from infections; bonding; prevents postpartum excessive bleeding; and has child spacing aspects. Factors for HIV vertical transmission are shown in Table 2.1.

Table 2.1: Risk factors for HIV Transmission through Breastfeeding and strength of the evidence related to vertical transmission.

Risk factor	Strength of the evidence
High maternal HIV viral load <ul style="list-style-type: none"> ▪ Recent infection ▪ Advanced disease 	Strong
Advanced disease <ul style="list-style-type: none"> ▪ Clinical symptoms 	Strong
Immune deficiency <ul style="list-style-type: none"> ▪ Low CD4 ▪ High CD8 cell counts 	Strong
Maternal malnutrition <ul style="list-style-type: none"> ▪ Vitamin A deficiency 	Limited
Duration of breastfeeding	Strong
Non- exclusive breastfeeding in first 3-6 months	Limited
Breastfeeding while experiencing breast infections <ul style="list-style-type: none"> ▪ Mastitis, abscesses, nipple fissures 	Strong
Breastfeeding an infant with mouth sores	Limited

Adapted from UNICEF et al (1998c)

The risk through breastfeeding is cumulative, the longer the HIV infected mother breastfeeds, the greater the additional risk of transmission through breastfeeding. Where breastfeeding is common and prolonged transmission through breastfeeding may account for up to half of HIV infectious.

2.1.4 Interventions to Reduce MTCT of HIV

When replacement feeding is (AFASS): acceptable, feasible, affordable, sustainable and safe, avoidance of all breastfeeding by HIV positive mothers is recommended. Otherwise exclusive breastfeeding is recommended during the first 6 months of life. (Dickin et al. 1997, Caulfield et al. 2000).

To minimize HIV transmission risk, breastfeeding should be discontinued as soon as feasible taking into account local circumstances, the individual woman's situation and the risks of replacement feeding infectious other than HIV and malnutrition.

When HIV positive mothers choose not to breastfeed from birth or stop breastfeeding later they should be provided with specific guidelines and support to ensure adequate replacement feeding. HIV Positive mothers who breastfeed should be provided with guidance and support when they cease breastfeeding to avoid harmful nutritional and psychological consequences and maintain breast health.

All HIV positive mothers should receive counseling which includes provision of general information about the risks and benefits of various options and specific guidance selecting the option most likely to be suitable for their situation. Whatever the mother decides she should be supported in her choice. Postnatal follow-up with repeated growth measurements is also critical to this support as is nutritional counseling particularly around the period of breastfeeding cessation. (WHO 2001)

Strategies to prevent the transmission of HIV to infants and young children involves; prevention of infection in general especially in women and young people; Prevention of unwanted pregnancies among infected women to their infants and provision of care, treatment and support to HIV infected women, their infants and family.(UNICEF 2007)

In developing countries, given appropriate nutritional counseling and care, access to clean water and a supply of breast milk substitutes, replacement breastfeeding could be a safe intention to prevent MTCT of HIV in urban African setting.

Data from different studies indicate that breastfeeding for up to two years may be responsible for one third to one half of HIV infections in infants and young children in Africa (JAMA 2000). Among women recently infected with HIV, the risk of transmission through breastfeeding is nearly twice as high as for women before or during pregnancy because of high viral load shortly after initial infection.

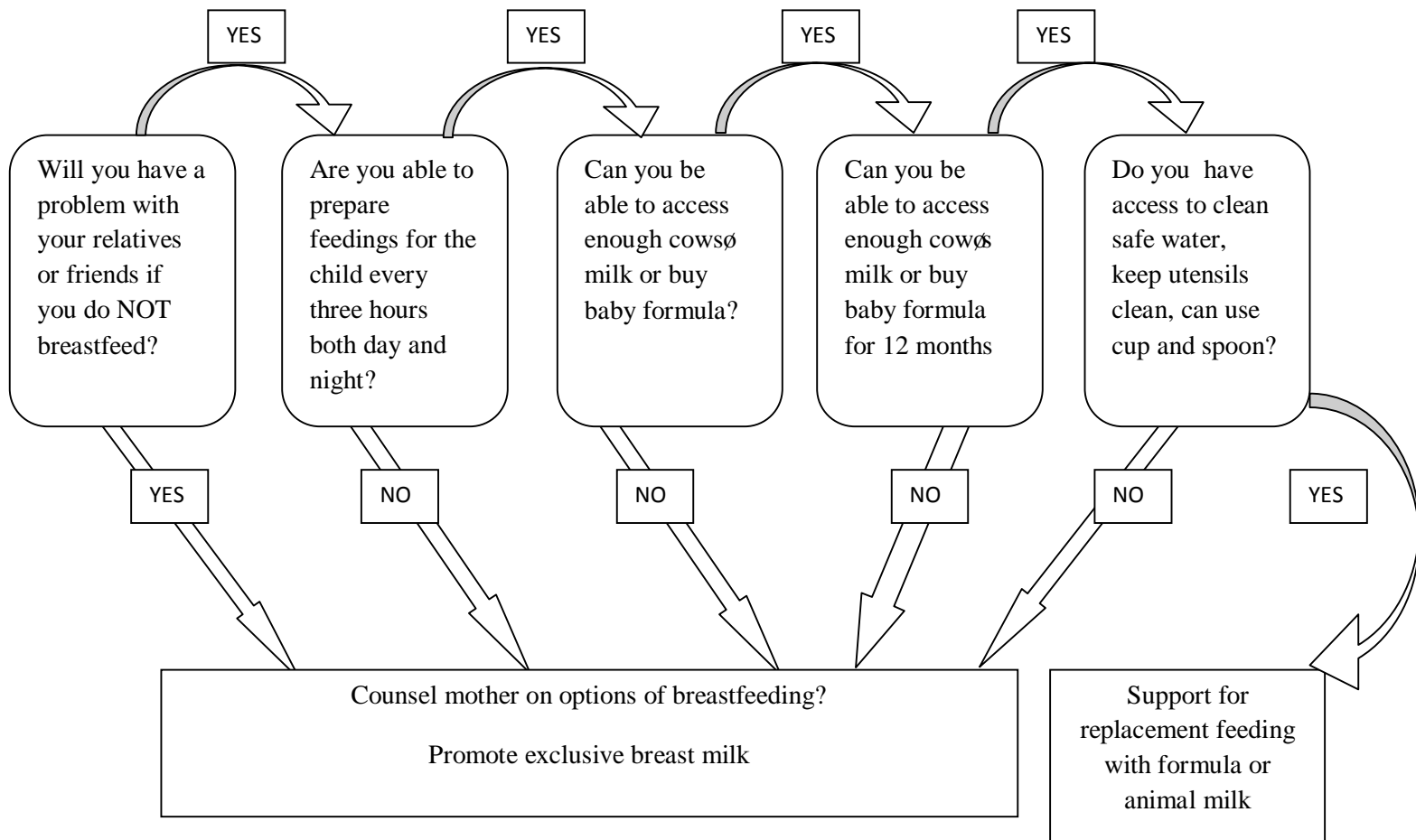


Figure 2.2: Showing individual evaluation form for replacement feeding for HIV-positive mothers: evaluation of AFASS

When HIV infected mothers choose not to breastfeed from birth or stop breastfeeding later, they should be provided with specific guidance and support for at least the first two years of the child's life to ensure adequate replacement feeding.

When the AFASS criteria is not met HIV infected women who choose to breastfeed are recommended to do so exclusively for 6 months then over a period of few days 2-3 days or 2-3 weeks rather than abruptly to stop breastfeeding completely.

Encouraging women to attend voluntary counseling and testing (VCT) , helps achieve prevention of infection. This is associated with behavior change and is an entry point for care for those found positive.

Reducing the number of HIV exposed pregnancies by use of family planning services to prevent pregnancy has been shown to reduce MTCT of HIV (NASCO 2005).

Another strategy is to prevent transmission of MTCT from infected pregnant women to their infants by use of Zidovudine (AZT) and Nevirapine given during pregnancy and labour or both can reduce viral load in the mother and reduce by half the risk of MTCT of HIV.

Reducing trauma and shortening exposure of the baby to the virus during labour and delivery by use of methods like effective caesarian section. Available interventions can substantially reduce the risks of MTCT during pregnancy, labour, and delivery but not yet during breastfeeding.

Appropriate choice for feeding infants can help reduce MTCT of HIV infected mothers should be counseled on infant feeding to help them make the choice for feeding that is safe, available and affordable. Main choices are breastfeeding exclusively for the first 6 months followed by abrupt but timely weaning or replacement feeding from birth without any breastfeeding. In considering replacement feeding the following conditions are critical: sustainable access to clean water, regular postnatal follow up with repeated growth monitoring, nutritional counseling and drugs and supplies at no cost or at a subsidized price, and with a controlled distribution. The family environment plays a key role in her choice of feeding option.

2.2 HIV/AIDS AND INFANT FEEDING PRACTICES:

2.2.1 Conceptualizing Infant Feeding Practices

The full impact of optimal breastfeeding and complementary feeding, as measured by population level reductions in mortality and morbidity and improved health and development, will never be realized unless caregivers adopt recommended practices. Recommended practices change as an infant and young child grows (WHO/University of California, Davis, 2000). WHO (2006) defines optimal practices as exclusive breastfeeding for 6 months of age and continued breastfeeding into the second year of life and beyond with inclusion of appropriate complementary feeds.

Field studies show that complementary foods introduced between 4 and 6 months of age replace nutrients from breast milk and confer no advantage on growth or development (Cohen et al; Dewey, 2003). Whether or not optimal practices are adopted is a result of the interaction of many factors. The closest determinants relate to a woman's choice and her ability to act upon this choice. For optimal breastfeeding and complementary practices to occur, a woman must both wish to use them and be able to choose them. The two factors are influenced most immediately by the infant feeding information a woman receives as well as the physical and social support provided to her during pregnancy, childbirth, and postpartum. These factors are, in turn, influenced by familial, medical, and cultural attitudes and norms, demographic and economic conditions (including the resources to grow or purchase needed foods and maternal employment), commercial pressures, and national and international policies and norms. Thus, to promote optimal breastfeeding and complementary feeding practices, interventions need to be targeted not only to individual men but also to changing the context in which infant and child feeding choices are made.

The determinants of infant feeding practices are shown in Fig. 2.1. This figure elaborates the interplay between factors that determine the capacity, resources, and care practices for young children.

2.2.2 Breastfeeding and HIV/AIDS

Before the emergence of the terrible scourge of HIV/AIDS, breastfeeding was recognized as the best way to feed infants in virtually all circumstances. This is no longer so with the advent of HIV/AIDS. It is estimated that worldwide 3 million children under-15 years have been infected with HIV and that vertical transmission accounts for 90% of HIV infection in the children. A child whose mother is HIV positive stands a risk presently estimated to be at least 1 in 7, of acquiring the virus through breastfeeding. Given such a problem, joint WHO/UNICEF/UNAIDS guidelines on infant feeding have been issued to assist policy makers and health workers in addressing this risk and helping to safeguard the rights of mothers and their children (WHO, 1998).

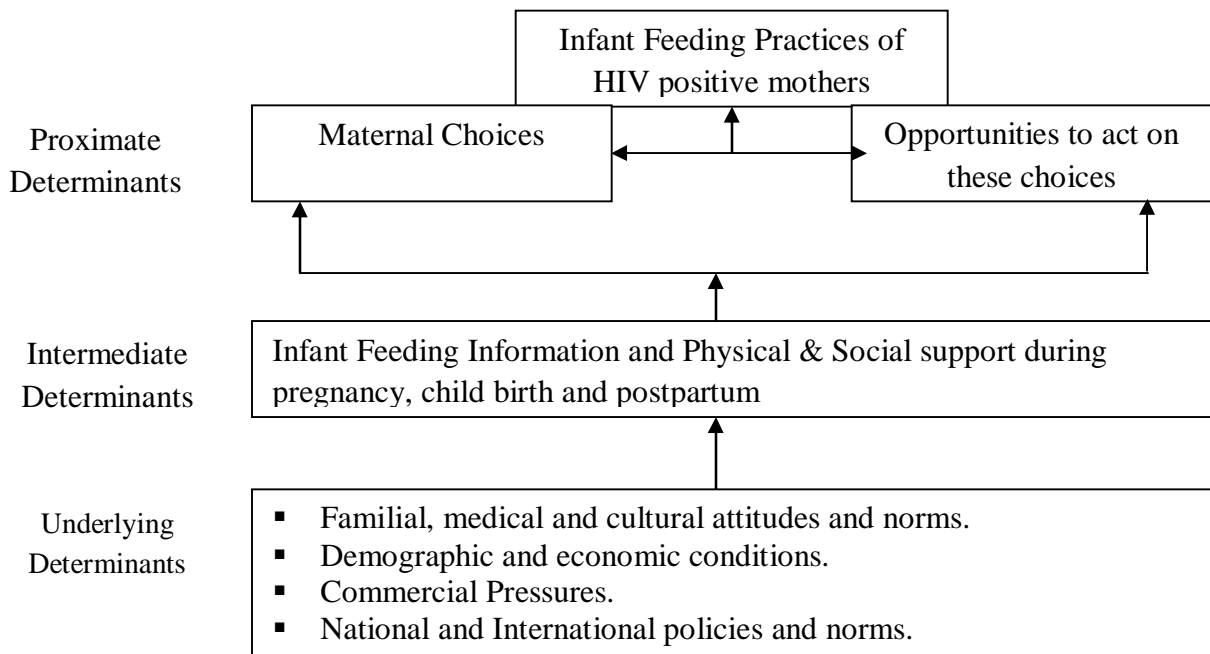


Figure 2.3 Determinants of Infant Feeding Practices

Source: Adopted from ACC/SCN (2002). 4th Report on the World Nutrition Situation pp 35 (Extracted from Lutter CK, 2000)

Central to these guidelines is the right of mothers to make decisions, on full and clear information, on what is best for them and their infants and/or how to carry out these decisions. This calls for access to voluntary and confidential HIV counseling and testing for women and men. Women who are aware of their HIV status should be counseled on

the risk of vertical transmission to their babies and on the benefits and risks of all the various infant feeding options.

Recent studies in South Africa suggest that combination of breastfeeding and artificial feeding has even more potential harm to the infant in the first months of life and that those who are exclusively breastfed, at least for the first 3 months, may face a significantly lower risk than was previously thought (Coutsoudis et al., 1999). The study suggests that giving other solids or fluids in addition to mother's milk in the first months of life may be what injures the baby's gut and allows the HIV to enter the body tissues. It is believed that the lower transmission in exclusively breastfed infants is because they maintain a healthy gut epithelium, which acts as a viral barrier, and that breast milk contains immune factors which have been shown to have anti-viral and anti-HIV effects in vitro.

Women who are HIV negative or do not know their HIV status, should be encouraged to continue breastfeeding and to avoid infection in future. Of great concern here are also the issues concerning confidentiality, the protection, respect and fulfillment of human rights including the right of the child to survival, development and health; the right of the woman to know her HIV status and to choose not to be tested or not to know the results of an HIV test; and the right of women and men irrespective of their HIV status to determine the course of their reproductive lives and health and to have access to information and services that allow them to protect their own and family's health.

Prevention of breast-milk HIV transmission strategies should be integrated into an overall approach by health services to preventing HIV infection in women and their partners and reducing Mother-to-Child Transmission (MTCT). Such measures should include promotion of safer sex; providing early detection and appropriate treatment of STDs; ensuring safety during blood transfusion; antiretroviral therapy and replacement feeding for the infant.

2.3 ALTERNATIVE INFANT FEEDING

2.3.1 Main Issues to be considered

From birth to six months, an infant requires milk in some form as a necessity. If a mother is infected with HIV, it may be preferable to replace breast milk to reduce the risk of MTCT of HIV to her infant. The risk of alternative feeding should be less than the potential risk of HIV transmission through breastfeeding so that infant illness and death from other causes do not increase. The main issues to be considered include the nutritional requirements; risk of bacterial infection; cost of alternative feed; effect on family planning; stimulation and the socio-cultural factors.

If not breastfed, an infant needs about 150ml of milk per kg of body weight a day. For a 5 infant this translates to about 750ml per day, given as five 150ml feeds per day (WHO, 2000). Replacement feeding should aim to provide the entire infant's nutritional requirements as completely as possible, and should be provided together with social and health care.

Breast milk alternatives lack antibodies that protect against bacterial infections. Bacteria may therefore contaminate the feed during preparation, so it is imperative that high hygienic standards are kept during preparation and feeding. This calls for access to clean water, fuel and sufficient time. Even where hygiene is good, artificially fed infants suffer live times as many bacterial infections as breastfed infants and in situations where hygiene is poor, the risk of death from diarrhea in artificially fed young infants may be 20 times that of breastfed infants (WHO, 1998). Families feeding their infants with breast milk alternatives therefore need access to health care.

To buy enough substitute feed for infant can cost considerable proportion of family income. In Kenya for example, purchasing commercial infant formula costs the equivalent of 84% of the monthly urban minimum wage (WHO/BASICS/UNICEF, 1999). In addition to formula, the costs of fuel, water and health care need to be taken into account. All these factors raise the cost of the feed and often lead families to use diluted formula at the expense of nutritional sufficiency.

Women who do not breastfeed compromise the benefits of child spacing that breastfeeding provides. Another pregnancy too soon can cause the health of an HIV positive woman to deteriorate even more and results in potentially more HIV infected

children to care for. It is thus essential for the mothers to have access to affordable and appropriate family planning methods.

Since breastfeeding fosters a close social relationship between the mother and her infant, substituting breastfeeding can be detrimental to this social bonding resulting in lack of stimulation for the infant. Steps should be taken to help mothers ensure that replacement fed infants receive as much attention as breastfed infants do (WHO/FRH/NUT/CHD, 2000).

In a society like Kenya, where breastfeeding is the norm, women who do not breastfeed can easily be stigmatized, resulting in a range of other problems. Personal experience I reveals that this is a sensitive issue especially among the Kisii community and measures are required to provide social care to HIV positive mothers who opt to use alternative feeding.

2.3.2 Feeding Options for HIV Positive Mothers

For the first six months when the infant requires some form of milk, breast milk alternatives like commercial infant formula, home prepared formula and unmodified cow's milk formula can be given to the infant. Commercial infant formula based on modified cow's milk or soy protein has been found to be closest in nutrient composition to breast milk (WHO/FRH/NUT/CHD, 2003). It is usually adequately fortified with micronutrients including iron. It can be a good option if the family has reliable access to sufficient formula, clean water, fuel, utensils, skills and time to prepare it accurately and hygienically. Home-prepared formula can be made with fresh animal milks, dried milk powder or with evaporated milk. Care is needed to avoid over-concentration or over dilution. Micronutrient supplements like iron, zinc and vitamins A; C and folic acid are also recommended. Unmodified Cow milk with great caution, could be considered as an exceptional option by the HIV positive mother when the supply of Cow milk is reliable and affordable for the six months; the family lacks resources, time and fuel to modify Cow milk to make home prepared formula; the family will be able to offer extra water and monitor dehydration; and commercial infant formula is not available/affordable for the family.

Modified breastfeeding like early cessation of breastfeeding and heat-treatment of expressed breast milk reduces the risk of MTCT. Early cessation reduces the length of time for which an infant is exposed to HIV through breast milk. It could be a good option for those who find it difficult for social and cultural reasons to avoid breastfeeding completely.

Pasteurization at about 65°C for 30 minutes or boiling and then cooling in a refrigerator or cold water, of expressed breast milk may be a good option especially for sick and low birth weight (LBW) babies in a hospital setting. Heat-treated breast milk is still nutritionally superior to other milks, though heat-treatment reduces the level of the antibodies.

Other forms of breast milk like breast milk banks and wet-nursing can also be good options. Breast milk banks are generally used as a source of breast milk for a short time especially for the sick and LBW new born. They are not usually an option for meeting the nutritional needs of infants for a long period. It should be certain that donors are screened for HIV and that donated milk is correctly pasteurized. Wet-nursing is practicable in some traditional setting where a relative breastfeeds the infant. Traditionally, among the Kisii community for example, wet-nursing was mostly practiced when an infant happened to be bereaved at such a tender age by the mother. (UNICEF/UNAIDS/WHO 2003) recommends that wet-nursing be considered only when a potential nurse is informed of her risk of acquiring HIV from the infant in question; she has been offered HIV counselling & testing; she voluntarily takes a test and is found to be HIV negative

2.4 INFANT FEEDING OPTIONS: 0-6 MONTHS

2.4.1 Commercial Infant Formula;

It is made from modified cow's milk or soy proteins, but lacks the long chain essential fatty acids that are present in breast milk. Giving formula requires water, fuel, skills and time to prepare it accurately and hygienically. Cup feeding is recommended for hygienic purposes.

2.4.2 Home Prepared Formula

This can be made from animal milks, powdered milk and evaporated milk. They can be obtained from cows, goats, buffalo; Carmel; and sheep among others. They are usually deficient in micronutrients such as Iron, Zinc and Folate and vitamins A and C. Unmodified cow's milk increases the risk of dehydration due to greater concentration of Sodium, Phosphorus and salts. Cup feeding is recommended for hygiene purposes.

2.4.3 Exclusive Breastfeeding

Strategies of preventing MTCT of HIV during breastfeeding include; avoiding mixed feeding; early cessation of breastfeeding; heat treatment or pasteurization of expressed breast milk; microbicide treatment of expressed breast milk; and antiretroviral therapy during breastfeeding

The transition from exclusive breastfeeding to full replacement feeding should be as short as 2-3 days or as long as 2-3 weeks. (Sinkala M et al, 2007.) However it should be noted that still there is limited data available on the optimal length and process available on the optimal length and process of transitioning from exclusive breastfeeding to full replacement feeding.

Exclusive breast feeding is breast feeding without supplementary feeds such as water, liquids or semi-solid goods. Breast milk provides an easily digested form all the required nutrients for the first 4-6 months of life (WHO, 2000). It contains immunoglobulin, white blood cells, growth factors that are essential to the infant. Breastfeeding delays return of a woman's fertility and psychosocial development of the infant.

