GUIDELINES FOR PROMOTING SUPPLEMENTARY INFANT FEEDING TECHNIQUES AMONG HIV-POSITIVE MOTHERS

by

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DECLARATION

I declare that **"GUIDELINES FOR PROMOTING SUPPLEMENTARY INFANT FEEDING TECHNIQUES AMONG HIV-POSITIVE MOTHERS"** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references; and that this work has not been submitted before for any other degree at any other institution.

9 February 2012

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GUIDELINES FOR PROMOTING SUPPLEMENTARY INFANT FEEDING TECHNIQUES AMONG HIV-POSITIVE MOTHERS

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ABSTRACT

Vertical transmission of HIV is still a growing concern in South Africa. Breastfed infants are still at risk as HIV is present in breast milk, leaving HIV-positive mothers unsure of the best feeding option for their infants. However, there are various infant feeding techniques that HIV-positive mothers can use to supplement breastfeeding and flash-heat is one of them. Flash-heat is heat treating expressed breast milk to deactivate HIV for infant feeding.

This study explored the possibility of HIV-positive mothers to practice flash-heating method for their infants exclusively for four months as a strategy to prevent vertical transmission of HIV. A descriptive, explorative and contextual design using a mixed method was used to obtain data from mothers in a post natal ward at Tembisa hospital.

The mixed method used was useful in identifying the number of HIV-positive mothers who would adopt the flash-heat technique, the characteristics of mothers whom the technique could be promoted to, the factors that influence/affect the choice of infant feeding for these mothers, as well as their feelings associated with the feeding technique.

Most (74%) mothers had a positive response to the flash-heat technique compared to 10% who were uncertain. They believed that heat treating their breast milk would result in their infants being HIV-free. In addition they believed that this method was cheaper than formula feeding and expressed positive feelings about touching their breast milk while expressing with no adverse feelings of expressing into a glass jar.

Furthermore, findings of this study indicated that HIV-positive mothers in a public health facility would adopt flash-heat as an alternative infant feeding method. Thus practical guidelines to promote this feeding method were proposed. The proposed draft guidelines which promote the use of the flash-heat infant feeding method for HIV-positive mothers in public sector facilities will be communicated to relevant authorities such as the National Department of Health. These guidelines support the new policy shift to exclusive breastfeeding as a child survival strategy in South Africa.

KEY CONCEPTS

Flash-heat; HIV-positive mothers; breastfeeding; vertical transmission; supplementary feeding; infants; prevention of mother-to-child transmission; infant feeding methods.

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List of abbreviations

AAP	American Academy of Paediatrics
AED	Academy for Educational Development
AFASS	Acceptable, Feasible, Affordable, Sustainable and Safe
AIDS	Acquired Immune Deficiency Syndrome
ARV	Anti retroviral
BFHI	Baby-Friendly Hospital Initiative
C/S	Caesarean section
EBF	Exclusive breastfeeding
EHT	Expression and Heat Treatment
FH	Flash-heat
HIV	Human Immunodeficiency Virus
HSREC	Health Studies Research Ethics Committee
HTLT	High-Temperature Long-Time
HTST	High-Temperature Short-Time
IDIs	In Depth Interviews
IgS	Immunoglobulins
ITPC	International Treatment Preparedness Coalition
MEP	Mini Electric Pump
MP	Manual Breast Pump
MTCT	Mother-to-Child Transmission
NDoH	National Department of Health
PMTCT	Preventing Mother-to-Child Transmission
SADHS	South African Demographic Health Survey
SDoH	South African Department of Health
SES	Socio-Economic Status
SIDS	Sudden Infant Death Syndrome
SPSS	Statistical Package for Social Sciences
STD	Standard
SVD	Spontaneous Vertex Delivery
THCU	The Health Communication Unit
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization

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CHAPTER 1

ORIENTATION TO THE RESEARCH PROBLEM

1.1 INTRODUCTION

This chapter presents the background to breastfeeding in the context of HIV (Human Immunodeficiency Virus). It also looks into other harmful infant feeding techniques adopted by South African mothers. It will introduce the flash-heat method as an alternative feeding technique and look at its benefits in reducing vertical transmission of HIV.