Breastfeeding exclusively followed by early and abrupt weaning may reduce MTCT of HIV (Coutsoudis 2000).

2.4.4 Use of Expressed and Heat Treated Milk:

Breast milk is pasteurized (Heated to 62.5 degrees centigrade for 30 minutes) or boiled briefly and cooled immediately in a refrigerator or in cool water. This destroys the HIV virus (Orlaff et al., 1993). This method is most feasible in a hospital for sick and low birth weight infants.

2.4.5 Wet Nursing

There is a risk of HIV transmission to the infant if the wet nurse is infected. If a family considers this option both the wet nurse and mother are informed of risks. The wet nurse should be offered counseling and testing and be able to practice safe sex to remain HIV negative while breastfeeding the infant.

2.4.6 Breast Milk Banks

In some settings breast milk may be available from milk banks. This may be most useful for sick and low birth weight babies. The bank must be functioning according to recognized standards and donors should be screened for HIV.

2.5 INFANT FEEDING OPTIONS 6-24 MONTHS

2.5.1 Feeding of Infants Aged 6-24 Months Several Important Factors Need

Consideration: -

Amount of food needed- One should ensure that energy needs are met; this is ensured by giving energy dense foods and adjusting meal frequency.

Food consistency -Gradually increase food consistency and variety as the infant gets older, for example smashed pureed, finger foods. By 12 months most children can eat family foods.

Meal frequency and energy density – The appropriate number of feeding depends on the energy density of the local foods and amounts consumed at each feeding.

Nutritional content of foods – feed a variety of foods to ensure that nutrients needs are met, diets that do not contain animal source foods cannot meet all nutrient needs unless fortified products or nutrient supplements are to be used.

Use of vitamin or mineral supplements or fortified foods- use fortified foods or vitamin-nutrient supplements preferably mixed with or fed with food. For example iron, zinc, vitamin A, especially if the diets are plant based.

Fluid needs – Non breast fed infants and young children need at least 400 ó 600ml/day of extra fluids. Plain clear (boiled water) should be offered several times a day to ensure that the infant is satisfied.

Safe preparation and storage of foods – practice good hygiene and proper food handling by washing hands with soap, storing food, safety and serving food immediately after preparation and using clean cups and spoons and avoiding use of feeding bottles which are difficult to keep clean for prevention of diarrhea.

Responsive feeding – Practice responsive feeding by applying the principles of psychosocial care. Optimal infant feeding depends on not only what is fed, but also how, when and by whom the child is fed.

Feeding during and after illness – Children need more fluids and continued feeding during illness. Extra food will be needed after illness until the child is growing well again.

Guiding principles for feeding, non-breastfed children 6-24 months of age; infants should be exclusively breastfed for the first six months of life and thereafter receive appropriate complementary feeds with continued breastfeeding up to 2 years. To reduce risk of MTCT of HIV transmission it is recommended that when replacement feeding in AFASS mothers should avoid breastfeeding from birth, otherwise even at 6 months HIV infected mothers are still advised to continue breastfeeding till an appropriate replacement feed is obtained; and also use appropriate nutritionally adequate foods.

Children of this age should be given a suitable Breast milk substitute and complementary foods. Complementary foods are referred to as, special transitional foods since they are specially prepared and designed to meet the particular nutritional and physiological needs of the infant and young child (Dop and Benboizid 1999). These foods include porridge, fruit juice, vegetable soup, mashed bananas and potatoes among others. Complementary foods must be adequately dense in energy and nutrients to meet the requirements of this age group, they also must be prepared stored and fed in hygienic conditions (SCN 2004).

2.6 GLOBAL MALNUTRITION

Malnutrition and hunger remain among the most devastating problems facing the world's poor. Nearly 30 percent of humanity- infants, children, adolescents, adults, and the elderly suffer from one or multiple forms of malnutrition from protein-energy malnutrition to micronutrients deficiencies (WHO et al, 2003).

The tragic consequences of malnutrition includes death, disability, stunted mental and physical growth and as a result, retarded national socioeconomic development, some 49

percent of the 10million deaths among children under-five years of age in the developing world are associated with malnutrition (Pelletier, 1994). Recent research shows evidence that fetal malnutrition has important immediate and long-term consequences not only for Asia.

2.6.1 Millennium Development Goals, Malnutrition and Hunger

In September 2000, the largest ever gathering of Heads of States ushered in the new millennium by adopting the Millennium Declaration. The Declaration, endorsed by 189 countries, was then translated into a roadmap setting out goals to be reached by 2015.

The eight Millennium Development Goal (MDGs) build on agreement made at United Nations conference in the 1990s and represent commitments to reduce poverty and hunger, and to tackle ill-health, gender inequality, lack of education, lack of access to clean water and environmental degradation. Nutritional status as a key Millennium Development Goal (MDG) indicator of poverty and hunger is an important first step in recognizing that policies, programmes and processes to improve nutritional outcomes have a role to play in global development. The roles of nutrition in development goes far beyond providing and indicator of progress towards the MDGs. A nutritional perspective can strengthen key development mechanisms and instruments such as poverty reduction strategies, health sector reforms, improved governance and human right, and trade liberalization. Nutrition can be engaged in a practical programme and policy context in each of these areas which it is attained have much to offer those who seek to advance a broad range of development goals. Good nutritional underpins progress towards of the first six MDGs. The report further asserts that good nutrition status reduces poverty by boosting productivity throughout the life cycle and across generations (Goal 1), that it leads to improved educational outcomes (Goal 2), that dealing with malnutrition typically empowers women (Goal 3), that malnutrition is associated with over 50% of all child mortality (Goal 4), that maternal malnutrition is a direct contributor to poor maternal-child health (Goal 5), and that good nutrition status slows the onset of AIDS in HIV-positive individuals, increases. One of the goals is, to improve nutritional status by maintaining weight, preventing weight loss; and preserving lean body mass.

Building stores of essential nutrients both macro and micro nutrients to boost immunity preventing food borne illness by promoting hygiene and food and water safety.

Promptly treating infections and managing symptoms that affect food intake improves nutritional status. The contribution of nutrition to the millennium development goals is shown in Table 2.2.

TABLE 2.2: Nutrition’s contributions to the attainment of the MDGs

<p>Goal 1: Eradicate extreme poverty and hunger</p> <p>Malnutrition erodes human capital, reduces resilience to shocks and reduces productivity (impaired physical and mental capacity).</p> <p>Goal 2: Achieve universal primary education</p> <p>Malnutrition reduces mental capacity. Malnourished children are less likely to enroll in school, or more likely to enroll later. Currently hunger and malnutrition reduces school performance</p> <p>Goal 3: promote gender equality and empower women</p> <p>Better nourished girls are more likely to stay in school and to have more control over future choices.</p> <p>Goal 4: Reduces child mortality</p> <p>Malnutrition is directly or indirectly associated with more than 50% of all child mortality. Malnutrition is the main contributor to the burden of disease in the developing world</p> <p>Goal 5: Improve maternal health</p> <p>Maternal health is compromised by anti ó female bias in a location of food, health and care. Malnutrition is associated with most major risk factors for maternal mortality.</p> <p>Goal 6: Combat HIV/ AIDS, malaria and other diseases</p> <p>Malnutrition hastens onset of Aids among HIV positive. Malnutrition weakens resistance to infections and reduces malarial survival rates</p>

Source: ACC/ SCN, 2004

2.6.2 Causes of Malnutrition

Malnutrition or undesirable physical or disease conditions related can be caused by eating too little, too much or an unbalanced diet that does not contain all nutrients necessary for good nutritional status. A causality framework is very useful, maybe necessary in assessing and analyzing the causes of malnutrition in society (ACC/SCN,1997a) The causality for malnutrition and ways to address it are laid out in the multi-sectorial conceptual framework developed by the United Nations Children's Fund (UNICEF) in 1990 this is shown in figure 2.4.

The framework is comprehensive, incorporating both biological and socioeconomic causes, and encompasses causes at both micro and macro levels. It breaks the determinants (the most proximate levels), underlying determinants and basic determinants (the deepest level).

Malnutrition is any physical condition resulting either from an inappropriate or inadequate diet, such as a diet that either provides too much or too little of necessary nutrients, or from a physical inability to absorb or metabolize nutrients (New Encyclopedia Britannica, 1994). Malnutrition can be related to various factors, such as infections which lead to poor appetite and mal-absorption (WHO, 1996), poverty, and lack of access to food, sanitation and/ or health services.

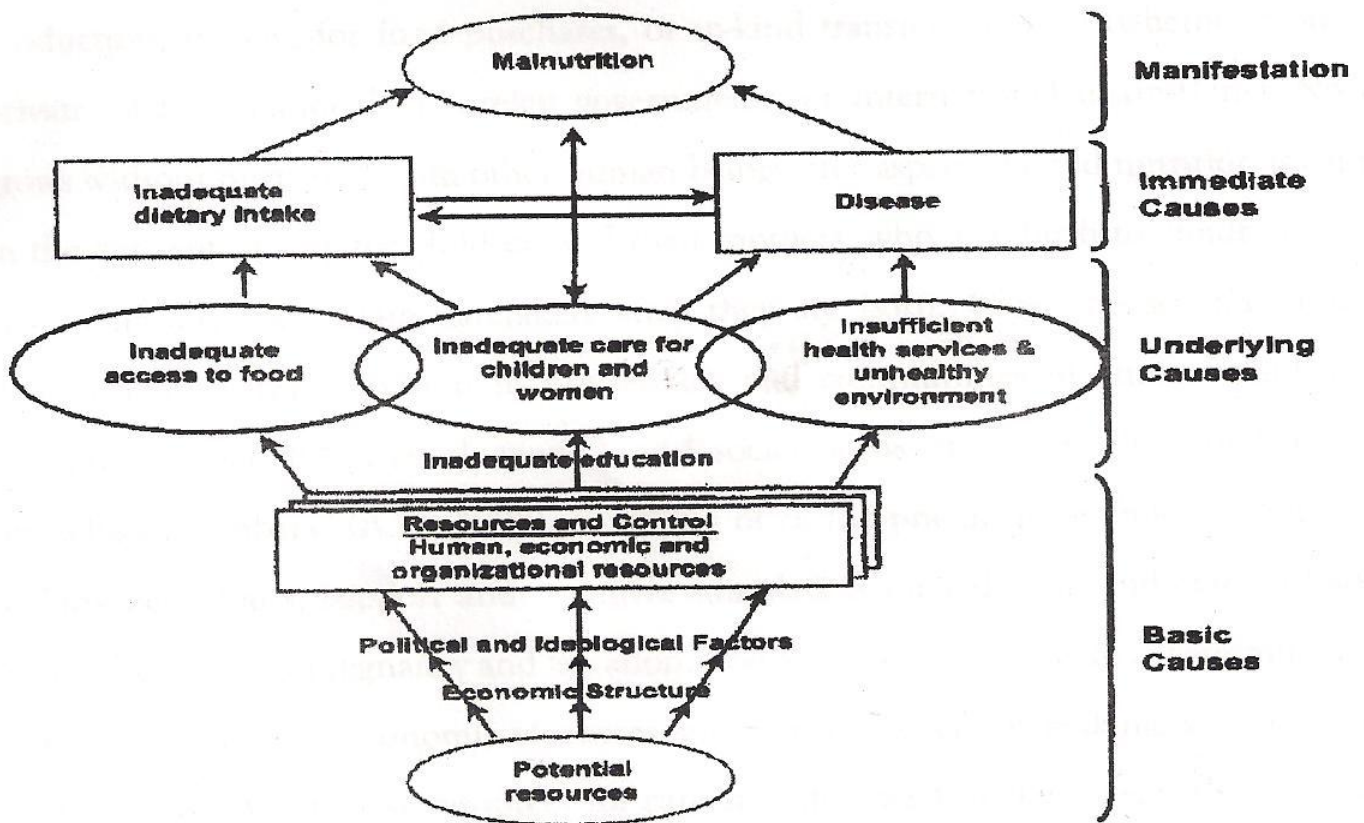


Figure 2.4 Conceptual frameworks on the causes of malnutrition

Source - UNICEF, 1990

The immediate determinants of child nutritional status manifest themselves at the levels of the individual human being. They are dietary intake (energy, protein, fat, and micronutrients) and health status, these factors themselves are interdependent. A child with inadequate dietary intake is more susceptible to disease. In turn, disease depresses appetite, inhibits the absorption of nutrients in food, and competes for a child's energy. Dietary intake must be adequate in quantity and in quality and nutrients must be consumed in appropriate combinations for the human body to be able to absorb them.

The immediate of child nutritional status are, in turn influenced by three underlying determinants manifesting themselves at the household levels. These are food security, adequate care for mothers and children and a proper health environment, including access

to health services. Associated with each is a set of resources necessary for their achievement.

Food security is achieved when a person has access to enough food for an active and healthy life, (World Bank, 1986). The resources necessary for gaining access to food are food production, income for food purchases, or in-kind transfers of food (whether from other private citizens, national or foreign governments or international institutions). No child grows without nurturing from other human beings: this aspect of child nutrition is captured in the concept of care for children and their mothers, who give birth to children and who are commonly their main caretakers after they are born. Care, the second underlying determinant is the provision in household and communities of time attention and support to meet the physical, mental, and social needs of growing child and other household members (ICN, 1992). Examples of caring practices are child feeding, health-seeking behaviors, support and cognitive stimulation for children, and care and support for mothers during pregnancy and lactation. The adequacy of such care is determined by the caregiver's control of economic resources. Standards of care is influenced by the caregiver's status relative to other household members. A final resource for care is the caregiver's knowledge and beliefs. The third underlying determinant of child nutritional status, health environment and services, rests on the availability of safe water, sanitation, health care, and environmental safety, including shelter.

A key factor affecting all underlying determinants is poverty. A person is considered to be in absolute poverty when he or she is unable to satisfy basic needs – for example, to obtain adequate food, health care, water, shelter, primary education and community participation (Frankenberger, 1996). Poor household and individuals are unable to achieve food security, have inadequate resources for care, and are not able use of (or contribute to the creation of) resources for health on a sustainable basis.

Finally, the underlying of child nutrition (and poverty) are, in turn, influenced by **basic determinants**, which include the potential resources available to a country or community, limited by the natural environment, access to technology, and the quality of human resource. Political, economic, cultural and social factors affect the utilization of these

potential resources and how they are translated for food security, care and environmental services.

2.6.3 Consequences of Malnutrition

Malnutrition negatively affects the quality of life and learning as well as death and disease status. Malnutrition includes over- nutrition and nutritional deficiencies as well . (WHO, 1997a; US Congress, 1991; World Bank, 1997) and impairs health, intellectual activity, adaptive behaviour, education, productivity and well-being, and can induce death (Horwitz, 1983). Malnutrition causes a great deal of human suffering both physical and emotional. It is a violation of a child's human rights (Oshaug et al, 1994). It is associated with more than half of all deaths of children worldwide (Pelletier et al., 1995) and it is a major waste of human energy. Adults who survive a malnourished childhood are less physically and intellectually productive and suffer from more chronic illness and disability (UNICEF, 1998). The personal and social costs of continuing malnutrition on its current scale are enormous. Eradicating malnutrition remains a tremendous public policy challenge. There are various consequences of malnutrition they are numerous and lead to various negative effects on the lives of children this is shown in table 2.3.

Table 2.3: Consequences of malnutrition and effects it has on children.

Condition	Characteristics	Effects on School children
Under-nutrition	Not enough total energy and nutrients are consumed.	Low body weight, wasting of body fat and later of muscles.
Protein-energy Malnutrition (PEM)	Inadequate dietary intake of protein and/ or energy.	Failure to grow and thrive, less resistance and high susceptibility to infections.
Wasting	Low weight for height	See above
Stunting	Low height for age	See above
Marasmus	Dietary deficiency of both protein and energy	See above, (more severe) (mainly preschool age)
Kwashiorkor	Dietary deficiency of protein with adequate (or even excessive) energy intake	See above, (more severe) (mainly preschool age)
Iron deficiency Anemia	Body is depleted of iron stores (reduced red blood cell count), hampering the body's ability to produce hemoglobin, which is needed to carry oxygen in the blood, most common in females.	Increased fatigue, shortened attention span, decreased physical and intellectual work capacity, reduced resistance to infections, impaired intellectual performance
Vitamin A deficiency	Body is low or depleted of vitamin A, which is vital for vision	Night blindness and eventually total blindness, reduced resistance to infection (mainly preschool age)
Iodine deficiency	Body is low or depleted of iodine which is vital for cell differentiation and thyroid hormone synthesis	Can affect brain development, learning disability and, when severe, grossly impair mental development; impaired reproductive performance

Condition	Characteristics	Effects on School children
Over nutrition (Overweigh/Obesity)	More food energy is consumed than expended, resulting in excess body fat	Elevated blood cholesterol and high blood pressure, associated with increased adult mortality.
Eating Disorders	Severe disturbances in eating behaviour, resulting in extreme thinness or overweight	Low self-esteem, feeling of inadequacy, anxiety, social dysfunction, depression, moodiness
Anorexia Nervosa	Intense fear of becoming obese and refusal to eat, leading to significant weight loss	See above (mainly adolescent)
Bulimia	Compulsion to binge eat and then purge the body by self-induced vomiting or use of laxatives	See above (mainly adolescent)

2.6.4 Assessment of Children Nutritional Status

Nutritional status can be measured for individuals as well as for populations. Population measures are more important in research. They can be used to describe nutritional status, to identify population segments at risk for nutrition-related health consequences, and to evaluate interventions. The choice of nutritional status assessment method depends on the objective and the level at which one wants information, as well as of the validity and reliability of the method. The assessment of nutritional status is commonly summarized as "ABCD," which stands for anthropometric measurement, biochemical or laboratory tests, clinical indicators, and dietary assessment.

2.6.4.1 Anthropometric methods

Anthropometric approaches are, for the most part, relatively non-invasive methods that assess the variations of physical dimension and growth composition of an individual at different age levels and degrees of malnutrition. Two types of anthropometric methods are commonly used to assess the nutritional status of children. These are "growth measurements" and "body composition measurements." Most widely used growth

measurements are height, length and body weights. Indices derived from growth measurements allow researchers and clinicians to assess weight-for-age, height-for-age and head-circumference-for-age as well as weight-for-height. For children, low height-for-age is considered stunting, while low weight-for-height indicates wasting. Head-circumference-age can be used in children 36 months and younger to monitor brain growth in the presence of malnutrition. On the other hand, measures of mid-arm circumference and skin-fold measured over the triceps muscles at the mid-arm are used to estimate fat free mass and body fat respectively. The various forms of anthropometric indicators are shown in table 2.4.

Table 2.4: Anthropometric indicators for children

Indicator	Definition	Implication & use
Birth-weight	The weight at which a baby is born	It is actually an indicator of Maternal nutrition and
Weight	Measured as weight in Kg (to the nearest 100g)	Mainly affected by acute infection and/ or acute food shortage. If after the infection the child is on an adequate diet weight demonstrates a period of rapid growth (Catch-up growth)
Head circumference	Measured around the head	Useful in the first 2 years mainly as a measure of brain development.
Mid-upper-arm-circumference (MAUC)	Measured on the left arm. Is not dependent on age	MUAC is a measure of adequacy in nutrition. A useful measure for screening acute malnutrition in the community. Also used for patients whose weight/ height cannot be taken, e.g. are bed ridden.
Weight-for-age	Is a measure of weight Compared to the weight of children of the same age and sex from a reference population	It is an indicator of both acute and chronic malnutrition.

Indicator	Definition	Implication & use
Height-for-age	Is a measure for height compared to the height of children of the same age and sex from a reference population	It is an indicator of chronic malnutrition and is used to identify stunted children.
Weight-for-height	Is a measure of weight compared to the weight of children of the same height from a reference population.	It is an indicator of acute, malnutrition.
Under weight	Weight is below minus 2 standard deviation of expected weight of children of same age from a reference population.	
Stunting	Height is below minus 2 standard deviations of expected height of children of the same age from a reference population.	
Wasting	Weight is below minus 3 standard deviations of expected weight of children of the same height from a reference population.	
Failure to thrive	The failure of the child to gain weight for more than 2 months (56 days).	This is important in detecting children who are at risk of malnutrition due to disease or inadequate food intake.
Body mass index (BMI)	Weight (in kilograms divided by height (in meters) squared. =wt (kg) [ht (m) ²]	An indicator of nutritional status.

2.6.4.2 Limitations of anthropometric methods

All methods have error. All methods produce imperfect measures that are indirect approximation of the process. Anthropometric measures of nutritional status can be compromised by other health conditions. For example, edema characteristic of some forms of malnutrition and other diseases state can conceal wasting by increasing body weight. Massive tumor also masks loss of fat and muscle. Head-circumference-for-age is not sensitive to less extreme malnutrition and non-nutritional factors such as disease, genetic variations and cultural practice influence head circumference.

2.6.4.3 Anthropometric reference data

Whatever method is chosen for assessment of nutritional status, the data obtained must be compared with reference data to produce an indicator of nutritional status. The quality of the available reference data is a factor that affects the assessment data.

World Health Organization recommended the use of US National Center for Health Statistics (NCHS) growth data as international reference for comparison of health and nutritional status among children. Other growth reference data for children, Canadian growth reference data for children and head circumference reference data among many others.

2.7 GAPS IN KNOWLEDGE

There still remain important gaps in knowledge, in areas related to appropriate feeding of infants born to HIV infected mothers, despite the extensive work that has been done on HIV/AIDS. Policy makers and programme managers are still struggling to develop appropriate guidelines on infant feeding for mothers who are infected with the virus (Piwoz and Preble 2000).

Decisions about infant feeding in settings of high HIV prevalence require careful balancing of risks; the risk of transmitting HIV through breastfeeding, and the risk and fear of mortality and morbidity and stigmatization from not breastfeeding on the other.

There are few studies with data on risks of artificial feeding in African settings because breastfeeding is nearly universal in Sub-Saharan Africa (Latham and Preble, 2000). But

data from other developing countries (Brazil, Pakistan and Philippines) show that infants where are not breastfed are likely to have 5-6 times higher morbidity and mortality rates, than breastfed infants in the first two months of life (Victoria et al., 1987; WHO collaborations study 1999). Further still the impact of not breastfeeding should be evaluated on the basis of the effect on the infected mothers social standing, health, fertility and vertical transmission to subsequent children.

If large numbers of mothers do not breastfeed due to fears of HIV there may be spillover effect and gains made over the years through efforts to protect, support and promote breastfeeding could be reversed.

CHAPTER THREE

METHODOLOGY

3.1 STUDY SETTING

The study was based in Kisii District Hospital which is located in central Kisii district. The hospital is presently the largest in central Kisii. It acts as a referral hospital to Nyamira, Homa-Bay, Migori and part of Narok district. The total bed capacity is approximately 1200 patients and the paediatric bed about 250 patients.

The out-patient paediatric clinics in the hospital include Comprehensive Care Clinic (CCC) and Maternal-Child Health clinic (MCH) among others.

Kisii District is part of Nyanza Province. The district was recently sub-divided into Kisii Central ; Gucha and Nyamira districts. The Central Kisii district lies between latitude 0° 30° S to 1° s and longitude 34° 38° to 30° E. It is second smallest district in the province after Nyamira. The district is situated in the highlands of south western Kenya and covers a total area of 1351km^2 . It shares common administrative boundaries with five districts: Kericho and Nyamira to the East, Narok to the South and Homabay and Migori to the West. Its headquarters is Kisii town which is a big centre of commercial activities relative to neighbouring towns because the main highlands from Migori to Kericho and from Kisumu to Narok pass through the town.

3.1.1 Food Production

The district is characterized by small land holdings averaging 1.2 hectares, but it has the advantage of having both fertile soil and reliable rainfall, which allows intensive mixed farming. The main cash crops include maize, bananas, millet, beans and a variety of horticultural crops. Maize is the major crop and accounts for 40% of total cultivated land (GOK 1989).

3.1.2 Population

Kisii central is one of the districts with the highest population growth rate in the country. Currently the population is over 1 million. One ethnic group, the Abagusii, exclusively

inhabits the district. Basically they are patrilineal in descent; land, and all permanent assets are owned by the male household head (Ong'ayo 1985).

3.2 STUDY DESIGN

This study was a cross-sectional and exploratory in design. This design was aimed at generating data on the current knowledge of MTCT of HIV; and on the current knowledge of factors affecting mothers' choice of infant feeding alternatives and factors affecting various infant feeding practices and alternatives.

3.2.1 Inclusion Criteria

Women with infants aged 0-24 months among the general population were recruited for the study in questionnaire administration; while HIV positive women with children aged 0- 24 months were recruited to form a sub-group.

3.2.2 Ethical Issues

Permission to carry out the study was obtained from the government through the Ministry of education, the District Commissioner, and District Medical Officer of health. Also informed consent was obtained from the mothers to participate in the study the purpose of the study was explained to them and confidentiality of the data collected to them was assured.

3.3 SAMPLE SIZE DETERMINATION AND SAMPLING PROCEDURE

3.3.1 Sample Size Determination

From Medical reports in the district 14% of the pregnant mothers in the district hospital are HIV positive. Assuming a standard error of 5% (0.05) at 95% confidence interval the sample required was determined as following (Fisher et al., 1991).

$$\begin{aligned} n &= \frac{Z^2 pq}{d^2} \\ &= \frac{(1.96 \times 1.96)(0.14 \times 0.86)}{(0.05)^2} \\ &= 185.9 \\ &= 186 \text{ subjects} \end{aligned}$$

Where;

n: is the sample size

Z: is the normal deviate (confidence limit) taken as 1.96 at 95% confidence level

p: is proportion of HIV infected women in the study population.

q: is population of women not infected in the study population.

d: is the acceptable degree of accuracy desired.

3.3.2 Sampling Procedure.

Purposive sampling as part of multi-stage sampling also simple random sampling procedure was used. The sampling procedure employed is show in figure 3.1. This allowed for convenience since all clinics/wards admit similar patients. Then wards where the study was to be conducted were selected purposively for logistical reasons. All children meeting the inclusion criteria were admitted to the study. Patients were identified through the case notes in respective units/wards with the assistance of a medical doctor. Simple random sampling was then applied to obtain the actual sample of cases. A number was assigned to every subject of the study population. These numbers were written on a small piece of paper. All the papers were then put in a box, after which the box was shaken vigorously to ensure randomization. The papers where then picked at random from the box and the numbers were then recorded. The subjects responding to the numbers picked were therefore recruited. The areas considered for the study were, the comprehensive care clinic, the maternal child health clinic and the pediatric wards.

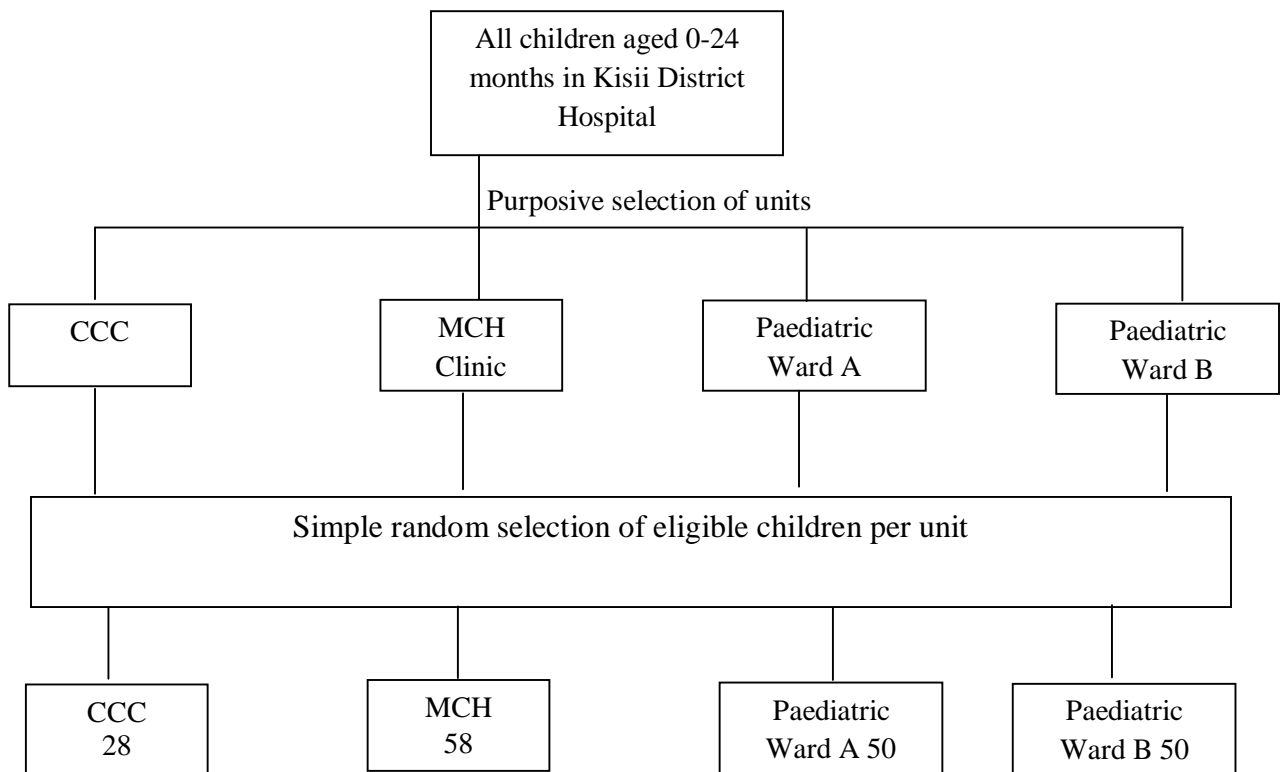


Figure 3.1: Sampling procedure for the study.

3.4 DATA COLLECTION INSTRUMENTS

The study applied both quantitative (Questionnaires) and qualitative research tools (Key informant interviews, observations, focus group discussions for data collection).

3.4.1 Questionnaire

Questionnaires were used to collect both quantitative and qualitative data. The main questionnaire was pre-tested before use.

The questionnaire was designed to collect the following information:

- (i) Infant feeding practices and feeding alternatives for the sub-group HIV positive mothers
- (ii) Maternal knowledge on MTCT of HIV through breastfeeding

- (iii) Knowledge on Infant feeding by mothers counseling on information received by mothers from clinics and other sources
- (iv) Cultural attitudes and norms relating to infant feeding
- (v) Anthropometric parameters of the infants indicating the nutritional status.
- (vi) Social economic status of the households.

3.4.2 Observations

Observation as a data collection method is important in assessing behavior and practices, providing valuable non-verbal clues to the happenings. Observations were made on the sub-sample mothers of mothers with HIV, the actual infant feeding practices opted for and find out the nutritional practices, if the infant has difficulty feeding, attachment during breastfeeding; general hygiene of the mother; cooking facilities; mode of refuse/disposal; water sources and feed preparation.

3.4.3. Focus Group Discussions

Focus group discussions were used to collect information from the community regarding views on the issues affecting infant feeding; locally available and possible alternatives to breastfeeding and maternal knowledge on vertical transmission of HIV among others. FGD allowed for exploration of factors that are difficult to obtain using quantitative methods and were useful in verifying information collected by the questionnaires. Two groups were selected

- (i) Mothers of reproductive age (15 to 49 years)
- (ii) Men in the community whose partners qualify to be in group (1) above. 2 discussion sessions were conducted for each group. Each FGD consisted of 8 members.

3.4.4. Key Informant Interviews

Four elderly women knowledgeable on the traditional infant feeding practices were selected and interviewed in depth on the subject matter. These interviews were to provide clarification on information obtained from other sources and other data collection methods.

3.4.5 Anthropometric Measurement

Anthropometrics measurements consisting of weight and height were taken from the study subjects together with date of birth and their sex. The heights/ length of the study children was measured using length / height boards designed locally to measure children under 2 years of age lying down (recumbent), and older children standing up, whereas, weight was measured using digital mother/ child electronic scale. The scale was a floor scale weighing children as well as adults (capacity of 150 kg). Weighing capacity of the scale was from 1 kg to 250 kg in 100g divisions, accuracy +/- 100g. All the survey equipments were portable and durable.

3.5 MTCT KNOWLEDGE INDEX DETERMINATION

3.5.1 Determination of MTCT Knowledge Index

A total of six questions were used for scoring to develop MTCT knowledge index. The aspects of MTCT studied are whether children could get HIV/AIDS; timing of the MTCT ó during pregnancy, delivery and breastfeeding and whether MTCT was preventable.

A response will be considered valid if it provides the correct answer known (i.e. a yes response). Two points will be given to a valid response and zero for an invalid response. A total score will be calculated out of 12 points and used as MTCT knowledge indicator. The respondents overall knowledge on MTCT of HIV was then rated on scale 0-12 and the respondent graded using few cut-off points as;

- (i) 1 = No knowledge at all (0 points)
- (ii) 2 = Low MTCT knowledge (2-4 points)
- (iii) 3 = Average MTCT knowledge (6-8 points)
- (iv) 4 = High MTCT knowledge (10-12 points).

3.5.2 Determination of AFASS for Feeding Option Index

A total of 7 brief questions were used to develop the AFASS criteria classification index. The Aspects of AFASS to be studied include Acceptability; feasibility; affordability; sustainability and safety of replacement feeds.

The respondents overall AFASS Criteria determination will be rated on a scale 0 to 7 whereby yes=1 points and no=0 points and the respondent graded using seven cut off points : a where as;

- (i) 0 = Low (Poor rating)
- (ii) 7=High (Best rating)

If any of one of these conditions is not fulfilled the mother is **NOT** eligible for replacement feeding.

Table 3.1 AFASS criteria followed in counseling HIV positive mother

Criteria for Replacement Feeding	YES (1)	NO (0)	Total points
ACCEPTABLE means that :			(1 point)
<ul style="list-style-type: none"> • The mother perceives no barrier to choosing replacement feeding for cultural or social reasons, or for fear of stigma and discrimination. 	x		
FEASIBLE means that:			(1 point)
<ul style="list-style-type: none"> • The mother (or family) has adequate time, knowledge, skills, resources, and support to correctly prepare breastmilk substitutes and feed the infant 8 to 12 times in 24 hours. 	x		
AFFORDABLE means that:			(1 point)
<ul style="list-style-type: none"> • The mother and family, with available community/or health system support, can pay for the cost associated with the purchase/production, storage and use of replacement feeds without compromising the health and nutrition of the family. 	x		
SUSTAINABLE means that:			(1 point)
<ul style="list-style-type: none"> • A continuous, uninterrupted supply and a dependable system for distribution of all ingredients (for example micronutrient supplements, fuel) and products needed to safely practice replacement feeding are available for as long as needed. 	x		
SAFE means that:			(3 points)
<ul style="list-style-type: none"> • Replacement are correctly and hygienically stored and prepared and fed with clean hands using clean cups and utensils – no bottles or teats: <ul style="list-style-type: none"> ○ Safe source of portable water for household use; ○ Replacement foods should be stored in secure places or prepared at each meals; ○ Other persons (care-givers) should have skills in case mother is not available 	x x x		

3.6 TAKING ANTHROPOMETRIC MEASUREMENTS

Anthropometric measurements consisting of weight and height together with age and sex were taken from the study subjects according to the procedure outlined on anthropometric measurement guide (Cogil, 2003). World Health Organization (WHO) has cut off points to classify malnutrition; Table 3.2 below shows the classification according to Z-Scores.

Table 3.2 Classification of malnutrition.

WHO cut off malnutrition classification	
Mild	< - 1 to -2Z-score
Moderate	< -2 to -3Z-score
Severe	< -3Z -score

3.6.1 Procedures before Measurement

The preparatory and decisions that were addressed prior to obtaining measurements were as follows:

3.6.1.1 Initial preparation

The mother or caretaker of the child was informed in order to make her understood what was happening to the child. All survey equipments were clean and safety secured. Measurements were done out of direct sunlight to avoid interference with reading scales and to create comfortable environment for the measurer and child.

3.6.1.2 Ethics during measurement

It was the responsibility of the survey team to minimize the discomfort and inconvenient of the survey and anthropometric measurements. The purpose and contents of the survey were explained in a non-threatening and culturally relevant manner while providing the listener an opportunity to ask questions and decline participation if necessary. Explanation was given to the respondent or caregiver as to how the information will be used and by whom. Confidentiality of the information collected was assured and

maintained. Oral informed consent from mothers or caregivers from the samples frame was taken prior to administering a survey questionnaire or undertaking any measurement.

3.6.1.3 Number of measurers

Two trained field assistants measured a child's height and length. The first measurer held the child and took the measurements. The assistant helped to hold the child and recorded the measurements on the questionnaire.

3.6.1.4 Measuring board and scale placement

The survey instruments were placed in a sturdy and flat surface and adequate light to read the measurements with precision.

3.6.1.5 When to weigh and measure

Weighing and measuring was done after an interview in order to make the mother and child feel more comfortable before the measurements began.

3.6.1.6 Step-wise measurements

Questions and measurements for one child were completed at a time to avoid potential problems of mix-ups that might occur during the measurement of several children.

3.6.1.7 Control of the child

The two measurers together with the mother/caretaker of the study children ensured the child was as calm as possible when taking weight and length/height measurements in order to get an accurate measurement.

3.6.1.8 Recording measurements

All measurements were recorded in pencil. When a mistake was made when recording a measurement, it was corrected.

3.6.2 Procedures for Measurement of Age, Height, Length and Weight

The techniques for obtaining height, length and weight are illustrated in figures 5-7.

3.6.2.1 Child age

Date of birth of children was obtained from clinic cards or baptismal certificates. For those without written evidence, direct recall of the date of birth by the mother was applied. Ages of the children were calculated from children date of interview using MS-Excel computer software during data analysis.

3.6.2.2 Procedure for length for infants and children 0-23 months

- (i) **Measurer or assistant** ó Place the measuring board on a hard flat surface, i.e., ground, floor, or steady table.
- (ii) **Assistant** ó Place the questionnaire and pencil on the ground, floor, or table. Kneel with both knees behind the base of the board if it is on the ground or floor .
- (iii) **Measurer** ó Kneel on the right side of the child so that you can hold the foot piece with your right hand.
- (iv) **Measurer and assistant** ó With the mother's help, lay the child on the board by supporting the back of the child's head with one hand and the trunk of the body with the other hand. Gradually lower the child onto the board.
- (v) **Measurer or assistant** ó Ask the mother to kneel close on the opposite side of the board facing the measurer as this will help to keep the child calm.
- (vi) **Assistant** ó Cup your hands over the child's ears. With your arms comfortably straight, place the child's head against the base of the board so that the child is looking straight up. The child's line of sight should be perpendicular to the ground . Your head should be straight over the child's head. Look directly into the child's eyes.
- (vii) **Measurer** ó Make sure the child is lying flat in the center of the board. Place your left hand on the child's shins (above the ankles) or on the knees. Press them firmly against the board. With your right hand, place the foot piece firmly against the child's heels.
- (viii) **Measurer and assistant** ó Check the child's position. Repeat any steps as necessary.
- (ix) **Measurer** ó When the child's position is correct, read and call out the measurement to the nearest 0.1 cm. Remove the foot piece and release your left hand from the child's shins or knees.
- (x) **Assistant** ó Immediately release the child's head, record the measurement, and show it to the measurer.
- (xi) **Measurer** ó Check the recorded measurement on the questionnaire for accuracy and legibility. Instruct the assistant to erase and correct any errors.

3.6.2.3 Procedures for weight taking

Child Weight Using Digital electronic scale ó The Digital mother / child electronic scales requires the mother and child to be weighed simultaneously. The mother was weighed with the child and then weighed without the child. The difference between the two measures was the child's weight. This technique was chosen to avoid struggle and stress to the child by the use of weighing pants and to obtain accurate measurement. The deduction between the measurements was done by the principal investigator every night after the data collection.

- (i) **Measurer** ó Minimize the clothing on the child.
- (ii) **Measurer** ó Ensure the scale is not over-heated in the sun and is on an even surface enabling the reading to be clear.
- (iii) **Measurer** ó Ask the mother to stand on the scale with her child.
- (iv) **Measurer** ó Record the weight and include the reading with one decimal point (e.g. 65.5 kilograms).
- (v) **Measurer** ó Pass the child to a person nearby and record the second reading with just the mother (e.g. 58.3 kilograms). The difference (e.g. 7.2 kilograms) is the weight of the child.

3.6.3 Immunization Status

The information on immunization coverage was obtained in two ways ó from health cards and from mother's verbal reports. All mothers were asked to show the interviews the health cards used for the child's immunization. If the card was available, the interviewer copied the information. If a vaccination was not recorded on the card as being given, the mother was asked to recall whether that particular vaccination had been given or not. If the mother was not able to present a card for a child at all, she was further asked to recall whether the child had received BCG, polio, DPT and measles. A child was considered to be fully immunized if he/she had received one dose of BCG and polio (at 6, 10, and 14 weeks of age), and one dose of measles vaccine at the age of nine months. A child missing either of the above was not fully immunized and if the child had not received any immunization, he/she was considered as not immunized.

3.6.4 Data Quality Control Measures

Data quality control measures that were employed during the data collection are discussed in the following sections:

3.6.4.1 Ensuring accuracy of anthropometric measurements

Accuracy of measurements was achieved through good training and supervision by the principal investigator. During height and weight measurement, two measurements were taken on the same child and were averaged. When the measurements were vastly different from each other, the measurements were disregarded and the measuring was started again. Large acceptable differences between repeated measurements are 0.5 kilogrammes for weight and 1.0 centimeters for height measurements.

3.6.4.2 Standardization/ calibration of instruments

Standardization tests for the scales were performed every morning prior to the field work with known weights to minimize instrument bias and to ensure the scales were reliable and accurate.

3.6.4.3 Minimizing biases

The study respondents were well informed about the purpose of the research in order to minimize Hawthorne effect (bias) and obtain complete and reliable information. To avoid observer bias and assure validity of anthropologic measures to readings were taken at each measure.

3.6.4.4 Data cleaning

After data entry cleaning was carried out to ensure that the data had been correctly into the computer. Frequencies were running to check for missing data, any error obtained during data entry and consistency of responses between questions. All the outliers were selected and filtered out before the data analysis. At the nutritional indices conversion stage, cleaning was done the Epi ó Info software in the built mechanism of check file and Epi ó Nut flagging.

3.7 ANALYSIS OF ANTROPOMETRIC DATA

Information that was obtained checked and verified then entered into a computer. The choice of statistical analysis for anthropometric data depends on the type of information

collected. However, most studies that have done to assess risk factors and determinants of child malnutrition applied bivariate (mainly chi-square). To examine whether associations between dependent and independent variables exist or not, and multivariate (mainly logistic regression) to estimate the relative risk based on odds ratios from logistic regressions (Getaneh et al, 1998). Qualitative data output was obtained by cross-tabulations and frequencies of individual variables. Also there was use of the statistical package for social sciences (SPSS) software and EPI ó INFO Version 6 software. Graphs and descriptive information were done using MS ó Excel software. Both descriptive and analytical methods were used in the generation of the results of this study. Bivariate variables relationships were determined between hypothesized factors by correlation and analysis of variance (ANOVA). Information obtained from FGD and key Informant Interviews that were written in field notebooks, and those recorded in Radio- cassettes were verified, transcribed and descriptive associations derived unit of the summaries. Parametric and non- parametric tests were used.

CHAPTER FOUR

RESULTS 4

4.1 DESCRIPTIVE AND UNIVARIATE RESULTS

4.1.1 Social Economic and Demographic Characteristics of the Study Participants.

All the mothers were in the reproductive age falling in the range of 15 ó 42 years with the highest proportion of the mothers 34% falling in the 25 ó 29 years age bracket and 16.7% being teenage mothers. The mean maternal age was 24 years (SD=5.14). The highest proportion 42.7% of the respondents was affiliated to the Catholic Church. The remaining confessed either being Protestants 54.8% or Muslims 2.5%.