In the developed world, maternal HIV infection has negligible adverse effects on infant status (Brocklehurst & French 1998:838). Yet in Sub-Saharan Africa, infants born to HIV-positive mothers are at risk of low birth weight, prematurity, perinatal and neonatal death (Brocklehurst & French 1998:838). Results of studies in Nairobi and Rwanda indicate that maternal HIV infection resulted in significantly lower birth weight babies (Bulterys, Chao, Munyemana, Kurawige, Nawrocki & Hibamana 1994:94), compared to babies born to HIV negative mothers.

Morbidity in infants is influenced by feeding choices mothers make (Israel-Ballard, Abrams, Coutsoudis, Sibeko, Cheryl & Chantry 2008:444). Supplementary foods damage the intestinal lining of newborn babies, making them more susceptible to HIV infection (Iliff, Piwoz, Tavengwa, Zunguza, Marinda, Nathoo, Moulton, Ward & Humphrey 2005:699). A study by the Human Sciences Research Council (HSRC) revealed that only 25% of mothers in South Africa practice exclusive breastfeeding while 75% use formula for feeds during the first six months (Human Science Research Council (HSRC) 2010:21)

Much of the guidance literature on infant feeding in the context of HIV has, in the researcher's opinion, led to confusion regarding the most optimal feeding choice. In 2006, the World Health Organization (WHO) recommended that mothers exclusively breastfeed their infants up to six months and then rapidly wean them off the breast as a method of preventing mother-to-child transmission (PMTCT) of HIV. Thereafter, they were advised to give replacement feeds such as soft foods and formula milk. It should

be noted that there *was* an emphasis on the dangers of mixed feeding and that supplementary foods should only be introduced when they were "acceptable, feasible, affordable, sustainable and safe" (AFASS) (WHO 2010:1). It is the researcher's opinion that the AFASS principal was not fully understood and implemented as suggested by the WHO due to insufficient support to nurses who are required to use this principal when counselling HIV-positive mothers on infant feeding.

The 'flash-heat' (FH) technique, (also termed flash-heating) is a new feeding method and involves heating expressed breast milk from HIV-positive mothers in order to kill HIV (Israel-Ballard, Chantry, Dewey, Lonnerdal, Sheppard & Donovan 2005:175). This method could prove safer than formula feeding in many African countries such as Zimbabwe, Tanzania and South Africa (Israel-Ballard et al 2005:175) where there is unreliable access to clean drinking water, firewood, or a consistent supply of formula.

The purpose of this study is to explore the possibility of HIV infected mothers' expressing breast milk, heating it, and spoon-feeding their infants exclusively for four months as a strategy to prevent vertical transmission of HIV. This feeding strategy is receiving global attention but has not been sufficiently researched to explore feasibility and acceptability with HIV-positive mothers in an urban South African setting.

1.2 BACKGROUND

There are various infant feeding techniques that HIV-positive mothers can use to supplement breastfeeding. Literature has shown that some of the alternative feeding methods utilised to feed infants are bottle-feeding, feeding expressed breast milk using cup-feeding, spoon-feeding or paladai-feeding techniques (Sommerfelt 2006:6; Lang 1994:173; Ghosh 1992:70). For purposes of this study, the feeding methods which were considered advantageous in the developing world were focused on. All these feeding methods other than bottle-feeding were referenced as vessels used to feed expressed breast milk to an infant in the context of this study.

1.2.1 Cup-feeding

This feeding method is known as an alternative method of feeding breast milk to an infant using a small cup without a lip (Lang 1994:174). The cup is practical to use and

readily available. It is recommended by the baby-friendly hospital initiative (UNICEF 2009a:1) and is easy to use and simple to clean (Sommerfelt 2006:6). The infant is able to take the quantities he/she requires at his/her own pace (Sommerfelt 2006:6), thus not risking pouring large amounts of milk into the infant's mouth. It can be used by the mother or caregiver allowing for good eye contact when feeding.

1.2.2 Spoon-feeding

Spoon-feeding is safe, but can prove more difficult than cup-feeding. This feeding technique is mainly used for babies with breathing problems, until such time as the breathing problem is managed (Sommerfelt 2006:6). One disadvantage of spoon-feeding is the risk of pouring the milk from the spoon into the infant's mouth. The infant should be allowed to sip the milk from the spoon. Alternatively, very small amounts should be put into the infant's mouth.