More than half of the respondents 79.6% were in monogamous marriages while 7% were in polygamous relationships .The rests were either single, widowed or separated. Most of the households 83.9% were male-headed while only 16.1% were Female-headed households this was either as a result of death of the male spouse or because of separation. The average household size was six members, with the largest household having 13 members and the smallest having 2 members, the mother and one child. A large majority56.3% of the respondents had primary education, while about 32.3% of them had secondary education. 1.9% had no formal education at all with (9.5%) attaining tertiary education. Figure 4.1 below shows the levels of education attained.

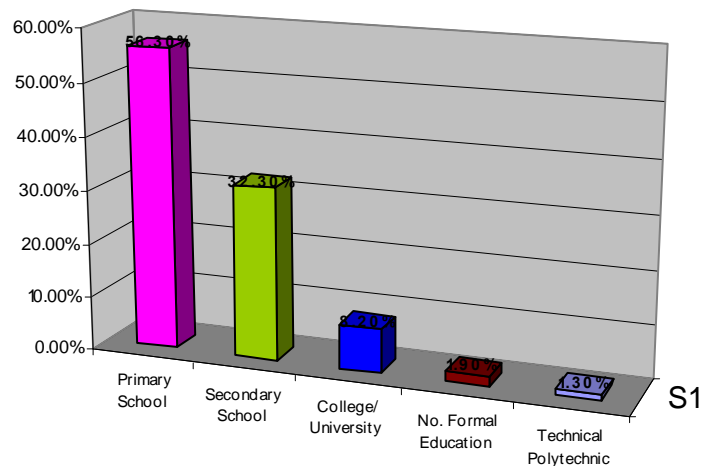


Figure 4.1 Levels of education attained

Most of the respondents 30.5% directly depended on agriculture as source of livelihood. Other sources of income mentioned included salaried employment 20.1%, retail business 26.2% and those who relied on wages from casual labour were 17.7%. Figure 4.2 shows the levels of maternal income.

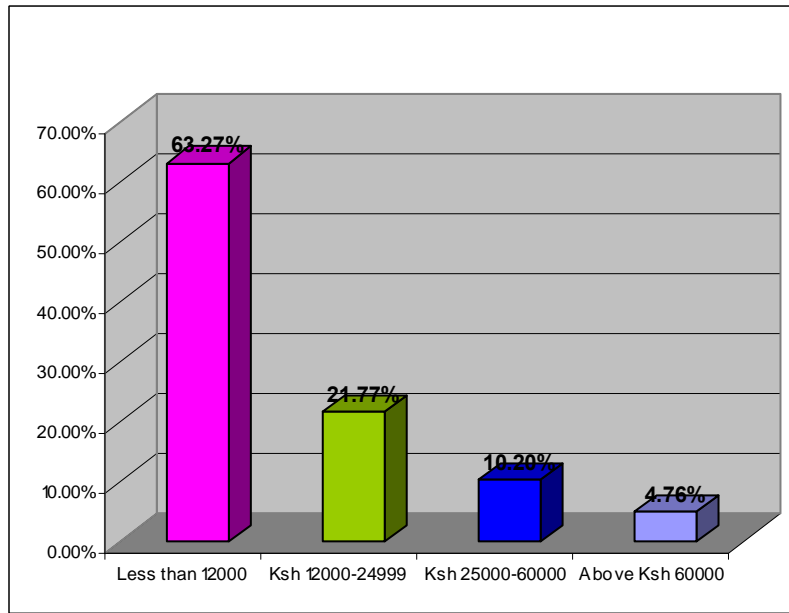


Figure 4 Levels of maternal income

4.1.2 Age and Sex Composition of the Children

A total of 158 children whose mothers HIV status is unknown were investigated. Out of the 158 children surveyed (55.5%) were male and (44.2%) were female.

The highest proportion of infants (56.1%) fell within the ages 1.5 to 6 months while those that fell between 12-17.9 months, 18-24 months took 8.9% and 1.2% respectively.

The majority of the children (53.4%) had normal birth weight. Whereas (31.3%) were born low birth weights and (5.3%) were born with more than 4 Kgs. A minority (10%) had unknown weight.

A total of 28 children born to HIV positive mothers were also investigated. Out of the 28 children 65.4% were male and 34.6% were female. 42.9% of the children had normal birth weight while the rest were either low birth weight 25% or overweight 32.1%.

4.2 NUTRITIONAL STATUS OF CHILDREN IN THE STUDY POPULATION

Figure 4.3 shows nutritional status of the 158 children born to the non-tested mothers according to the three anthropometric indices. The data showed that about (9.9%) (n=32) were severely stunted while (13.5%) were moderately stunted which means they had Low Height ó for ó Age (<HAZ) status. The data also showed that (4.7%) (n=17) were severely underweight and (6.0%) were moderately underweight which means they had Low Weight for Age (<WFA). The data also showed that (0.8%) (n=6) were severely wasted and (3.8%) were moderately wasted which means they had low (<WFH).

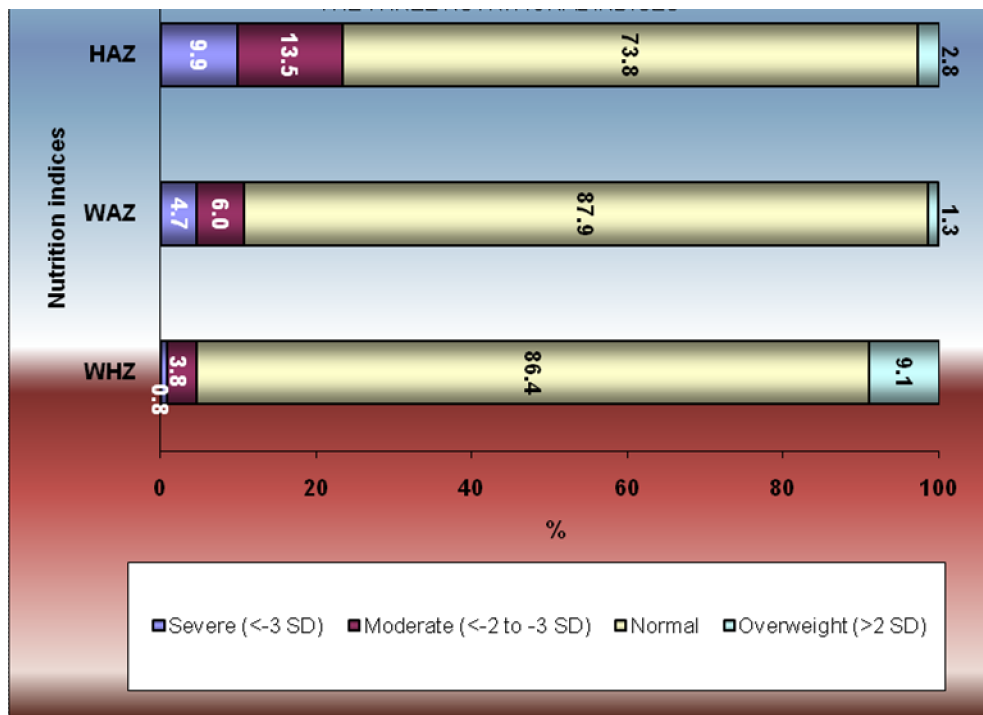


Figure 4.3 Nutritional status of children born to the non-tested mothers

Figure 4.4 shows the nutritional status of the children born to HIV Positive mothers; 46.4% of the children had severe stunting <-3SD, and 10.7% of them were stunted at <-2SD. The data also indicated that 28.6% were severely wasted at <-3 SD, and 10.7% of them were wasted at <-2SD. It was also shown that 35.7% of them were severely underweight<-3SD, and 10.7% of them were underweight at <-2SD.

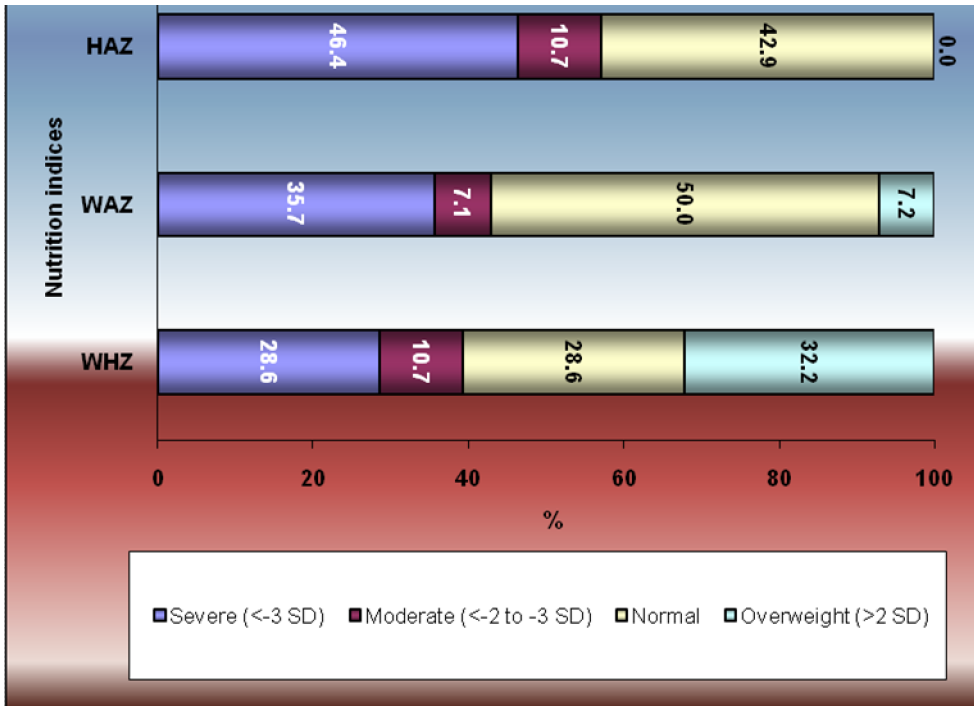


Figure 4.4 Nutritional status of children born to the HIV positive mothers

The survey also found out that (4.1%) of the children born to the non-tested mothers had mild pitting oedema. Whereas 22.2% of the children born to the HIV positive mothers also had oedema.

4.3 MOTHER- TO - CHILD TRANSMISSION OF HIV (MTCT)

4.3.1 Knowledge of HIV/AIDS and MTCT

The respondents were asked a number of questions on the awareness of HIV/AIDS, whether it is curable, timing and possibility of transmission from mother to the child, and whether this is preventable.

Regarding the timing of transmission, most respondents 40.6% reported it could occur during pregnancy and 41.3% indicated that transmission was not possible in pregnancy, while the rest said they did not know. 88.3% stated that vertical transmission can occur during delivery while 94.3% reported that HIV could be transmitted through breast milk.

86.3% of the respondents knew MTCT of HIV could be prevented. Most of the respondents 92.4% knew AIDS as a killer disease with no known cure. Only 5.1% of the

respondents indicated that it could be cured but the drugs were only too expensive and 2.5% did not know.

Table 4.1: Mothers knowledge on the timing and prevention of mother-to-child transmission (MTCT) of HIV.

MTCT Timing and Prevention	Response by Mothers					
	Non-tested mothers (N=158)			HIV positive mothers (N=28)		
	Yes (%)	No (%)	Don't Know (%)	Yes (%)	No (%)	Don't Know
Pregnancy	40.6	41.3	18.1	89.3	10.7	0
Delivery	83.3	7.1	9.6	96.4	3.6	0
Breastfeeding	94.3	3.2	2.5	96.4	3.6	0
Preventable	86.3	8.5	5.2	92.6	7.4	0

In general the non-tested mothers had lower ultimate MTCT knowledge 19.6% in comparison to their HIV Positive counterparts whose ultimate knowledge level was at 39.3%. The average knowledge level was at 70.9%). However 9.5% had either poor MTCT knowledge or absolutely no MTCT knowledge at all . Table 4.2 below shows MTCT knowledge among the two study groups.

Table 4.2 Shows MTCT knowledge among the two study groups in percentage

MTCT knowledge (%)	NON-TESTED MOTHERS (N=158)	(n)	HIV POSITIVE MOTHERS (N=28)	(n)
No knowledge at all	3.8%		0%	
Poor/low knowledge	5.7%		0%	
Average knowledge	70.9%	112	60.7%	17
Ultimate/ highest knowledge	19.6%	41	39.3%	11

One thing that came out vividly from the FGDs was the fact that women do not have authority over their sexual lives. The culture of widow inheritance/remarriage and polygamy still thrives in this area despite the wide cognizance about HIV/AIDS.

4.3.2 Infant Feeding Options Mentioned

Respondents were asked on what or how a newborn is fed if the mother by bad luck dies or is too ill or incapacitated in any way, what other possible alternatives there were and whether they could consider the various alternatives suggested medical practitioners appropriate.

Up to 98.6% of the non- tested mothers mentioned cow milk as the option for feeding an infant who is bereaved as such a tender age. About 26.8% felt that wet-nursing should be the suitable method, to use on an orphaned infant. 35.4% felt that they could consider the use of a breast milk bank. While 27.9% would consider expressed and heat treated breast milk as an option. Goat milk proved to be the least popular with only 19.2% of the respondents considering as an option for use. 60.6% of responds considered dried milk powder as appropriate to feed an infant who has been orphaned at early age. A majority of respondents 80.1% would also consider commercial infant formula as an option. Some of the non ótested mothers 39.2% opted to use wimbi porridge, 39.6% of them opted to use a herbal concoctions called ekerandi, and 11.6% of them were using sfruit juice to feed their infants. Table 4.3 shows the various infant-feeding options used by the non tested mothers , while table 4.4 show the various infant feeding options used by te HIV positive mothers.

Table 4.3 Breast milk alternatives indicated by the non –tested mothers for infants below 6months.

Feeding option	Non-tested mothers (N=158)					
	Yes (%)	(N)	No (%)	(N)	Don't know (%)	Total (%)
Wet-nursing	26.8	42	70.3	111	2.9	100%
Expressed, heat-treated breast milk	27.9	44	40.3	64	31.8	100%
Formula	80.1	127	15.6	25	4.3	100%
Breast milk from milk bank	35.4	56	41.7	66	22.8	100%
Cow milk	98.6	156	0.7	1	0.7	100%
Goat milk	19.2	30	73.6	116	7.2	100%
Dried milk powder	60.6	96	27	43	12.4	100%
Wimbi porridge	39.2		60.8		-	100%
Herbal concoction (ekerandi)	39.6		60.4		-	100%
Fruit juice	11.6%		88.4%		-	100%

Table 4.4 Feeding options by the HIV positive mothers for infants below 6 months.

Feeding option	HIV positive mothers (N=28)					
	Yes (%)	(N)	No (%)	(N)	Don't know (%)	Total (%)
Wet-nursing	60.0	17	40.0	11	0	100%
Expressed, heat-treated breast milk	40.7	11	55.6	16	3.7	100%
Formula	88.0	25	12.0	3	0	100%
Breast milk from milk bank	79.2	22	16.7	5	4.2	100%
Cow milk	85.7	24	14.3	4	0	100%
Goat milk	5.0	1	95.0	27	0	100%
Dried milk powder	95.2	27	4.8	1	0	100%
Porridge	50.0		50.0		0	100%

Orphans, it was revealed from FGD and key-informant interviews, are traditionally distributed among close relatives who then take care of them in bringing them up socially, educating them, feeding them and buying them clothing. Such a relative was expected to take the orphan as one of her own children. If orphaned at an early age, the baby is better taken care of by an elderly woman.

4.3.2 Infant Feeding Options

Respondents were asked on what or how a newborn is fed if the mother by bad luck dies or is too ill or incapacitated in any way, what other possible alternatives there were and whether they could consider the various alternatives suggested medical practitioners appropriate.

Up to 98.6% of the non- tested mothers indicated cow milk as the option for feeding an infant who is bereaved at such a tender age. About 26.8% felt that wet-nursing should be the suitable method, to use on an orphaned infant. Only 35.4% indicated that they could consider the use of a breast milk bank, while 27.9% would consider expressed and heat treated breast milk as an option. Goat milk was the least popular with only 19.2% of the respondents considering as an option for use. Up to 60.6% of responds considered dried milk powder as appropriate to feed an infant who has been orphaned at early age. Majority of respondents (80.1%) would also consider commercial infant formula as an option. Some of the non ótested mothers (39.2%) opted to use wimbi porridge , 39.6% of them opted to use a herbal concoction called *ekerandi*, and 11.6% of them were using fruit juice to feed their infants . Table 4.3 shows the breast milk alternatives for non tested mothers while table 4.4 shows the breast milk alternatives for the HIV positive mothers.

4.4 INFANT FEEDING PRACTICES

4.4.1 Breast Feeding Practices

A large number 85.4% of the non-tested mothers reported that they were breastfeeding their babies. The frequency of breastfeeding was varied. More than half (62.7%)

breastfed their babies on demand, (11.2%) breastfed more than eight times in a day, (10.4%) breastfed 5-7 times in a day and (15.7%) breastfed less than 4 times in a day.

The common practice in the study area is mixed feeding. 75% of the mothers who had infants less than 6 months old, said that they usually give other fluids/foods and only 25% said they did not. However, these 25% still confessed having given warm water, glucose solution, and concoctions of drinks from leaves or gripe water at one point. The result shows exclusive breastfeeding is almost non-existent.

About 46.2% of the respondents initiate breastfeeding within the first hour of delivery, about 23.1% after 2-6 hours while 7.7% do so after 7-24 hours postpartum. However 23.1% delay initiation of breastfeeding coming more than 24 hours after delivery. More than 69.7% of the women interviewed on breastfeeding duration indicated that they would continue breastfeeding for 1-2 years, and about 8.1% will still continue breastfeeding beyond 2 years. About 20.2% discontinued breastfeeding after 6-12 months and 2.0% breastfed for only 1-3 months. Table 4.5 shows the breastfeeding practices of the non-tested mothers in the study area.

A small percentage 2.9% of the respondents reported onset of another pregnancy as reason for discontinuing breastfeeding while 4.8% indicated self-refusal by the baby. The rest were forcefully discontinued by bittering the breast 13.5%, staying away from the child (41.3%) or persistent withholding (11.5%) because they were perceived to be old enough

Out of the 28 HIV-positive mothers who were interviewed, 42.8% breastfed their babies however 35.7% of them were able to breastfeed exclusively to avoid the risk involved with mixed feeding. If they withheld breastfeeding they would opt for dried milk powder (95.2%), cow milk (85.7%), infant formula (88%), wet nursing 60%, expressed heat treated breast milk 40.7%, breast milk bank 79.2%, and goat milk 5.0 %.

Table 4.5 Breast feeding practices for the non tested mothers

Feeding practice	Percentage number of children	
	From the study N = 186	National level N = 3,702 KDHS 2003
Every breastfeed (any breastfeeding)	85.4%	97%
Exclusive Breastfeeding (<2 months) (In the last 24 hrs)	19.3% n = 80	29%
Initiation of breastfeeding		
- Within 1 hour of birth	46.2%	
- Within 24 hours of birth	53.8%	52%
Frequency of breast feeding < 6 months	n = 96	82%
On demand	62.7%	
5 times or less	15.7%	
6 times or less	84.3%	
Duration of breastfeeding		
Up to 23 months	69.7%	
24 months or more	8.1%	
Median	23 months	
Age of complementation		
0-3 months	53.6%	20 months
4-6 months	29.1%	69.3%
> 6 months	12.8%	81.1%

4.4.2 Complementary Feeding Practices

About 53.6% of the mothers interviewed introduced the baby to other foods at 1-3 months; however 29.1% did it at 4 to 6 months and the remaining before 1 month 4.5% or after 6 months (12.8%). Figure 4.5 shows the distribution of respondents by age of introduction of complementary foods.

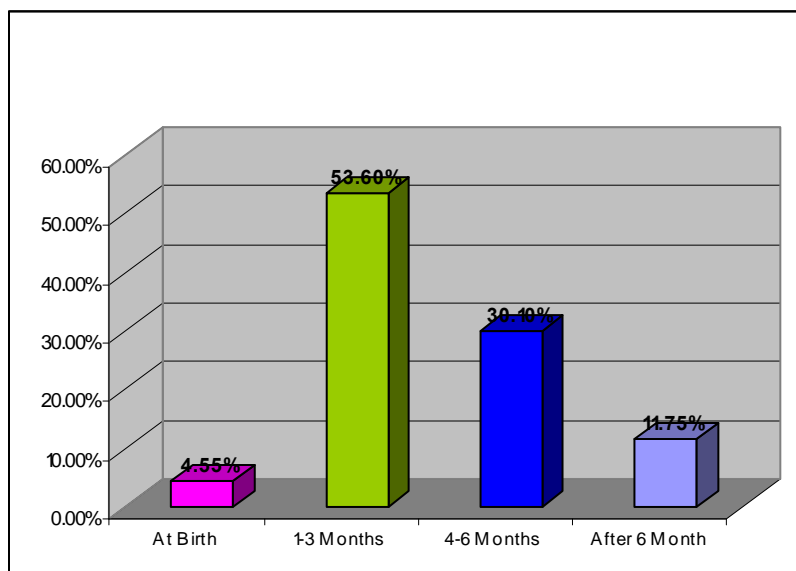


Figure 4.5 Age of introduction of complementary foods

Uji made from millet flour was used by 39.2% of the non-tested mothers as the main complementary food given to their babies before 6 months of age. Other foods mentioned were cow milk, fruits, mashed matoke, legumes, cereals, vegetables, tubers and roots ,meats, and formula milk.

The reasons given for giving other foods early include perceived insufficient breast milk (67.6%), to straighten the intestines in readiness for other foods or to prevent stomach upsets (12.7%) and to accustom the baby early for other foods in case the mother goes away (5.6%). Other reasons included making the baby stronger (4.2%), being away from home (4.2%), onset of another pregnancy (2.8%), mother is sick or baby refuses (1.4%) and mother is committed in the farm, business or at work (1.4%). Table 4.6 shows the different complementary foods used to feed children born to both tested and non-tested.