1.2.3 Paladai-feeding

In India, a paladai is traditionally used for feeding babies. The paladai looks like a very small cup with one side extended out into a narrow channel (Ghosh 1992:75). It is completely open like a cup, so it is easy to keep clean. The mother holds the baby as for cup-feeding, placing the narrow channel on the baby's lips.

The hazards of formula feeding and bottle-feeding require no elaboration especially in developing countries (Ghosh 1992:70). Similarly the value of expressed breast milk to an infant with all its nutrition and anti-infection properties needs no emphasis. Maternal and infant breastfeeding benefits have been studied for decades and are still being encouraged. Breast milk provides optimal nutrition, energy and protection from disease; particularly infection for infants (Denison 2002:1). Breastfed infants have the advantage of protection from respiratory infections, bacterial meningitis, Sudden Infant Death Syndrome (SIDS), insulin-dependent diabetes mellitus, Crohn's disease, lymphoma, allergic and digestive diseases (American Academy of Paediatrics (AAP) 1997:1) as well as improved motor and language skills (Vestergaard, Obel, Henriksen, Srensen, Skajoa & Stergaard 1999:1327). However, in light of the above, all the advantages may seem futile to HIV-positive mothers who are still unsure of the optimal feeding method for their infants without transmitting HIV. Moreover, breast milk agents

fight common childhood illnesses such as diarrhoea and respiratory infections (De Cock, Fowler, Mercier, De Vicenzi, Saba, Hoff, Alnwick, Rogers & Shaffer 2000:283). However, because HIV is passed through breast milk, South African and international initiatives aimed at promoting safe and exclusive breastfeeding (EBF) have been insufficient thus far in protecting infants from HIV infection.

1.3 EXCLUSIVE BREASTFEEDING

Exclusive breastfeeding is the safest option, *provided* that the baby is successfully weaned (Coovadia, Rollins, Newel, Little, Coutsoudis, Bennish & Bland 2007:1107). Weaning entails gradually removing an infant from one particular food source to another but it poses significant risks if not done correctly. Abrupt weaning or early cessation of breastfeeding results in higher viral loads in breast milk, which could pose significant threats to prevention of vertical transmission of HIV, if the mother decided to resume breastfeeding (Sinkala, Kuhn & Kankasa 2007:1; Thea, Aldrovandi & Kankasa 2006:1539). The adverse consequences of abrupt weaning include infant dehydration, subsequent weight loss and malnutrition, psychological stress in the mother, breast engorgement and mastitis (Piwoz, Huffman, Lusk & Zehner 2001:10). Early (prior to three months) cessation of breastfeeding could put infants at risk of growth retardation and illness, which outweighs the risks of transmitting HIV through breast milk (Abrams 2007:235).

The choice of infant feeding is influenced by many social and familial factors such as poverty (Academy for Educational Development (AED) 2001:1) and possibly community perspectives. Difficult economic and social circumstances are often the reason why some mothers opt for a cheaper feeding option or resume breastfeeding after alternative foods are introduced. Most families cannot afford to purchase, prepare, or properly store infant formula. Breast milk substitutes require careful measurement, preparation and storage under sterile conditions, which is often difficult or impossible in many African social and economic situations; especially in poor communities. In circumstances where the provision of infant formula is unsustainable, families resort to home foods which are generally poorer in nutritional quality with deficits in energy, vitamin A, iron, calcium, zinc, and other essential nutrients (WHO 2009:1). Safe replacement feeding usually cannot be readily obtained.

The risk of transmission from mother to infant is clearly associated with the chosen feeding method and duration. Babies that are exclusively breastfed have a 4% risk of infection from six weeks to six months (Rollins, Meda & Becquet 2004:188). Other researchers suggest exclusive breastfeeding as having a three- to four-fold reduced risk of HIV transmission (Rollins et al 2004:188). Iliff et al (2005:700) support this by stating that HIV transmission is increased when introducing other foods during the breastfeeding stage. The benefits of exclusively feeding infants breast milk are well referenced. Of importance is that the risk of HIV transmission from the mother to infant is reduced, when compared to the more common practice of mixed-feeding (Iliff et al 2005:699; Abrams 2007:253). In addition, women who breastfeed exclusively are also less likely to develop breast health problems, a risk factor for transmission of HIV (Coovadia et al 2007:1107). Furthermore, exclusively feeding infants breast milk maintains the impermeability of the intestinal lining, whereas foods other than breast milk can inflame and damage intestinal cells (Catassi, Bonucci, Coppa, Carlucci & Giorgi 1995:384; Weaver 1988:785).

1.4 SUPPLEMENTARY FEEDING

The introduction of solids and supplementary foods at an early age and the effect of this practice on the rate of HIV transmission from mother to infant is a major concern (Moodley, Linley & Saitowitz 1999:681). Adequate supplementary feeding of infants from six months old is required for optimum growth and development; however, research suggests that in most developing countries poor feeding is practiced (WHO 1998b:1). This poor feeding practice results in numerous infants exposed to poor growth outcomes like stunting and poor cognitive development (UNICEF 2011a:1). The South African Demographic and Health Survey of 2003 reported that for most mothers who breastfed, supplementation of breast milk started early (South African Department of Health (SDoH) 2004:144). UNICEF (2009b:1) reports this proportion as 7%. Plain water or other liquids are usually given as supplements (SDoH 2004:144), with inadequate milk production cited as the main reason for introducing complimentary feeds (Sibeko, Mohammed, Karen, Timothy & Katherin 2005:31). The International Treatment Preparedness Coalition also found similar to Sibeko et al (2005:31) that many women feared their breast milk to be insufficient for infant feeding (International Treatment Preparedness Coalition (ITPC) 2009:62). Encouraging mothers to exclusively breastfeed will remain a major challenge in Sub-Saharan Africa. In South

Africa and other Sub-Saharan Africa regions, infants in the first few weeks of life are given water, tea, porridge and other foods as well as breast milk. This unfortunately, is viewed as a normal practice by many (UNICEF 2009b:1; Leshabari, Koniz-Booher, Astrom, De Paoli & Moland 2006:18). Exclusive breastfeeding is rarely practiced after three months (Omari, Luo, Kankasa, Bhat & Bunn 2003:156; Poggensee, Schulze, Moneta, Mbezi, Baryomunsi & Harms 2004:477).

Mixed feeding is similar to supplementary feeding in that supplementary foods such as water, fruit juices, maize porridge etc., in addition to breast milk, are introduced to the infant's diet (Coutsoudis, Pillay, Kuhn, Spooner, Tsai & Coovadia 2001:379). Schools of thought on why mixed feeding is less safe compared to exclusive breastfeeding is that other foods disturb the intestinal lining of infants in the first months of life, allowing greater permeability of HIV into the bloodstream (Catassi et al 1995:383; Smith & Kuhn 2000:333).

Most studies on the risk of transmission of HIV from mother to infant have focused on duration but have not looked at the patterns of feeding. The use of the term 'exclusive breastfeeding' (EBF) has also been used loosely, not according to the WHO definition which defines EBF as breast milk only, at the exclusion of other solids or liquids (WHO 2004:1). The only study to correctly use the WHO definition was conducted in Durban (Coutsoudis et al 2001:379) which may suggest that this area needs to be studied in greater detail.

The poor infant feeding culture adopted by many South African mothers could be associated with the spread of morbidity and mortality amongst babies. Past advice on breastfeeding therefore centred on rapidly weaning the infant before it was exposed to mixed feeding for too long. It was due to this feeding behaviour that the WHO in its 2006 guidelines, advised that "breastfeeding should be discontinued as soon as feasible, taking into account local circumstances, the individual woman's situation and the risks of replacement feeding (including infections other than HIV and malnutrition)."

After reviewing literature for almost a decade, the WHO revised its guidelines to include the AFASS criteria (WHO 2001:1). It made varying recommendations, first suggesting that free formula be provided to HIV-exposed infants (AED 2004:1), then recommending exclusive breastfeeding and the avoidance of mixed feeding because of the increased

risk of HIV infection (Coovadia et al 2007:1107), then recommending an extended regimen of ARV therapy to either mother or infant, and mixed feeding (WHO 2009:1).

Few HIV-positive women are aware of the strategies that could prevent them from infecting their children (Coovadia et al 2007:1107), leaving many with the dilemma of whether to breast feed or bottle-feed as they try to understand which option is better for their baby and themselves. The benefits of exclusive breastfeeding for HIV-positive mothers include it serving as a form of contraception as they are unlikely to fall pregnant (Denison 2002:1). The contraceptive quality of breast milk is a tremendous benefit for this key population who are already vulnerable and may not want to conceive again as a way of protecting their offspring from HIV infection.