About half (50%) of the respondents interviewed reported that they feed their babies 4 ó 7 times in a day with about the same proportion (40%) indicating 1 ó 3 times a day. The remaining (10%) fed their babies 8 times or more. More than half of the mothers (55%) produce the main complementary food while (30%) buy the food. The rest (15%) reported producing some ingredients and buying others. Almost all (85%) of the 78

women gave the baby her own serving. The food was mostly prepared by mother (72%) but could be prepared by the sibling (16%) or grand- parent (14%).

Table 4.6: Different complementary foods used to feed children.

Complementary food	Non tested mothers		HIV Positive mothers	
	N	%	N	%
Cow milk	89	56.3	19	68.8
Porridge	62	39.2	14	50.0
Herbal	63	39.2	6	20.0
Fruits	48	30.5	15	52.5
Mashed matoke	80	50.2	13	49.5
Legumes	82	52.2	15	50.2
Cereal	95	60.2	16	55.4
Vegetables	92	58.2	16	55.4
Foods from roots tube	64	40.5	10	35.5
Meat/fish	32	20.5	13	48.5
Eggs	80	50.2	17	60.2
Formula	3	2.2	2	6.3

4.5 HYGIENE CONDITIONS OF THE STUDY AREA

Other than the use of safe breast milk alternatives (and possible use of antiretroviral drugs), the reduction of MTCT of HIV requires improved access to clean water and sanitation; maternity (antenatal care) & family planning services; VCT and medical services for special conditions like AFASS to be met adequately.

There was no adequate amount of clean piped water in the study area only 12.3% of respondents had access. Women get their water from various sources including borehole (1.3%), river/stream (50%), well (1.9%), and springs (29.9%). Slightly more than half (63.6%) reported that they boil the drinking water, but personal experience and FGD

reports showed that very few women boil water. There was also a popular belief that water from springs and rain is pure and clean hence requires no treatment.

Slightly more than half (54.4%) of the households had usable latrines and most of the mothers indicated that they swashed their hands after visiting the latrine (97.4%) and when handling food (95.4%). The study showed that 37.8% of the respondents disposed their refuse in the garden, 34.5% disposed in composite pit, 3.8% burned it, while the rest (3.8%) either buried refuse or used bins.

4.6 MORBIDITY PATTERNS

Out of the 158 children in the study (37%) were reported to have had cough/blocked nose. Other common illnesses reported were fever (32%), diarrhea (30%), running nose or cold (19%) and pneumonia (1.6%). Malaria is endemic in the region of this study like other parts of the lake region, for all age groups. The major manifestation for malaria is fever, which ranked second after cough/blocked nose followed by diarrhea. The comparison in morbidity patterns between the tested and non tested mothers is shown in Table 4.7.

Table 4.7 Common illnesses suffered by the children

Illness	Response							
	Non tested mothers				HIV positive mothers			
	Yes (%)	(N)	No (%)	(N)	Yes (%)	(N)	No (%)	(N)
Cough	37%	58	63%	100	18.8	5	81.2	23
Fever	32%	51	68%	107	23.5	7	76.5	21
Diarrhea	30%	47	70%	111	17.6	4	82.4	24
Running nose	19%	30	81%	128	18.8	5	81.2	23
Anemia	30%	47	70%	111	57.1	16	42.9	12
Pneumonia	1.6%	3	98.4%	155	65%	18	35%	10
Measles	1%	2	99%	156	5%	1	95%	27

4.7 GENERAL HEALTH AND IMMUNIZATION STATUS OF THE CHILDREN

Of the HIV positive mothers interviewed 27% had received Folate supplementation. A Small percentage (26%) had received screened for Anaemia and given iron supplements. Only 27% of them had received the much needed malaria prophylaxis. Those who had received vitamin A supplementation were only 27%. It was encouraging to note that 75% of the 28 sero -positive mothers were on ARV treatment and so had more than half (65.4%) of their children. At least more than half (66.7%) had already received the much needed Zinc supplementation.

More than half (61.1%) of the babies were delivered in a medical facility, 3.9% of the children were delivered at home under traditional birth attendants, some of who did not even have gloves while one third (34.7%) were delivered at home without any professional care. Only 10.4% of the babies n=186 had completed their immunizations, while 64% progressed well but were below 9 months. The rest were defaulters who either had got only part of the immunizations (13.6%). The rest had got none at all 12%. Figure 4.7 shows the immunization status of the children born to the tested and non tested mothers.

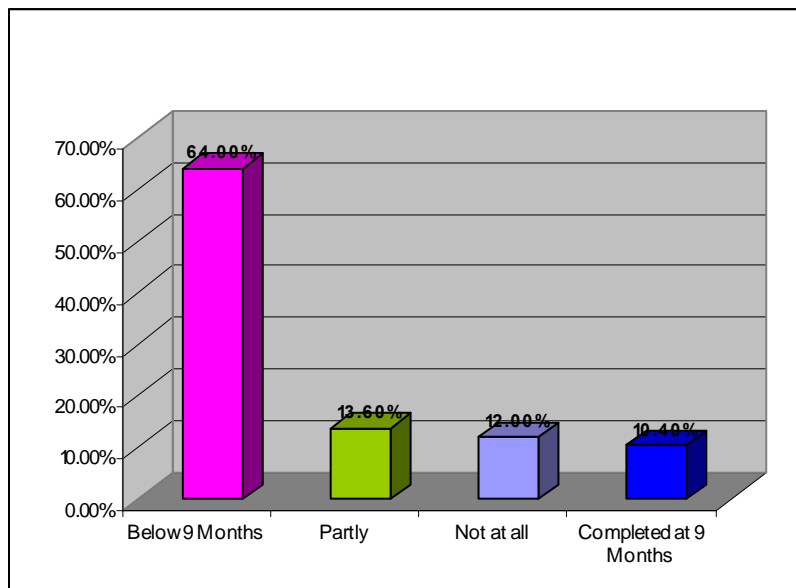


Figure 4.6 Distribution of children by immunization status

A number of factors contributed to poor clinic attendance, among them long distance to the clinic/health facility (average 4 km), and the long queues were discouraging the mothers attendance patterns. Some mothers believed that a child suffering from measles if injected would die. Others claimed the vaccines contain family planning drugs that reduce the child's future fertility, and yet others believed if they take their babies to the clinics they would die, claiming they have lost some babies that way before.

Family planning services utilization was very poor with 78 out of the 158 mothers (49.2%) being non-users. Of the users, (0.8%) reported using condoms, (8.7%) used pills while (29.4%) used the DEP injection method the remaining 9.5% said they had opted to use the natural method. The general understanding of family planning was that it is meant to terminate births. Since premature termination of breastfeeding is associated with new pregnancy and with the child spacing benefit of breastfeeding forgone when using an alternative feed like cow milk, family planning would be most important so that another baby does not come too soon. Figure 4.7 shows distribution of respondents by method of family planning.

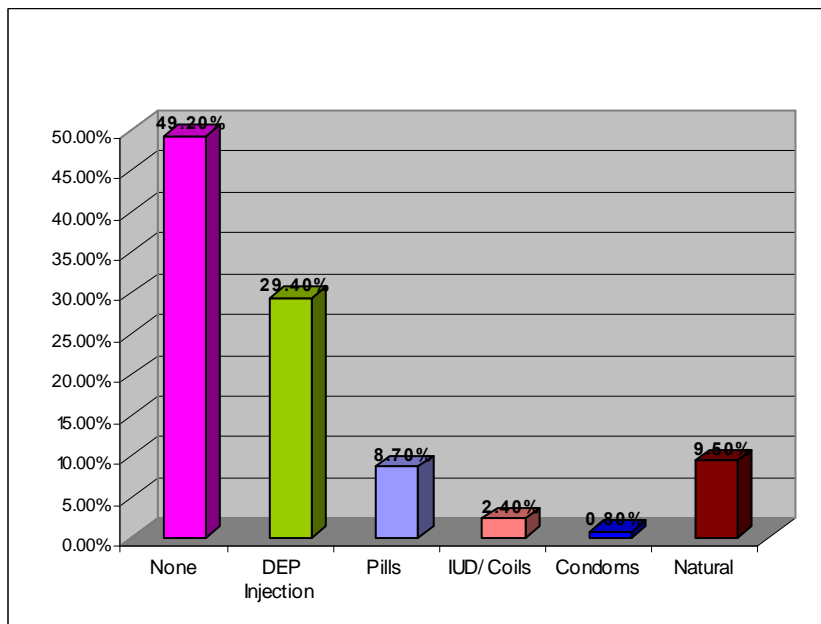


Figure 4.7 Distribution of mothers by method of family planning.

Table 4.8 shows the number of mothers who have received lectures on various topics. However it was encouraging to note that the 28 HIV positive mothers had received sufficient counseling and few had joined support groups

Table 4.8 Lectures received by mothers in the recent past

Lecture topic	N=158)		N= 28	
	Yes (%)	No (%)	Yes (%)	No (%)
	Breastfeeding	71.9	28.1	85.7
Complementary feeding	69.5	30.5	81.5	18.5
Breastfeeding alternatives	68.7	31.3	85.7	14.3
Maternal nutrition	73.8	26.2	89.3	10.7
Prevention of MTCT	75.0	25.0	92.9	7.1
Home hygiene	73.7	26.3	92.9	7.1

4.8 FACTORS THAT INFLUENCE NUTRITIONAL STATUS.

Bivariate analysis was performed using chi-square test on all the candidate variables assumed to influence children nutritional status. Three nutritional indicators namely weight-for-age, height-for-age, and weight-for-height Z scores were considered in the analysis. The results are shown in Tables 4.9 socioeconomic factors, 4.10 demographic characteristics , 4.11 dietary factors, and 4.12 health and health related factors and their relationship to the nutritional status of a child.

Table 4.9: Socio-economic characteristics by nutritional status of children under 5 years of age

Socio-economic and housing characteristics	Weight-for-Height (n=6)				Weight-for-Age (n=17)				Height-for-Age (n=34)			
	<-2SD		χ^2	P	<-2SD		χ^2	P	<-2SD		χ^2	P
	N	%	value	value	N	%	value	value	N	%	value	value
Marital status of mother												
Single	0	0.0			2	13.3			4	28.6		
Married	4	3.3	16.143	<0.001 *	13	9.9	6.27	0.043 *	28	23.0	0.932	0.628
Separated/Divorced/widowed	2	40.0			2	50.0			2	40.0		
Highest level of education												
< Secondary	4	5.1	0.283	0.695	13	14.8	2.608	0.106	20	24.4	0.021	0.884
>= Secondary	2	3.3			4	6.3			14	23.3		
Denomination												
Catholic	3	5.1			10	15.4			13	21.7		
SDA	1	2.0	4.88	0.181	3	5.5	3.698	0.296	14	26.9	0.423	0.936
Protestant	1	4.2			3	11.5			6	24.0		
Muslim	1	25.0			1	25.0			1	25.0		
Employment status												
Formal	0	0.0	1.912	0.336	1	6.3	2.501	0.195	7	21.2	0.001	0.972
Informal	6	100.0			15	93.8			26	78.8		
Mother's annual income from various sources												
Less than kshs 12000	3	50.0			10	58.8			24	72.7		
Kshs 12000-24999	3	50.0	3.430	0.330	7	41.2	6.375	0.095	7	21.2	3.062	0.382
Kshs 25000-60000	0	0.0			0	0.0			2	6.1		
Above kshs 60000	0	0.0			0	0.0			0	0.0		
Major source of fuel for food preparation												
Other	2	33.3	0.001	1.000	4	23.5	0.696	0.584	12	35.3	0.044	0.838
Firewood	4	66.7			13	76.5			22	64.7		

Table 4.10: Demographic characteristics by nutritional status of children under 5 years of age

Demographic characteristics	Weight-for-Height (n=6)				Weight-for-Age (n=17)				Height-for-Age (34)			
	<-2SD		χ^2	P	<-2SD		χ^2	P	<-2SD		χ^2	P
	N	%	value	value	N	%	value	value	N	%	value	value
Age of index child in months												
Below 6 months	0	0.0	6.843	0.009*	6	6.8	4.162	0.041	18	22.0	0.423	0.515
6 months and above	6	9.1			11	17.5			16	26.7		
Employment												
Formal	0	0.0	1.912	0.336	1	3.1	2.501	0.195	7	23.3	0.001	0.972
Informal	6	5.7			15	12.9			26	23.6		
Sex of index child												
Male	4	5.1	0.247	0.699	9	10.7	0.056	0.813	18	23.1	0.071	0.789
Female	2	3.3			8	11.9			16	25.0		
Sex of household head												
Male	5	4.2	0.064	0.581	12	9.5	1.456	0.261	29	23.8	0.257	0.612
Female	1	5.6			4	18.2			5	29.4		
Birth order of index child												
1	2	33.3	0.134	0.935	3	18.8	0.946	0.623	12	40.0	3.041	0.219
2 ó 3	3	50.0			10	62.5			13	43.3		
4 ó 5	1	16.7			3	18.8			5	16.7		
Mother's age categories												
< 20	0	0.0	2.356	0.308	3	18.8	4.227	0.121	6	18.8	0.044	0.978
20-29	4	66.7			8	50.0			22	68.8		
30+	2	33.3			5	31.3			4	12.5		
Number of children alive												
1	0	0.0	5.756	0.056	4	40.0	1.782	0.410	15	55.6	0.459	0.795
2	0	0.0			4	40.0			7	25.9		
3	1	100.0			2	20.0			5	18.5		

In table 4.9 the results of the analysis showed that nutrition status (weight-for-height $< -2SD$) and weight-for-age associated significantly with marital status $P < 0.001$ and $P = 0.043$ respectively. Despite the limitation in the number of children, majority (40%) were taken care by either separated, divorced or widowed guardians compared to those that were brought up by single (0%) and married (3.3%) guardians. In Table 4.10 None of the children aged less than 6 months was severely malnourished, while the level of malnutrition in those that were 6 months and above was 9.1%. Age of index child associated significantly $p < 0.05$ with Weight-for height and weight-for-age nutritional indicators. However, the proportions of acute malnutrition were significantly higher than severe malnutrition. There was no significant association between chronic malnutrition (Height-for-Age $< -2SD$) and all the candidate variables.

In Table 4.11 the analysis showed that the association between child feeding practices and the three indicators of nutritional were as follows: Exclusive breast feeding as an option was the only factor that significantly associated with low (weight-for-age $< -2SD$) but not stunting (low (height-for-age $< -2SD$) or wasting, low (weight-for-height $< -2SD$). Majority of those with acute malnutrition had not practiced exclusive breast-feeding (19%) compared to those that practiced mixed feeding (3.5%). The other feeding practices like the choice of infant feeding option; initiation of breast feeding ; feeding frequency and duration of breast feeding ; did not significantly associate with any of the three indicators of nutritional status.

Table 4.11: Distribution of dietary factors by nutritional status of children under 5 years of age

Variables/ categories	Weight-for-Height			Weight-for-Age			Height-for-Age			
	<-2SD	χ^2	P	<-2SD	χ^2	P	<-2SD	χ^2	P	
	n	%	value	N	%	value	N	%	value	
Breastfeeding										
Breastfed	4	3.3	2.055	0.190	14	10.6	0.447	0.451	27	21.6
Not breastfed	2	10.5			3	15.8			7	41.2
Feeding option										
Exclusive breastfeeding	1	5.6	0.539	0.442	4	19.0	6.575	0.027	3	15.8
Not exclusive breastfeeding	2	2.4			3	3.5			14	17.1
Initiation of breastfeeding										
Within 1 hour of birth	1	2.0	1.133	0.471	3	5.7	0.639	0.503	9	17.3
Within 24 hours of birth	0	0.0			6	9.7			15	25.9
Frequency of feeding/ day										
3 times	1	2.6			2	5.3			7	18.4
4-7 times	0	0.0	1.245	0.537	1	3.3	1.017	0.601	4	13.3
8 times or more	0	0.0			2	10.0			5	27.8
Duration of breastfeeding										
< 12 month	2	9.5			2	10.0			4	19.0
12 - 24 months	2	3.3	1.711	0.425	7	10.3	0.904	0.636	13	20.3
> 24 months	0	0.0			0	0.0			2	25.0
Age complementary food started										
< 4 months	1	1.7			5	7.9			11	18.3
4 - 6 months	0	0.0	0.707	0.702	1	3.1	1.862	0.394	8	25.0
> 6 months	0	0.0			2	14.3			4	28.6

In Table 4.12 results from this study also revealed that immunization status of the child associated significantly with weight-for-age of the child $P=0.008$. The child who had not received any immunization was more likely to be malnourished.

Table 4.12: Health and health related factors sby nutritional status in children less than 5 years of age

Variables/ categories	Weight-for-Height			Weight-for-Age			Height-for-Age				
	<-2SD %	χ^2 value	P value	<-2SD n	%	χ^2 value	P value	<-2SD n	X2 %	P value	
Immunization status											
Completed	0	0.0		2	15.4			5	38.5		
Not at all	0	0.0	0.222	0.895	4	26.7	9.771	0.008	4	33.3	3.187 0.203
Partly	1	1.1		4	4.2			18	19.4		
Main source of water											
River/Stream/Rain											
water/Spring	6	5.4	1.414	0.493	15	12.3	0.868	0.648	28	24.6	0.301 0.860
Well/Dam/Borehole	0	0.0			0	0.0			1	16.7	
Tap/piped	0	0.0			2	10.5			5	27.8	
Water treatment											
Boiling	3	3.6			10	11.1			23	27.1	
Chlorinating	0	0.0	1.145	0.564	1	11.1	0.061	0.970	2	25.0	0.790 0.674
Nothing at all	3	6.8			6	12.5			9	20.0	
Presence of homestead latrine											
Yes	1	0.9	0.009	1.000	8	6.7	12.437	0.075	26	22.6	3.325 0.233
No	0	0.0			1	100.0			1	100.0	
Washing hands after visiting the latrine											
Yes	6	4.7			17	12.1			34	26.0	
No	0	0.0	0.195	0.907	0	0.0	0.551	0.759	0	0.0	1.388 0.500
Sometimes	0	0.0			0	0.0			0	0.0	
Washing hands before handling food											
Yes	6	4.8	0.349	1.000	17	12.4	0.985	1.000	33	25.8	0.465 0.679
Sometimes	0	0.0			0	0.0			1	14.3	

Multivariate analysis

In Table 4.13 binary logistic regression was performed on multiple factors to establish true predictors of nutritional status. Four factors were considered together in the model, namely;

- (i) Age of the index child (0=Less than or equal to 6 months, 1=More than 6 months)
- (ii) Marital status (0=Single, 1=Married, 2=Separated/Divorced/widowed)
- (iii) Feeding option (0=Exclusive breastfeeding, 1=Not exclusive breastfeeding)
- (iv) Ever breastfed (0=Yes, 1=No)

The dependent variable was nutrition status (0=Normal, 1=Malnourished). Table F shows the final outcome of the analysis. Two factor predictors of nutrition status are left in the model.

Table 4.13: Logistic Regression Predicting nutrition status from Age of the index child, and feeding option

Variable/ categories	B	S.E.	Odds ratio	95.0% C.I. for odds ratio		P value
				Lower	Upper	
Age of index child*						
More than 6 months	3.1	1.3	21.9	1.7	284.1	0.018***
Feeding option**						
Not exclusive breastfed	3.5	1.3	33.6	2.8	396.6	0.005***

*Reference category used was Age of child less than or equal to 6 months

**Reference category used was feeding option exclusive breast feeding

***Significant at 0.05 level.

Table 4.13 shows beta coefficient (β), odds ratio and P value for each of the factors associated with nutrition status. A child is 21.9 times more likely to become malnourished than normal if the child is aged more than six months compared to one who

is aged less than or equal to 6 months . Therefore Age can help to predict nutrition status of the child.

Mother's practice on feeding the baby was examined as well. There was a significantly associated between feeding option and nutrition status. A child is 33.6 times more likely to be malnourished than normal if they are not exclusively breastfed.

An analysis was done on maternal MTCT knowledge level to find significant differences in the non tested mothers and the HIV positive mothers. Table 4.14 Analysis of maternal MTCT Knowledge found that $p=0.22$ hence the difference was not statistically significant.

Table 4.14 Level of maternal MTCT knowledge

Mothers	Ultimate knowledge n	Average knowledge & below n	OR	95% CI of OR	χ^2	P
Not Tested	41	117	Ref			
HIV+	11	17	1.85	0.74 - 4.59	1.49	0.22

In Table 4.15 an analysis was done to determine differences in maternal infant feeding options among the tested and non tested mothers the following results were obtained. There were significant differences in wet nursing $p=0.001$, breast milk $p=0.002$, cow milk $p= 0.002$, and dried milk $p= 0.006$

In Table 4.15 Infant feeding options among the tested and non tested mothers

	Yes N	No N	OR	95% CI of OR	χ^2	P value
Wet Nursing HIV + Non-tested	17 42	11 111	4.08 Reff	1.64-10.26	11.85	0.001
Expressed heat tested breast milk						
HIV +	11	16	1.00	0.39-2.55	0.5	0.827
Non- tested	44	64	Reff			
Formula						
HIV +	25	3	1.64	0.42 6 7.00	0.24	0.577
NT	17	25	Reff			
Breast milk						
HIV +	22	5	5.19	1.716 16.81	9.84	0.002
NT	50	66	Reff			
Cow milk						
HIV +	24	4	Reff			
NT	156	1	26	2.55-638.18	12.04	0.002
Goat Milk						
HIV +	1	27	Reff			
NT	30	116	6.98	0.95-143.5	3.54	0.060
Dried milk						
HIV +	27	1	12.09	1.66-246.74	7.64	0.006
NT	96	43	Reff			

In Table 4.16 an analysis was done to get significant differences in maternal infant Feeding (complementary feeds) among the non- tested and HIV positive mothers. Significant differences were found in fruit 0.017 and meat and fish 0.003.