1.5 OVERVIEW OF THE FLASH-HEAT TECHNIQUE

Recent studies have shown that heating expressed breast milk from HIV-positive mothers *can* be used as a method to prevent HIV infection from mother to infant (Israel-Ballard et al 2005:175) in South Africa and other parts of Africa.

The flash-heat technique entails manually expressing 75-150 ml of breast milk into a peanut butter, jam, or honey jar. The jar is placed in a simple aluminium pan containing around two glasses of water. The water and the jar of milk are heated together over high heat. When the water reaches a visible rolling boil (between 62 and 72.9°C) the milk is immediately removed from the water and allowed to cool. The infant may then be fed with a spoon (Israel-Ballard et al 2005:175).

Figure 1.1 A community health worker uses simple, locally purchased materials to demonstrate a method of flash-heating milk in Kibera, a massive slum area outside of Nairobi, Kenya (The temperature gauge is not required for home use)
(Young 2007:1).

The flash-heat technique is similar to Pretoria pasteurisation where milk is heated to high temperatures to rid it of harmful bacteria; however in pasteurised milk, most of the nutritional qualities of milk were destroyed (UNICEF 2010:1). Unlike Pretoria pasteurisation, flash-heating heats milk over a short period of time. This is referred to as High-Temperature Short-Time (HTST) (Dhar, Fichtali, & Skura 1996:569). This method performs best in killing micro-organisms while retaining the nutritional value of the milk as opposed to the High-Temperature Long-Time (HTLT) process which pasteurisation follows (Chantry, Israel-Ballard, Moldoveanu, Peerson, Coutsoudis, Sibeko & Barbara 2009:265).

When testing the flash-heat method, the researches monitored the temperature of the milk and water at 15 second intervals in a laboratory setting and found that the breast milk reached a climax temperature of 72.9°C. Studies have evaluated the safety and effectiveness of this method and pilot safety studies found that the flash-heat method *was* capable of inactivating HIV in spiked breast milk samples from healthy mothers,

while retaining most of the milk's nutritional and anti-microbial properties (Israel-Ballard et al 2005:175).

The flash-heat technique has been recommended by the WHO as an alternative to traditional infant feeding, but this option has largely gone unnoticed (Israel-Ballard et al 2005:175). Viral analysis of the flash-heated and unheated breast milk found that cell-free HIV had been inactivated in all of the heated samples (Chantry et al 2009:266). This, unlike some of the other recommendations of infant feeding the WHO has suggested could be a practice that women *can* do in under-served communities. It is a cheaper feeding option as the resources required for this are already found in households.

"Clinical trials are urgently needed to substantiate that mothers can express, flash-heat and store their milk safely" (Chantry et al 2009:264).

1.6 STATEMENT OF THE PROBLEM

Infants born to HIV-positive mothers in South Africa continue to be at risk of prematurity, perinatal and neonatal death (Brocklehurst & French 1998:838). For every 100 babies born to HIV-positive mothers, 10-20 will become HIV-positive during the breastfeeding period (Tearfund 2009:2).