Table 4.16 Complementary foods given to children born to HIV positive and non tested mothers

Complementary food	Non tested mothers		HIV Positive mothers		Odds Ratio	95% CI for O.R	χ^2	Value
	N	%	N	%				
Cow milk	89	56.3	19	68.8	0.61	(0.24 - 1.54)	1.29	0.256
Porridge	62	39.2	14	50.0	0.65	(0.27 ó 1.55)	1.13	0.287
Herbal	63	39.2	6	20.0	2.32	(0.83 ó 6.84)	3.06	0.080
Fruits	48	30.5	15	52.5	0.38	(0.15 ó 0.92)	5.68	0.017
Mashed matoke	80	50.2	13	49.5	1.18	(0.49 ó 2.85)	0.17	0.683
Legumes	82	52.2	15	50.2	0.94	(0.39 ó 2.24)	0.03	0.871
Cereal	95	60.2	16	55.4	1.13	(0.46 ó 2.74)	0.09	0.767
Vegetables	92	58.2	16	55.4	1.05	(0.43 ó 2.53)	0.01	0.915
Foods from roots tube	64	40.5	10	35.5	1.23	(0.50 ó 3.07)	0.23	0.634
Meat/fish	32	20.5	13	48.5	0.29	(0.12 ó 1.61)	8.84	0.003
Eggs	80	50.2	17	60.2	0.66	(0.27 ó 1.61)	0.96	0.326
Formula	3	2.2	2	6.3	0.25	(0.03 ó 2.28)	2.49	0.115

In Table 4.17 an analysis of the children's Morbidity Patterns was done to find out the significant differences in morbidity patterns of children born to HIV Positive mothers and the non tested mothers. There were significant differences in Anaemia $p= 0.009$, and pneumonia <0.001 .

Table 4.17 Morbidity patterns of the children

	Yes N	No n	Or	95% CI of OR	χ^2	P value
Cough						
HIV +	5	23	Ref	0.90-8.50	2.78	0.054
NT	58	100	2.67			
Fever						
HIV +	87	23	Ref	0.5-4.32	0.57	0.449
NT	51	107	1.57			
Diarrhea						
HIV +	4	24	Ref	0.78-9.18	2.13	0.144
NT	47	111	2.54			
Running Nose						
HIV +	5	23	Ref	0.35-3.54	0.01	0.903
NT	30	128	1.08			
Anaemia						
HIV +	16	12	3.15	1.29-7.76	6.79	0.009
NT	47	111	Ref			
Pneumonia						
HIV +	18	10	93	20.70-	80.31	<0.001
NT	3	155	Ref	485.28		
Measles						
HIV +	1	27	2.89	<0.01	6	0.01
NT	2	156	Ref	42.84		0.389

CHAPTER 5

5.0 DISCUSSION

5.1 INTRODUCTION

The present investigation made emphasis on the infant feeding Practices and alternatives; morbidity patterns; and factors that affect nutritional status of children among them the socio- economic and demographic factors. Therefore it generated data on infant feeding practices and alternatives available for infants born to HIV positive mothers. It also generated data on the morbidity patterns, socioeconomic parameters and nutritional status of the children hence providing baseline information for future research needs.

The findings of this study revealed that there were significant differences ($P < 0.05$) in the infant feeding alternatives opted by the HIV positive mothers from their non-tested counter parts in relation to the following: Wet nursing; Breast milk; Cow milk and dried milk powder.

It was evident that due to a higher MTCT knowledge level index of the HIV positive mothers they were more willing to opt for more options than the non-tested counterparts. This also could be explained by the fact that the HIV Positive mothers had received more support in counseling in PMTCT and infant feeding; hence they were more likely to make informed choices. Hence the null hypothesis given earlier in this study that there exists no difference in the feeding alternatives of children born to HIV positive mothers of those from their non-tested counterparts is therefore partially rejected.

The findings in this study also revealed that there were significant differences in the feeding practices of those mothers who have HIV from those of the non-tested mothers. This is as regards the different complementary foods given to the child: Fruits, Meat, and eggs/pulses. Hence the null hypothesis given earlier in this study that there exists no difference in the feeding practices of children of the non-tested mothers from those children of HIV positive mothers is therefore also partially rejected.

The study also revealed that exclusive breastfeeding as a feeding practice was the dietary factor that associated significantly with the risk of malnutrition. Therefore the second

hypothesis given in this study that "the relationship between infant feeding practices and nutritional status of children aged 0 - 24 months is not significant", is also partially rejected.

With regards to the morbidity patterns there were significant differences between morbidity of children of the non-tested mothers from those from the HIV positive mothers. With respect to anaemia and pneumonia ; more children born to HIV positive mothers presented with anaemia and pneumonia than from the children born to the non-tested mothers. Hence the hypothesis given earlier in this study that "there is no difference in the morbidity patterns of children born to HIV positive mothers from their non-tested counterparts" is also therefore partially rejected.

The findings of the study also revealed that the age of the index child and mothers marital status were the only socio-economic and demographic characteristics significantly $p < 0.05$ associated with the nutritional status of the child that is wasting and underweight status respectively.

Similarly among the variables of health and health related (environmental) factors that were included in this study, Immunization status of the child was found to be significantly associated with risk of malnutrition, that is the risk of being underweight.

It is however to be noted that most of the dietary factors showed trends of association with nutritional status of the child however since these associations were not statistically significant hence they disappeared in the regression model.

5.2 DISCUSSION

5.2.1 Dietary Factors/ Infant Feeding Practices

Infant feeding practices constitutes a major component of child caring practices a part from socio-cultural, economic and demographic factors (Kumar et al, 2006). Feeding practices play a pivotal role in determining optimal development of infants. Poor breastfeeding and infant feeding practices have adverse consequences on the mental and physical development of the child. Women delivering at home or in health centers are encouraged to initiate breastfeeding ideally within the first 30 minutes after birth, except for a HIV-positive mother who has chosen not to breastfeed (MOH 2003). From this

study the children who had been breastfed were at 85.4% this is slightly lower than the national level at 97% (KDHS 2003). From this study overall 46.2% of the children had breastfed within the ideal time set; this is lower than the national level of 52%.

In the province according to past survey 73.1% of the children received pre-lacteal feeds before initiation of breast feeding. This same picture is reflected in the study where more than half of the children had received pre-lacteal feeds. These feeds are believed to cleanse the infant's stomach from black stool, and that they help to heal colic pains. The extent to which pre-lacteal feeds is generally responsible for malnutrition is not well known and hence requires further investigation, however it was clear that it shows a negative trend to nutritional status of a child (Singh et al, 1997) due to the fact that it delays initial breastfeeding and reduces the amount of breast milk consumed.

This study showed that the choice of exclusive breastfeeding as a feeding option had a significant association with a child's nutritional status, that is the risk of being underweight. The child who is not exclusively breastfed is 33.6 more likely to be malnourished compared to those exclusively breastfed for the recommended period of 6 months. Even if there was no significant association noted, the other factors which seemed to play a role in infant feeding include ; frequency of feeding and duration of breastfeeding. International guidelines on infant and young child feeding ,recommends breastfeeding up to and beyond 2 years, (Patio; WHO, Linkage 2004). This study showed that 69.7% of the mothers reported they would breastfeed till 1 - 2 years. Studies showed that the length of breastfeeding is affected by mother's working status (Pascale et al., 2007). In this study children born to mothers in formal employment (26.4%) were less malnourished than those whose mothers were in informal employment (52.2%)

5.2.2 Complementary Feeding Practices

Among rural communities in developing countries home made foods are likely to be composed of locally grown products, the choice of infant foods given is however limited by the ability to mix foods into nutritional combinations. (Yasmeen et al, 2006). Early introduction of complementary foods in the study population was also noted in this study whereby more than half 56.3% of the children were fed at 1-3 months, cow milk was reported as the main complementary food given. However this cow milk was added water

for dilation but not sugar or micro-nutrients. The others were uji made from wimbi flour and mashed bananas.

According to the (KDHS, 2003) 54% of the children under six months receive solid or semi solid food which are cereals based, whereby the protein rich foods were introduced by a much smaller percentage 8%. This probably explains why children end up being wasted and stunted in the long run. Breast milk alone is sufficient for a baby up to 6 months whereby breastfeeding is still continued but more nutrition food is introduced. Early introduction of food/ fluids is discouraged because it does not increase caloric intake and only displaces milk from the diet (Cohen et al., 1999). There is also a likelihood of contamination and a child's digestive system is not mature enough to handle bulky foods. Early complementation is attributed to the 'insufficient milk' syndrome this is a perception by mothers due to delayed onset of breast milk or crying of babies in early infancy which is usually due to other related problems and not hunger.

This study showed that there were significant differences in the complementary foods given to the children by the HIV positive mother in comparison to the non-tested mothers; Fruits, meat, eggs, and pulses. The HIV positive mothers fed their children with more food groups especially protein and vitamins. This is due to the many sessions of counseling conducted to teach them on infant feeding and PMTCT. HIV positive mothers have also formed support groups with kitchen gardens for food security. The HIV positive mothers also keep chicken in groups for meat and eggs hence their children are fed on them.

5.2.3 Infant Feeding Alternatives

Majority of the mothers (98.6%) mentioned cow milk as the option for feeding an infant. This was followed by commercial formula 80.1% and dried milk powder 60.6%. However goat milk was the least popular (19.2%) and wet nursing (26.8%). (Thairu, 2000) reported that more than 90% of the mothers interviewed would consider cow milk, since it was regarded as being the most feasible milk choice due to affordability, social acceptability however the knowledge on cow milk dilution and fortification was very poor.

The idea of a wet nurse was also not acceptable because most FGDs reported that mothers did not opt for it because it is believed that others would bewitch their children or pass on diseases and ill-luck. The idea of expressing and heat treating breast milk to most sounded strange and unacceptable for they claimed human milk was so volatile it would all evaporate (Thawn et al., 2000) got similar results.

A good number (80.1%) said formula was good in a sense that formula fed children seemed to look big and healthy although they decried the prices. Similar results were reported by (Nduati et al., 2000). The alternatives did not differ much among HIV positive mothers except that they were willing to opt for more conventional alternatives like wet nursing and dried milk powder. There is a need to balance the nutritional and other benefits of breast feeding with the risk of transmitting HIV to their infants. HIV positive mothers are to choose between exclusive breastfeeding and replacement feeding commercial formula or home modified milk and other breast milk options (heat treated breast milk and wet nursing or donor's milk from a milk bank (WHO, UNICEF 2004).

When replacement feeding is Acceptable, Feasible, Affordable, Sustainable and Safe (AFASS), HIV infected mothers should avoid breastfeeding completely and choose a suitable replacement feed. From this study an analysis of AFASS on the infant feeding option showed that 20% of the mothers viewed their infant feeding option as not fulfilling the AFASS criteria, 80% of them claimed that it was fulfilled. It was interesting to note that the HIV positive mothers were more receptive to more conventional alternatives than their non tested counterparts.

5.2.4 Child Health and Health Related Factors

The major illnesses of concern that featured most among the children were cough 37%, fever 32%, diarrhea 30% and anemia 30%. These are being endemic for malaria, the major manifestation of malaria is fever which ranked second. A child with diseases like diarrhea loses weight and can quickly become malnourished (UNICEF et al 2002). It is therefore important to improve on water, hygiene and sanitation education. The provincial fever prevalence was ranked at 48% slightly higher than the percentage in this study (32%).

Immunization status of the child had a significant association with the child's nutritional status $P=0.008$. The child who had not received any immunization had a higher chance of becoming malnourished than the one that had completed immunization.

It is noted in this study that during most surveys when the Kenya demographic health survey the target group chosen is normally between 12 - 23 months hence there is no data available for those children with no vaccinations below this age.

In this study it was apparent that (25.6%) of the children had never received any vaccination at all. The other health and sanitation factors which had an influence on the nutritional status of the children included main water sources; water treatment; presence of a latrine, these factors had associations which were not however statistically significant.

Family planning services utilization was very poor (49.2%) being none users. This compares to the low usage reflected in the province at 25% (KDHS 2003). This suggests a need for more efforts of sensitization and awareness on family planning and benefits of child spacing as relates to the nutrition status of children.

In the ($n = 28$) children born to HIV sero positive mothers it was observed that vitamin A supplementation had been given to only (27%) of them, this percentage was slightly higher than the supplementation level in the province (26.5%). The HIV prevalence in Kisii district was at 6.6%, being part of Nyanza province which has the highest at 15% (KDHS 2003). It was also noted that only 12% of this sub-group ($n = 28$) had no immunization given at all. According to the world summit of children's goals and national plan of action 1994, the target was to virtually eliminate VAD disorders by 2000 (CBS, UNICEF 2003). VAD can cause eye damage and increase the severity of infections such as measles and diarrheal diseases in children. (KDHS 2003). Therefore ensuring that children receive adequate intake is the single most effective child survival intervention.

5.2.5 Nutritional Status of the Children

The findings of the study revealed that the age of the index child and mothers marital status were the only socio-economic and demographic characteristics significantly associated with the nutritional status of the child; that is wasting and underweight status respectively. The study also revealed that exclusive breastfeeding as a

feeding option was the dietary factor that associated significantly with the risk of malnutrition; that is risk for being underweight.

Similarly among the variables of health and health related (environmental) factors that were included in this study, Immunization status of the child was found to be significantly associated with risk of malnutrition; that is the risk of being underweight.

It is however to be noted that most of the dietary factors showed trends of association with nutritional status of the child however these associations were not statistically significant. The growth patterns of healthy and well fed children are reflected in positive changes in their height and weight. Monitoring of nutrition indicators will provide information on the progress made in achieving Millennium Development Goals (MDG) as well as targets set in the economic recovery strategy (Ministry of Planning and National Development, 2003).

5.2.5.1 Stunting

Stunting that is height-for-age is a measure of linear growth; it is a measure of chronic malnutrition. Stunting is a condition reflecting the cumulative effect of chronic malnutrition; it reflects failure to receive adequate nutrition over a long period of time and may be caused by recurrent and chronic illness. Height for age does not vary appreciably according to season of data collection.

At the National level 11% of the children under five are severely stunted $< - 3$ SD. In this case the highest stunting levels are among children aged 12-23 months (16%) and those less than 6 months have the lowest at 1% (KDHS 2003). This study also shows that **23.4%** of the children are **stunted**: 9.9% of the children were severely stunted, and 13.5% moderately stunted. In Nyanza province however more children were either severely or moderately stunted at 7.9% severe stunting and 31.1% moderately stunted.

5.2.5.2 Wasting:

Weight - for - height measures body mass in relation to body length and describes current nutritional status. Wasting represents the failure to receive adequate nutrition in the period immediately preceding the study. This may be a result of inadequate food intake or recent episodes of illness causing loss of weight. Prevalence of wasting may vary

considerably by season. Nationally 6% of the children are wasted, the proportion of those severely wasted < - 3sd being 1%. In this study **4.6%** of the children are **wasted**: 3.8% of the children were moderately wasted <-2SD while 0.8% of them were severely wasted < - 3SD.

Women with little or no education had high levels of wasted and severely wasted children 15% and 4% respectively (KDHS 2003). In this study education level of mother also reflected an association whereby those women with higher than secondary education had a proportion of wasted children at 32.9% whereby their counterparts with lower education levels had those children who are wasted at 44.3%.

5.2.5.3 Underweight

Weight-for-age is a composite index of height-for-age and weight-for-height and thus does not distinguish between acute malnutrition (wasting) and chronic malnutrition (stunting). It is a useful tool in clinical setting for continuous assessment of nutritional progress and growth. In Nyanza Province underweight children were at 15.6%. In this study **10.7%** of the children were **underweight**.

In the children born to HIV positive mothers, the nutritional status parameters revealed vital trends that require urgent further research. It was not possible to get a sample big enough sample of the HIV positive mothers, due to confidentiality and matters of informed consent. The data showed that those children who were stunted or had low height - for - age were at 49.3% using the WHO classification of prevalence severity $\times 40$ is the highest. The data also showed that those children show weight - for - age were at 39.9% higher than the WHO 15% mark. This data clearly indicates that these children born to HIV positive mothers were wasted and stunted in large numbers. However this trends in children born to HIV positive mothers in past studies indicate that almost 50% of these children are stunted or wasted or have failure to thrive.

5.2.6 Demographic and Socio-Economic Factors

Age and sex are important demographic variables and are the primary basis of demographic classification in surveys (NBS, 2005). The result of the present study indicated the index child's age and marital status of the mothers are the demographic determinants of a child's nutritional status. The study clearly indicated that even if there

was no statistically significant association of the child's nutritional status with the mother's economic status there was a trend indicating that most of the wasted children belonged to those mothers with an annual gross income of Kshs. 30,000 or an equivalent monthly salary of less than Kshs. 2,500.

There was also a trend indicating that the mother whose education level was below secondary school level tended to have more children malnourished(44.3%), than the mothers with higher than secondary school education(32.9%), though this difference was not statistically significant.

The marital status of the mother had a statistically significant association with the child's nutritional status: that is wasting and underweight status respectively. The children born to single, divorced, or widowed mothers, had a higher likelihood of being malnourished than those born to their married counterparts. Despite the limitation in the number of children majority or 40% of the malnourished children were taken care by either, separated divorces or widowed guardians.

This study also showed that the age of the index child associated significantly with the nutritional status of child: that is wasting and underweight status respectively. It was noted that, a child aged above six months was **21.9** times more likely to be malnourished than those aged 6months and below. When binary logistic regression was performed on some variables, Age was found to be a predictor variable if a child was likely to be malnourished or not.

This study implies that the older the child the more they are at risk of being malnourished. According to the findings of this study the female children were more malnourished (40.2%) compared to the male children who were malnourished at 38.9%, this difference was however minimal. Few studies showed boys are more malnourished than girls (Luboya, 2002). A study in the Gaza Strip on the other hand revealed no gender difference in nutritional status between boys and girls (Shoen Bawn et al., 1995). Therefore ensuring that children receive adequate intake is the single most effective child survival intervention.

5.2.7 Maternal Knowledge on MTCT of HIV

Almost all mothers in Nyanza (99.9%) had heard of HIV/AIDS; however knowledge on MTCT had not been documented (KDHS 2003). Data from this study shows that most respondents (92.4%) knew HIV/AIDS as a killer disease with no known cure. However this study shows clearly that knowledge on MTCT was very poor at 19.6% in the non-tested mothers and only slightly better in the HIV positive sub-group at 39.3%.

It was clear that the HIV positive sub-groups were more receptive to feeding alternatives and their MTCT knowledge was higher. This was due to the counseling and support they had received from health workers. Regarding timing of HIV transmission, 40.6% reported it could occur during pregnancy, however a slightly larger population of mothers at 41.3% said it was not possible. More awareness programmes on prevention of mother to child transmission of HIV are encouraged for further sensitization and

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION:

1). Though most children had been breast fed, exclusive breast feeding was very low and supplementary feeding commenced within the first 2-3 months. Pre-lacteal feeding with specifically cow milk and herbal extracts was rampant.

2). There exist significant differences between the use of alternatives by the non-tested mothers from the HIV positive mothers with respect to breast milk, cow milk, and dried milk powder. The HIV positive mothers were more receptive to use more varieties of options than the non tested ones due to the fact that the HIV positive mothers had received counseling support services offered by health workers and peers. The HIV positive mothers fed their children with more protein, (meat, pulses, fish) and fruits than their non-tested counterparts.

3) Cow milk was the most popular alternative to breast milk in both groups of mothers.

4) The nutritional status especially in regards to stunting and underweight was significantly poorer among children from HIV positive mothers than the children from the non tested ones.

5) Morbidity specifically in regards to anaemia and pneumonia also followed a similar trend of being significantly more prevalent among the children of HIV positive mothers than in the children from the non tested ones.

6.2 RECOMMENDATIONS:

- 1) Due to the importance of PMTCT and Nutrition counseling in the decision making process of the mother, this knowledge should be availed to the general public for more improved health and nutrition outcomes.
- 2) Infant and young child feeding guidelines should be locally adopted to ensure that mothers receive the much needed knowledge on the importance of exclusive breastfeeding and how to feed infants especially those in difficult circumstances like HIV positive mothers.
- 3) The government and other related agencies should step up efforts and campaigns in ensuring that the immunization process is taken up seriously due to its importance in promoting the health and nutrition status of the children.
- 4) Given that cow milk is a popular breast milk alternative, the mothers who opt to use it should be guided on how to prepare it in order to meet the hygiene and nutritional requirement of the child.
- 5) The government should step up efforts to sensitize mothers on the importance of family planning in the promotion of health and nutrition outcome of children.
- 6) Children born to HIV positive mothers constitute a special group with unique needs hence longitudinal comprehensive studies should be done with participation by the affected parties in order to create programmes that address directly the needs of this group.

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APPENDICES

QUESTIONNAIRE

KAP SURVEY ON FEEDING PRACTICES AND INFANT FEEDING OPTIONS FOR HIV POSITIVE MOTHERS IN KISII DISTRICT (JULY – SEPTEMBER 2006).

Introduction

This questionnaire is designed to obtain information from you regarding the prevailing Infant Feeding practices, Mother to Child Transmission of HIV and Infant Feeding options available for HIV positive mothers. The results of this study, will be used by the researcher (student) from University of Nairobi to write her M.Sc. thesis. The results will also be useful in designing appropriate interventions aimed at reducing vertical transmission of HIV. This information will be treated with the confidentiality that it deserves and will not be used for any purpose other than those outlined here. Your participation in this survey will be of great value to the researcher and we appreciate your co-operation.

Instructions

The questionnaire is set up in six (6) sections. Please answer all questions in all the sections by CIRCLING the response you find most appropriate. Some sections will have their own set of instructions. Please follow these carefully.

1. Division: _____ Location: _____ Sub-location: _____

Village: _____ Household No. _____ Size Household: _____

2. Name of Interviewer: _____ Date of Interview: ____/____/2006

3. Respondent's Name: _____ Sex: _____ (1 = Male 2= Female).

5. Name of Household Head: _____ Sex _____ (1 Male 2 = Female).

2 Socioeconomic Information

2. Record the following information about the mother.

Mother's Name: _____ Age: _____

Marital status of the mother: _____ 1 = Married monogamous,
2 = married polygamous, 3 = Single, 4 = Separated/ Divorced, 5 = Widowed.

Highest Education attained: _____ 1 = No formal education, 2 =
Primary school, 3 = secondary school, 4 = Technical/ polytechnic, 5 = college/
University.

Denomination: _____ 1 = Catholic, 2 = SDA, 3 = Protestants, 4 = Muslim,
5 = Traditional

Child's name: _____ Sex: _____ 1 = Male, 2 = Female

Age (in months): _____ Birth order: _____ Number of children alive: _____

What are the family's sources of income (circle the sources mentioned and put a star on
the main one)?

1 = Housewife, 2 = Farming, 3 = Business, 4 = Salaried, 5 = Casual labour, 6 = Artisan

Estimate the mother's annual income from the various sources

1 = Less than Kshs. 12000, 2 = Kshs. 2000-24999, 3 = Kshs. 25000- 60000, 4 = Above
Kshs. 60000

B. Food Security

7. How many meals do you normally eat per day (circle one only for both)

7.1 Rainy season (pre-harvest) 1 = One 2 = Two 3 = Three

7.2 Dry Season (post harvest) 1 = One 2 = Two 3 = Three

8. Do you have land for cultivation?

9. Who owns or controls the land (use)? 1= Husband 2=Wife 3= Family

4= community/ group 5= Father- in ólaw other, specify _____

11. Does your crop produce last to the next harvest season? 1= yes 2= No

12. [If No in question 11], What is the main reason?

1= Rainfall failure 2= Pests attack 3= Poor soil 4= Little land 5= Hails/
Floods 6 = Insufficient labour force 7 = Weeds Other, Specify _____

13. And (if no in question 11) how do you obtain food before the next harvest?

1= Government provision 2= Food for work activities 3= NGO food/ charity e.g
church/ mosque 4 = Casual work 5= Remittances (from relatives and children)
6= purchasing 7= Grow drought- escaping crops.

14. Who makes decisions about day-to-day food use in this household?

1= Husband 2= Wife 3= Both 4= Mother-in- law Other, specify _____

15. Who decides when to use stored food? 1= Husband 2= Wife 3= Both

4= Mother ó in- law 5= Co-wife Other, specify _____

16. What is your major source of fuel for food preparation?

1= Gas 2= Electricity 3= Firewood 4= Charcoal 5= Paraffin

17. How affordable is the source of fuel in your opinion?

1 = Cheap 2= Expensive 3 = Moderate/ Affordable

20. Who owns the livestock?

1 = the family 2= Husband 3= Wife 4= Father- in- law Other, specify

22 How much milk per day do you get from your animals (Cows / Goats)?

1= None 2= 0.5- 1 litre 3= 1.5- 2 litres 4= 2- 5 litres 5= more than 5 litres

C: Breastfeeding

23. Is the infant breastfed? 1= Yes 2= No

24. If yes, how often per day (24hours)?

1= on demand 2= Every 3 hours 3= 4 times or less 4= 5- 7 times 5= at least 8 times

25. Do you breastfeed during the night? 1= Yes 2= No

26. Does the child take any other fluids or foods? (if below 6 months of age) 1= Yes 2= No (If No, or if Child is above 6 months, skip to No. 29).

27. If yes, which one(s)? 1= Warm water 2= Uji 3= Animal milk 4= Formula feed
5= Mashed food/ soup 6= Gripe water 7= Concoction 8= Glucose solution

9= Fruit juice other, specify _____

28. And if yes in 26, why? 1= Perceived insufficient milk 2= Onset of another pregnancy
3= Being away from the child 4= Accustom the baby early to other foods other, specify _____

29. After how long did you introduce the child to breast milk on delivery?

1= within the first hour 2= 2-6 hours 3= 7-24 hours 4= after 24 hours 5= don't know.

30. How often do you stay together (in the same room) with you new born baby?

1= All the time 2= Most of the time 3= only when breastfeeding 4= Least of the time / Rarely _____

(If child is first born, skip to No. 33)

31. At what age do you discontinue breastfeeding?

1= less than 1 month 2= 1-3 months 3= 4-6 months 4= 7-11 months

5= 1-2 years 6= for more than 2 years.

32. How do (did) you discontinue the child from breastfeeding?

1= Bittering the breast 2= Staying away 3= Persistent withholding 4= self refusal by child 5= Onset of another pregnancy or baby other, specify_____

D: Complementary/ Alternative Infant Feeding

33. At what age do (did) you introduce foods to the baby?

1= at birth 2= 1-3 months 3= 4-6 months 4= after 6 months

34. At what age do you feel these complementary feeds should be introduced?

1= Below 1 month 2= 1-3 months 3= 4- 6 months 4= 6 months- 1 year

5= 1- 2 years 6= after 2 years

35. What did the child eat yesterday? (The interviewer should note if anything other than breast milk was given except vitamin drops and medicine. If the child was not given anything else, skip to No. 48).

1= water 2= cow milk 3= Goat milk 4= formula 5= Cerelac 6= Ugali/ fluidy vegetables 7= porridge 8= fruit juice 9= cooked mashed food/ fish 10= soup

36. How many times was the child fed (in the last 24 hours)?

1= 3 times 2= 4-7 times 3= 8 times or more.

37. How is the main complementary food obtained?

1= Own produce 2= Bought 3= Donated 4= some bought/ produced

38. Did you actively encourage the child to eat? 1= yes 2= No

39. If yes, what is it that you did?

1= Sat with the child 2= Gave foods liked by the child 3= soothed the child
4= Sweetens food 5= Forces by palm/ Hand feeding

40. Does the child's feeding change during illness? 1= yes 2= No

41. If yes, how? 1= eats less 2= eats more 3= discriminates food 4=
only breastfeeds.

42. Do you encourage the child to eat during or after illness? 1= yes 2= No

43. What do you use to feed the child?

44. 1= cup/ mug 2= spoon 3= Bottle 4= Calabash 5= Glass 6=
Dish/ bowl Other, specify _____

45. Where do you take the food left over by the child? 1= Keep for next serving
2= Give to sibling or eat 3= Discard Other, specify _____

46. Who feeds the child? 1= Mother 2= Father 3= Sibling 4= House help
5= Grandparent Other, specify _____

47. Who decides on what types and quantities of food to give the baby? 1= Mother
2= Father 3= Both 4= House help 5= Grandparent
Other, specify _____

E. KAP on mother – to child Transmission of HIV

48. Can children have HIV/AIDS? 1= Yes 2= No 3= Don't know

49. Can HIV positive mother transmit the virus to the baby?

1= Yes 2= No 3= don't know

50. Do you think that HIV can be transmitted from mother- to a child:

50.1 During pregnancy? 1= Yes 2= No 3= don't know

50.2 During delivery? 1= Yes 2= No 3= don't know

50.3 Through breastfeeding? 1= Yes 2= No 3= don't know

51. Is mother to child transmission of HIV preventable 1= Yes, 2= No, 3= Don't know

52. Is there any cure for HIV/AIDS? 1= Yes 2= No 3= Don't know

53. If by any bad luck, a mother of an infant dies, is too ill or is incapacitated in any way to feed the baby, how is such a child fed? 1= Surrogate breastfeeding 2= Infant formula feeding 3= animal milk 4= child nursery other, specify _____

54. List the different alternatives to breast milk that are used to feed such an infant.

55. Would you accept to wet-nurse an infant whose mother has been incapacitated in any way? 1=yes 2=No

56. Would you consider the following as alternative feed to such a child?

56.1 Surrogate breastfeeding? 1= Yes 2= No 3= don't know

56.2 Expressed and heat treated Breast milk 1= Yes 2= No 3= don't know

56.3 Commercial infant formula? 1= Yes 2= No 3= don't know

56.4 Breast milk from milk bank? 1= Yes 2= No 3= don't know

56.5 Cow's milk? 1= Yes 2= No 3= don't know

56.6 Goat's milk? 1= Yes 2= No 3= don't know

56.7 Dried milk powder? 1= Yes 2= No 3= don't know

57. Why would you prefer any of these alternatives and not the other?

58. Are there women who do not breastfeed their infants?

1= Yes 2= No 3= don't know

59. How would you view a woman who opts for one reason or another, not to breastfeed her baby? 1= Rejection 2= Apathy 3= Indifference 4= Isolation 5= Don't know other, specify _____

F. Health Services and Morbidity Patterns

60. Has the child had any of the following illnesses in the past 2 weeks?

60.1 Cough or difficulty in breathing? (e.g. blocked nose) 1= Yes 2= No

60.2 Fever 1= Yes 2= No

60.3 Diarrhea 1= Yes 2= No

60.4 Running nose 1= Yes 2= No

60.5 Helminthes 1= Yes 2= No

60.6 Measles 1= Yes 2= No

60.7 Pneumonia 1= Yes 2= No

61. If the child got ill where did he/she get treated? 1= at home 2= at the health facility 3= prayers only 4= traditional doctor 3= Quacks

62. How far is the existing health facility from your residence (Home)?

1= 1-2km 2= 3-6 km 3= 7-12km 4= more than 12km

63. Do you (the mother) have difficulty seeing at night or dawn? 1= Yes 2= No

64. Where was the child delivered? 1= At a health facility 2= Under a TBA
3= At home 4= On the way to hospital.
65. What was the nature of delivery? 1= normal 2= Caesarian 3= Mild operation
4= Normal but with difficulty
66. What was the child's weight at birth? (Confirm from the growth- monitoring chart)
1= less than 2.5kg 2= 2.5 ó 3.0 kg 3= 3.1 ó 3.5 kg 4= 3.6- 4kg
5= more than 4kg. 6= Not known.
67. Did you have complaints of feeding breathless/ tired so often during your pregnancy?
1= Yes 2= No
68. Is the child taken to the clinics for postnatal care (monthly) as required?
1= Yes 2= No 3= Not taken yet
69. What is the immunization status of the infant? (Confirm from the card).
1= completed 2= Not at all 3= partly 4= below 9 months 5= Not yet
70. Have you received counseling/ lectures from the clinic during your visits on the following topics/ issues?
- | | | |
|---|--------|-------|
| 70.1 Breastfeeding | 1= Yes | 2= No |
| 70.2 Infant weaning (Complementary feeding) | 1= Yes | 2= No |
| 70.3 Breastfeeding alternatives | 1= Yes | 2= No |
| 70.4 Maternal Nutrition | 1= Yes | 2= No |
| 70.5 Prevention of HIV/ STDs including MTCT | 1= Yes | 2= No |
| 70.6 Hygiene at home | 1= Yes | 2= No |

71. What is the main source of water for your household? 1= River/ stream

2= well 3= Dams 4= Tap/ piped 5= Borehole 6= spring

6= spring 7= Rain water

72. How far is the source of water from your household and how long do you take to reach it? _____ Km _____ minutes

73. How do you purify your water before drinking?

1= Boiling 2= Filtering 3= Sedimentation 4= chlorinating

5= Nothing at all other(s), specify _____

74. Do you have a latrine for your homestead? 1= Yes 2= No

75. Do you wash your hands after visiting the latrine?

1= Yes 2= No 3= sometimes

76. Do you wash hands before handling food?

1= Yes 2= No 3= sometimes

77. Where do you dispose your refuse?

1= Composite pit 2= Cowshed 3= Bury 4= Burn 5= Garden

Other, specify _____

78. Methods of family planning used: 1= natural 2= Condoms 3= IUD (e.g. coils/ foam tablets) 4= Vasectomy 5= pills 6= tube ligation

7= Depo-Provera (DEP) injection 8= none.

APPENDIX 2

OBSERVATION STUDY GUIDE

OBSERVATIONAL STUDY ON FEEDING PRACTICES AND INFANT FEEDING OPTIONS FOR HIV POSITIVE (SUB-GROUP) MOTHERS IN KISHI DISTRICT (JULY-SEPTEMBER 2006).

In a follow up to their homes (residences), observe and /or ask and then record all the following information about the selected HIV positive mothers.

Socioeconomic Profile.

1. Division: _____ Location: _____ Sub- Location: _____

Village: _____ Code No. _____

Date of Interview: ____/____/2006

Mother's Initials: _____ Age of Mother (Years) _____

Sex of child: _____ (1= male 2= female) Age of the child (months) _____

Birth order _____ Alive: _____

Sex of Household Head: _____ (1= male 2= Female)

Marital status of mother: _____ (1 = married monogamous 2= married polygamous 3= single 4= Separated/ Divorced 5= widowed)

Highest Education attained: _____ (1= No formal education 2= primary school 3= secondary school 4= Technical/ polytechnic 5 = college/ University)

Denomination: _____ (1= Catholic 2= SDA 3= Protestant 4= Muslim 5= Traditional)

2. What are the family's sources of income? (put star on the main one)

1= Housewife 2= Farming 3=Business 4= Salaried 5= Casual labour

6= Artisan 7= Fishing

3. Estimate the mother's annual income from the various sources

1= less than Kshs. 12,000 2= Kshs. 12000 ó 24999 3= Kshs. 25 000 - 60 000

4= Above Kshs. 60 000

4. Check or ask and record for the following

Item	Check (tick if available)
Radio	
Refuse pit	
Dish rack	
Hang line	
Latrine	
Kitchen	
Bathroom	
Granary/ store	

5. How many meals does the family take per day? 1= 2 or less 2= 3 meals 4= 4 or more

6. Does your crop produce last to the next harvest season? 1= yes 2= No

(If yes, skip to No. 9)

7. [If No question 6], What is the main reason?

1= Rainfall failure 2= Pest attack 3= Poor soil 4= Little land 5= Hails/ Floods

6= Insufficient labour force Other, specify _____

8. And (If No in question 6) how do you obtain food before the next harvest?

1= Government provision 2= Food for work activities 3= NGO food/ charity
e.g church/ mosque 4 = Casual work 5= Remittances (from relatives and
children) 6= purchasing 7= Grow drought- escaping crops.

9. Who makes decisions on the following:

9.1 Day to day food use in the household? 1= Husband 2=Woman 3= Both

9.2 Use of stored food? 1= Husband 2=Woman 3= Both

9.3 How to use the available income? 1= Husband 2=Woman 3= Both

9.4 Types and quantities of food to give to the baby? 1= Husband 2=Woman 3= Both

9.5 Health service to seek for the baby? 1= Husband 2=Woman 3= Both

9.6 When to have the next child? 1= Husband 2=Woman 3= Both

9.7 Which family method to use? 1= Husband 2=Woman 3= Both

10. What is the family's major source of fuel (energy) for food preparation?

1= Gas 2= Electricity 3= Firewood 4= Charcoal 5= Paraffin

11. How affordable is this source of energy for the family?

1= Cheap 2= Expensive 3= Moderate/ Affordable

12. What type and how many of these animals/ livestock do you have (in the last 12 months)?

Livestock	Number
Cattle	
Goats	
Sheep	
Donkeys	
Pigs	
Poultry	

13. Who owns the livestock?

1= The family 2= Husband 3= wife 4= Father-in-law Other,
Specify_____

14. If own produce, how much milk per day do you get from your animals (Cows/
Goats)? 1= None 2= 0.5-1 litre 3= 1.5- 2 litres 4= 2-5 litres 5=
more than 5 litres

15. If bought, how much milk do you buy per day? 1= None 2= 0.5-1 litre 3=
1.5- 2 litres 4= 2-5 litres 5= more than 5 litres

Breastfeeding

16. Is he infant t breastfed exclusively? 1= yes 2= No

17. Why did you choose to breastfeed and not any other alternative?

18. How often is the child breastfed (in 24 hours)?

1= on demand 2= Every 3 hours 3= 4 times or less 4= 5-7 times 5= at
least 8 times

19. How often does the mother stay together (in the same room) with the baby?

1= all the time 2= Most of the time 3= Only when breastfeeding 4= Rarely/
least of the times Other, specify _____

20. Has the infant breastfed in the previous hour? 1= Yes 2= No

(Ask the mother to put her/him to the breast and observe the breastfeed for about 4
minutes)

21. Is the infant able to attach? (to check attachment, look for:

- Chin touching breast Yes _____ No _____
- Mouth wide open Yes _____ No _____
- Lower lip turned outward Yes _____ No _____
- More areola above than below the mouth Yes _____ No _____

1= No attachment at all 2= Not well attached 3= Good attachment

22. Is the infant suckling effectively (that is, slow deep sucks, sometimes pausing)?

1= No suckling 2= Not suckling effectively 3= Suckling effectively

23. Is there any thrush in the child's mouth? (Look for the thrush in the mouth by looking at the presence of ulcers and /or white patches) 1= Yes 2= No.

24. At what age do (will) you discontinue breastfeeding your child?

1= Less than 1 month 2= 1-3 months 3= 4-6 months 4= 7-11 months
5= 1-2 years 6 = for more than 2 years

Alternative Infant feeding

25. If the mother does not breastfeed, what is her infant feeding choice?

1= wet-nursing 2= Expressed breast milk 3= Animal milk
4= Commercial formula 5= uji

26. Why did the mother opt for this alternative and not the other?

27. Is the alternative feeding exclusive? 1= Yes 2= No

28. How is the food prepared (including dilution ratio)?

29. How many times is the child fed in a day (24 hours)?

1= 1-3 times 2= 4-7 times 3=8 times or more

30. How is this alternative food obtained?

1= own produce 2= Bought 3= Donated Other, specify _____

31. Does the mother actively encourage the child to eat? 1=Yes 2= No

(If No, skip to No. 33)

32. If yes, what is it that she does?

1= Sit with the child 2= Give foods liked by the child 3= Gives frequent small servings 4= Sweetens the feed 5= Forces by palm/ Hand.

33. What does the mother use to feed the child?

1= cup/mug 2= spoon 3= Bottle 4= Calabash 5= Glass 6= dish/ bowl 7= palm/ hand

34. Where does the mother take the food left over by the child? 1= Keep for next serving 2= Give to sibling or eat 3= Discard Other, specify _____

35. Does the mother boil the water to be used for making the child's food?

1= Yes 2= No

KAP on mother- to – child Transmission of HIV

36. Does the mother feel at ease discussing issues related to HIV/AIDS?

1= Yes 2= No

37. Does the mother think that HIV can be transmitted from the mother-to óchild:

37.1 During pregnancy? 1= Yes 2= No 3= Donøt know

37.2 During delivery ? 1= Yes 2= No 3= Donøt know

37.3 Through breastfeeding? 1= Yes 2= No 3= Donøt know

38. Does the mother believe MTCT of HIV is preventable 1= Yes 2= No

3= Donøt know

39. Is there any cure for HIV/ AIDS? 1= Yes 2= No 3= Donøt

know

40. Would the mother consider the following as alternative infant feed given her state?

40.1 Surrogate breastfeeding? 1= Yes 2= No 3= Donøt know

40.2 Expressed and Heat- treated Breast milk? 1= Yes 2= No 3= Donøt know

40.3 Commercial infant formula? 1= Yes 2= No 3= Donøt know

40.4 Breast milk from a milk bank? 1= Yes 2= No 3= Donøt know

40.5 Cowø milk? 1= Yes 2= No 3= Donøt know

40.6 Goatø milk? 1= Yes 2= No 3= donøt know

40.7 Dried milk powder? 1= Yes 2= No 3= donøt know

Health services and Morbidity patterns

41. Is the child having any of the following illnesses?

41.1 Cough or difficulty in breathing? (e.g blocked nose) 1= Yes 2= No

- 41.2 Fever/ malaria 1= Yes 2= No
- 41.3 Diarrhea 1= Yes 2= No
42. Where was the child delivered?
- 1= At a health facility 2= Under a TBA 3= At home
43. What was the nature of delivery? 1= Normal 2= Caesarian 3= Mild operation
4= normal but with difficulty
44. What was the child's weight at birth? (Confirm from the growth & monitoring chart).
- 1= less than 2.5kg 2= 2.5-3.0kg 3= 3.1 & 3.5kg 4=3.6-4kg 5=
more than 4kg 6= Not known.
45. Has the mother received counseling/ lectures from the clinic during her recent visits on the following topics/ issues?
- 45.1 Breast feeding 1= Yes 2= No
- 45.2 Infant weaning (complementary feeding) 1= Yes 2= No
- 45.3 Breast feeding alternatives 1= Yes 2= No
- 45.4 Maternal Nutrition 1= Yes 2= No
- 45.5 prevention of HIV/ STDs including MTCT 1= Yes 2= No
- 45.6 Hygiene at home 1= Yes 2= No
46. Did the mother (or the child) receive the following during her pregnancy or later after delivery?(This information can be confirmed from the clinic visited)
- 46.1 screening for anaemia 1= Yes 2= No
- 46.2 Iron and folate supplements 1= Yes 2= No
- 46.3 Malaria prophylaxis 1= Yes 2= No

46.4 Vitamin A supplements

1= Yes

2= No

47. What is the main source of water for the household?

1= river/ Stream 2= well 3= dams 4= Tap/piped 5= borehole

6= spring 7= rain water 8= Other(s) specify: _____

48. How does the family purify the water before drinking?

1= Boiling 2= Filtering 3= Sedimentation 4= Chlorinating

5= Decanting 6= Nothing at all

49. Does she wash her hands after visiting the latrine? 1= Yes 2= No 3= sometimes

50. Does she wash her hands before handling food? 1= Yes 2= No 3= sometimes

51. Where does the family dispose refuse?

1= composite pit 2= cowø's shed 3= Bury 4= Burn 5= Garden

6= along the fence 7= Throw away

52. Observe and record for the general cleanliness/ hygiene of

52.1 Mother _____ 1= clean 2= moderately clean 3= dirty

52.2 child _____ 1= clean 2= moderately clean 3= dirty

52.3 kitchen _____ 1= clean 2= moderately clean 3= dirty

52.4 home environment 1= clean 2= moderately clean 3= dirty

Index Child's Information

53. Name of the Index child (0-12 months of age)

54. Sex of index child 1= male 2 =female

55. Birth weight of index child (check health card)

Measurements

Anthropometrics

No	Measurements	1 st measurement	2 nd measurement	Average
	Length			
	Weight (kg)			
	Muac (cm)			

56. Oedema in both feet

1= Present

2= Absent

GUIDE FOR FOCUS GROUP DISCUSSION

1. Is the community aware that a child can be HIV positive?
2. How can a child contract HIV?
3. How common is HIV/ AIDS among the community? Which groups are most affected?
4. Do people in the community discuss freely about HIV/ AIDS?
5. How do close family members react when one of them is suspected to have died of AIDS?
6. In this community are there women who do not breastfeed their babies?
7. If a woman, for one reason or another decided not to breastfeed her infant, how would the community view her?
8. How did the community traditionally feed a child who was orphaned before the age of 4 months?
9. At present if a mother dies out of any illness and leaves her young baby, how is the child fed? What kind of foods are used? Are these foods easily accessible and/ or affordable? How is the food prepared? Who has the primary responsibility of preparing the food and feeding the child?

10. How many orphans do you know of around this village? How do you get food, clothing and school fees?
11. In the community are there foods that must or must not be eaten by pregnant women or young children? If there are which ones?
12. In the community do families send their children to stay away with relatives? If yes, for what reasons? How healthy or well fed are such children?
13. Can HIV/ AIDs be cured?
14. How can infants be prevented from contracting HIV/ AIDS?
15. Are there herbal medicine or concoctions used in the community for treatment of HIV/ AIDS? If yes, which ones?

APPENDIX 3

Study on feeding practices and infant feeding options for HIV positive(sub-group) mothers in Kisii District hospital (October November 2007)

This questionnaire is designed to obtain information from you regarding the prevailing infant feeding practices, mother to child transmission of HIV and infant feeding options available for HIV positive mothers.

The results of this study will be used by the researcher (student) from university of Nairobi to write her Msc. thesis.

The results will also be useful in designing appropriate interventions aimed at reducing vertical transmission of HIV. The information will be treated with the confidentiality it deserves and will not be used for any other purpose than the one outlined here. Your participation in this survey will be of great value to the researcher and we appreciate your co-operation.

(Observe /ask and then record all the following information about the selected HIV positive mothers.)

Socioeconomic profile:

1: District í í í í í í í í í í locationí í í í í í í í í í í í í í .

Date of interviewí í í í í ../í í í í . /2007

Mother's initialsí í í í í í í .age of mother (years)í í í í í í .

Sex of childí í í í í í í í 1=male 2= female

Age of child (in months)í í í í í í í .

Birth orderí í í í í í í í í í í .aliveí í í í í í í í í í í í í í .

Sex of household head 1=male 2=female 3=other specify

Marital status of the mother a: Married monogamous

b: Married polygamous

c: Single

d: separated /divorced

e: widowed

Highest education attained

a. Non-formal education

b. Primary school

C. Secondary school

e. Technical /polytechnic

f. College/university

Denomination

a. catholic

b. SDA

c. Protestant

d. Muslim

e. Traditional

2. What are the family's sources of income? (Put star on the main one)

1=housewife 2=farming 3=business 4=salaried 5=casual labor

6=artisan 7=fishing

3. Estimate the mother's annual income from the various sources

1=less than kshs.12, 000

2=kshs.12, 000-24,999

3=kshs.25, 000-60,000

4=above kshs.60, 000

4: how many meals does the family take per day?

1=2 or less

2=3 meals

4=4 or more

5: does your crop produce last to the next harvest season?

1= yes

2=no

6: (if no question 6), what is the main reason?

1= rainfall failure 2= pest attack 3= poor soil 4= little land 5= hails/floods

6= insufficient labor force other, specify_____

7: and (if no in question6) how do you obtain food before the next harvest?

1=government provision 2= food for work activities 3= NGO food/charity?

E.g. Church/mosque 4= casual work 5= remittance (from relatives and children)

6=purchase 7=grow drought óescaping crops.

8: what is the family's major source of fuel (energy) for food preparation?

1= gas 2= electricity 3= firewood 4= charcoal 5= paraffin

9: how affordable is this source of energy for the family?

1= cheap 2= expensive 3= moderate/ affordable

10: who owns the livestock?

1=the family 2= husband 3= wife 4= father-in-law other

specify_____

11: if own produce, how much milk per day do you get from your animals (cows/goats)?

1= none 2= 0.5-1 litre 3=1.5-2 litre 4=2-5 litre 5= more than 5 litres

12: if brought. How much milk do you buy per day? 1= none 2= 0.5-1 litre 3=1.5-2 litre 4=2-5 litres 5=more than 5 litres

A) **Breastfeeding**

(Please answer this section if you breastfeed your child, if not please move on to question no 25)

16: is the infant breastfed. 1=yes 2=no

17: is the breastfeeding exclusive (meaning no other food or drinks given to the Baby) 1= yes 2= no

18: why did you choose to breastfeed and not any other feeding alternative?

19: How often is the child breastfed (in 24hours)?

1=on demand 2= every 3 hours 3=4 times or less 4= 5-7 times
5= at least 8 times

20: How often does the mother stay together (in the same room) with the baby?

1=all the time 2=most of the time 3=only when breastfeeding
4=rarely/least of the times other, specify_____

21: Has the infant breastfed in the previous hour? 1= yes 2= no

(Ask the mother to put her/him to the breast and observe the breastfeed for About 4 minutes)

22: Is the infant able to attach? (To check attachment, look for:

.chin touching yes_____ no_____

.mouth wide open yes_____ no_____

.lower lip turned outward yes_____ no_____

.more areola above than below the mouth yes_____ no_____

1=no attachment at all 2= not well attached 3= good

Attachment

23: Is there any thrush in the child's mouth? (Look for the thrush in the mouth.

By looking at the presence of ulcers and /or white patches)

1= yes 2= no

24 : At what age do (will) you discontinue breastfeeding your child?

1= less than 1 month 2= 1-3 month 3=4-6 month

4=7-11 months 5=1-2years 6=for more than 2 years

B) Alternative infant feeding

25: if the mother does not breastfeed, what is her infant feeding choice?

1=wet-nursing 2=expressed breast milk 3=animal milk

4=commercial formula 5=uji 6=other (please specify)

26: Had you received PMTCT counseling on infant feeding choices/ alternatives

Before deciding on the alternative?

1=yes 2= no

27: What amount of water do you use in the preparation of milk ó please specify

Ratio e.g. half cup water to half a cup of milk.

28: why did you opt for this alternative and not the other?

29: Is the alternative you use in feeding exclusive? (I.e. you do not use other methods)

1= yes 2=no

30: Does your family support your infant feeding device? e.g. (helping in preparation)

-please specify who helps.

1-husband 2-child 3-maid 4-others (please specify)

31: Do you add a micronutrient formula to the animal milk if used?

1=yes 2=no

32: Do you add sugar to milk when preparing a feed?

1=yes 2=no (specify amount)

33: In your view is the infant feeding alternative you are using

33.1 .Acceptable (socially/culturally)?

1=yes 2=no

33.2 Feasible (do you have time/ knowledge/ skills/ resources to prepare feed?)

1=yes 2=no

33.3 Affordable (at a cost you can afford)

0=yes 2=no

33.4 Sustainable (available in continuous supply)

1= yes 2=no

33.5 Safe hygienically prepared (please observe)

1=yes 2= no

34: Is the child having any of this symptoms/illnesses (observe please)

34.1 cough/difficulty in breathing 1=yes 2=no

34.2 oral sores/thrush 1=yes 2=no

34.3 fever/malaria 1=yes 2=no

34.4 diarrhea 1=yes 2=no

34.5 vomiting 1=yes 2=no

34.6 Anemia 1=yes 2=no

34.7 appetite loss / anorexia 1=yes 2=no

1=yes 2=no

35: does the mother actively encourage the child to eat?

1= yes 2=no (if no, skip to no.33)

36: if yes, what is it that she does?

1= sit with the child 2= give foods liked by the child 3=gives frequent

Small servings 4=sweetens the feed 5=forces by palm /hand

37: where does the mother take the food left over by the child?

1=keep for next serving 2=give to sibling or eat 3.discard

Others please specify í í í í í í í í

35: does the mother boil the water to be used for making the child's food?

1= yes 2=no

C.KAP on mother-to-child transmission of HIV

36: Does the mother feel at ease discussing issues related to HIV/Aids?(observe)

1=yes 2=no

37: Does the mother think that that HIV can be transmitted from the mother to the child?

37.1 During pregnancy? 1=yes 2=no 3=don't know

37.2 During delivery? 1=yes 2=no 3=don,t know

37.3. Through breastfeeding 1=yes 2=no 3=donøt know

38: does the mother believe MTCT of HIV is preventable?

1=yes 2=no 3=donøt know

39: is there any cure for HIV /Aids?

1=yes 2=no 3=donøt know

40: would the mother consider the following as alternative infant feed (given her state) ?

40.1 surrogate breastfeeding

1=yes 2=no 3=donøt know

40.2 expressed and heat-treated breast milk?

1=yes 2=no 3=donøt know

40.3 commercial infant formula?

1=yes 2=no 3=donøt know

40.4 breast milk from a milk bank?

1=yes 2=no 3=donøt know

40.5 cowø milk?

1=yes 2=no 3=donøt know

40.6 goat milk?

1=yes 2=no 3=donøt know

40.7 dried milk powder?

1=yes 2=no 3=donøt know

41: Have you attended the following support groups?

41.1 HIV /aids support groups?

1=yes 2=no

41.2 breast feeding support groups?

2=yes 2=no

41.3 Infant - feeding support groups?

1=yes 2=no

E. Health services and morbidity patterns

42. Where was the child delivered?

1=at a health facility 2=under a Tba 3=at home

43: what was the nature of delivery?

1=normal 2=caesarian 3=mild operation

4=normal but with difficulty

44: what was the child's weight at birth? (Confirm from the growth monitoring

Chart)

1=less than 2.5 2=2.5 -3.0kg 3=3.1-3.5kg 4=3.6-4kg

5=more than 4kg 6=not known

45: Has the mother received counseling /lectures from the clinic during her recent visit on the following topic/issues?

45.1 breast feeding 1=yes 2=no

45.2 infant weaning (complementary feeding) 1=yes 2=no

45.3 breastfeeding alternatives	1=yes	2=no
45.4 maternal nutrition	1=yes	2=no
45.5 prevention of hiv/STDs including MTCT	1=yes	2=no
45.6 hygiene at home	1=yes	2=no

46: Did the mother (or the child receive the following during her pregnancy or

Later after delivery (this can be confirmed from the clinic visited)

46.1 screening for anemia	1=yes	2=no
46.2 iron/folate supplements	1=yes	2=no
46.3 malaria prophylaxis	1=yes	2=no
46.4 vitamin a supplements	1=yes	2=no
46.5 ARV prophylaxis	1=yes	2=no
46.6 zinc supplements	1=yes	2=no

47: what is the main source of water for the household? 1=river/stream

2=well 3=dams 4=tap/piped 5= bore hole 6= spring 7=rain water

47.1 Has the child received ARV prophylaxis	1=yes	2=no
47.2 Is the mother on ARV treatment	1=yes	2=no

48: how does the family purify the water before drinking?

1=boiling 2=filtering 3=sedimentation 5=decanting
6=nothing at all

49: does she wash her hands after visiting latrines?

1=yes 2=no 3=sometimes

50: does she was her hands before handling food?

1=yes 2=no 3=sometimes

51: where does the family dispose refuse?

1=composite pit 2=cow shed 3=bury 4=burn

5=garden 6=along the fence 7=throw away

52: observe and record for general cleanliness/hygiene of

52.1= mother 1= clean 2=moderately clean 3= dirty

52.2= child 1=clean 2=moderately clean 3= dirty

52.3= kitchen 1=clean 2=moderately clean 3= dirty

52.4=home environ 1=clean 2=moderately clean 3= dirty

Index Child's Information

53. Name of the Index child (0-12 months of age)

54. Sex of index child 1= male 2 =female

55. Birth weight of index child (check health card)

Measurements

Anthropometrics

No	Measurements	1 st measurement	2 nd measurement	Average
	Length			
	Weight (kg)			
	Muac (cm)			

56. Oedema in both feet

1= Present

2= Absent.

APPENDIX 4

INDIVIDUAL EVALUATION FORM REPLACEMENT FEEDING OPTIONS FOR HIV-POSITIVE MOTHERS

For the mother to be allowed to practice replacement feeding, she should fulfill the following condition (in bold). If any one of these conditions is not fulfilled, the mother is not eligible for replacement feeding.

Criteria for replacement feeding	YES (1)	NO (0)	Total points
ACCEPTABLE means that;			(1 Point)
<ul style="list-style-type: none"> • The mother perceives no barrier to choosing replacement feeding for cultural or social reasons or for fear of stigma and discrimination. 	x		
FEASIBLE means that;			(1 Point)
<ul style="list-style-type: none"> • The mother (or family) has adequate time, knowledge, skills, resources, and support to correctly prepare breast milk substitutes and feed the infant 8 to 12 times in 24 hours. 	X		
AFFORDABLE means that;			(1 Point)
<ul style="list-style-type: none"> • The mother and family, with available community or health system support, can pay for the cost associated with the purchase/production, storage and use of replacement feeds without compromising the health and nutrition of the family. 	X		
SUSTAINABLE means that;			(1 Point)
<ul style="list-style-type: none"> • A continuous, uninterrupted supply and a dependable system for distribution of all ingredients (for example micronutrient supplements, fuel) and products needed to safely practice replacement feeding are available for as 	X		

long as needed.			
SAFE means that;			(3 Point)
<ul style="list-style-type: none"> • Replacement are correctly and hygienically stored and prepared and fed with clean hands using clean cups and utensils-no bottles or teats; <ul style="list-style-type: none"> • Safe source of portable water for household use; • Replacement foods should be stored in secure places or prepared at each mels; • Other persons (caregivers) should have skills in case mother is not available 	<ul style="list-style-type: none"> X X X 		

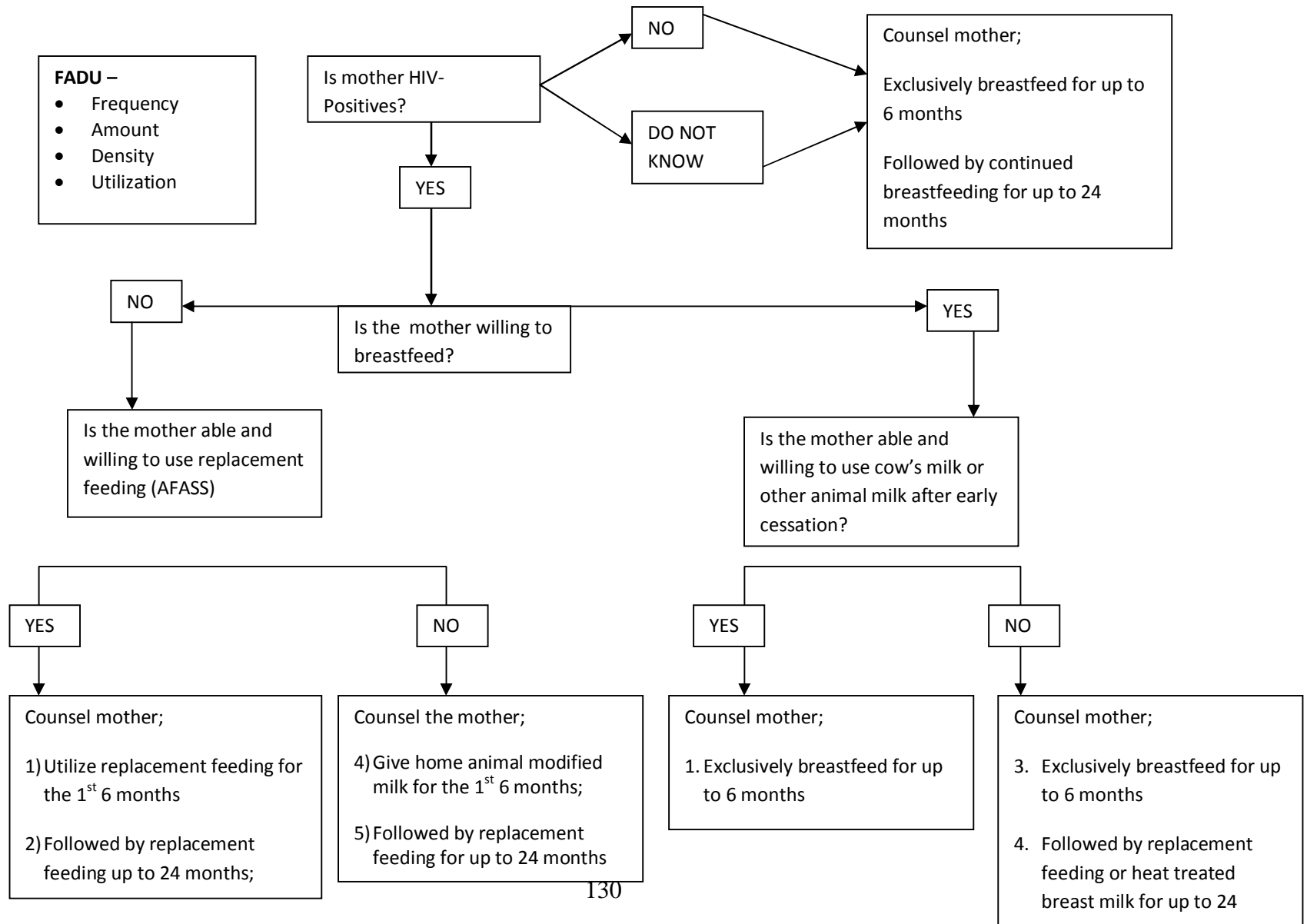
APPENDIX 5

Classification for assessing severity of malnutrition by prevalence ranges among children under 5 years of age

Indicator	Severity of malnutrition by prevalence ranges (%)			
	Low	Medium	High	Very high
Stunting	<20	20-29	30-39	≥ 40
Underweight	<10	10-19	20-29	≥ 30
Wasting	< 5	5-9	10-14	≥ 15

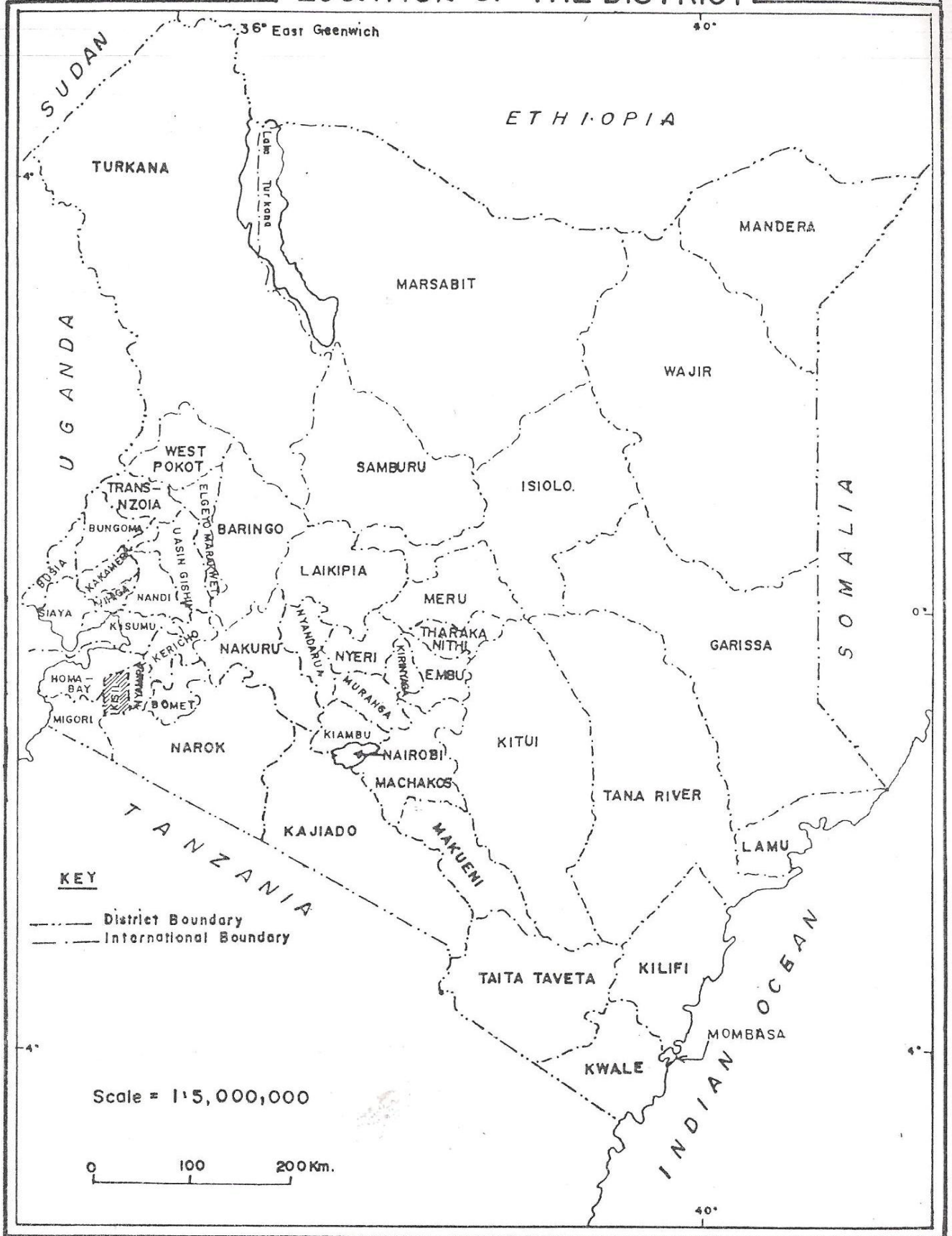
APPENDIX 6

ALGORITHM FOR COUNSELING OF HIV-POSITIVE MOTHERS ON INFANT FEEDING



APPENDIX 7

LOCATION OF THE DISTRICT



APPENDIX 8