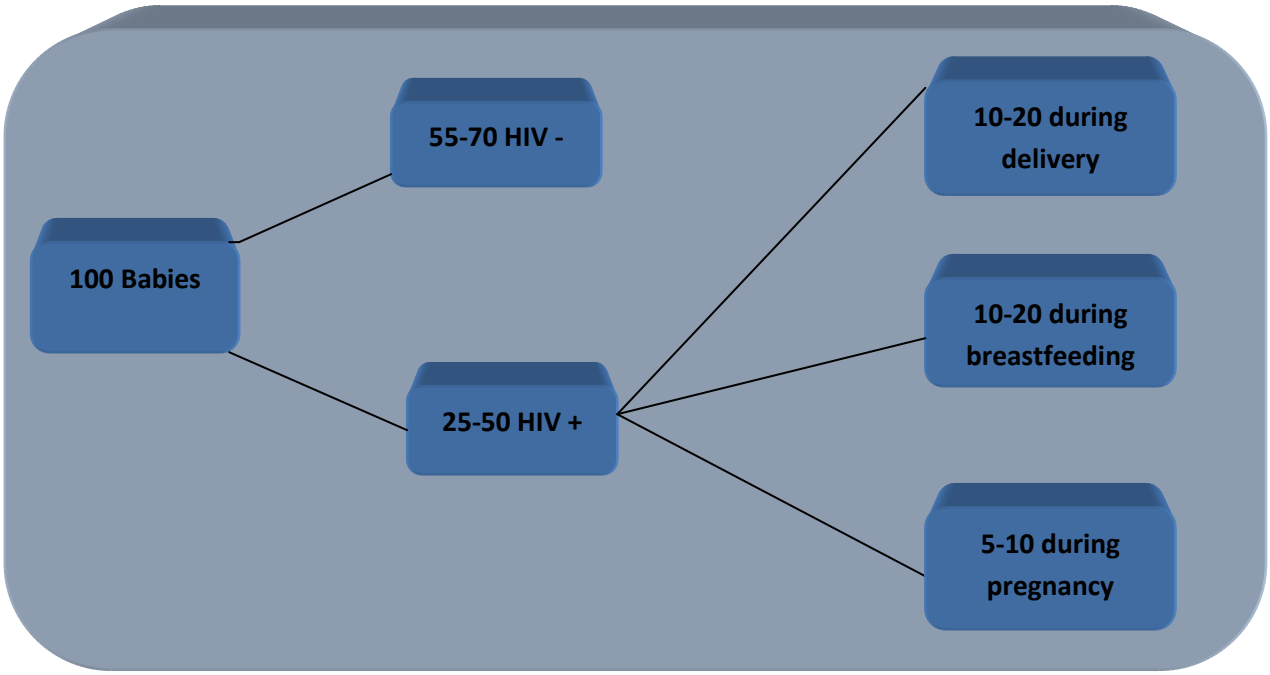

Figure 1.2 Outcome for 100 babies without intervention

HIV-positive pregnant women and new mothers in South Africa are still not sure which infant feeding method is best for their new babies (Coutsoudis, Coovadia & Wilfert 2009:1) because breastfeeding is responsible for 25% to 50% of HIV transmissions from an infected mother to an infant (WHO 2004:5). The WHO has over the last decade made several recommendations on infant feeding and HIV and has retracted others. For example, it recommended providing free infant formula for infants born to infected mothers; then retracted the statement and withdrew all formula from health centres. Unfortunately, the latest WHO recommendations do not come with 'user manuals' and the practicalities of these recommendations have not yet been explored. This is evident, as 66% of HIV-positive mothers make inappropriate infant feeding choices, resulting in only 7% of these infants being protected from infections through exclusive breastfeeding (National Department of Health (NDoH) 2009:1).

Manual expression of breast milk is common to most women and is easily taught to those who are not familiar with it. Women may find it easy once the technique is mastered; however, acceptability and ease of expressing and following an alternative feeding technique has not yet been thoroughly studied. More is yet to be understood as to why certain behaviours exist, such as not expressing at all and heat-treating. A study in Uganda suggested that expressing breast milk and feeding it to infants was seen as unnatural to mothers (Steel & Sserunjogi 1993:3).

Exclusive breastfeeding for longer than three months is not widely practiced in South Africa. Fear of babies getting insufficient food has been stated as a cause for this behaviour (Sibeko et al 2005:32) coupled with the introduction of supplementary or complimentary foods known to be a risk factor for HIV transmission (Iliff et al 2005:699).

Spoon-feeding has been practiced by nursing mothers and hospital staff in the past, given that a spoon is a feeding vessel that can be cleaned easily to prevent infection (Ghosh 1992:69). However, spoon-feeding is yet to be thoroughly researched as a preferred feeding method in South Africa when compared to the bottle used for formula feeds.

The need for a guideline promoting alternative infant feeding techniques for HIV-positive mothers was intensified by literature suggesting that 66% of HIV-positive mothers in South Africa still make inappropriate infant feeding choices (NDoH 2009:1). The

choices of these HIV-positive mothers resulted in only 7% of infants being protected from infections by exclusive breastfeeding (NDoH 2009:1). It is the researcher's opinion that the suggestions and retractions of recommendations made by the WHO on infant feeding and HIV could have resulted in the confusion of health workers and HIV-positive mothers. Furthermore, the national prevention of mother-to-child transmission (PMTCT) guidelines providing free infant formula for mothers in public health sectors (NDoH 2001:1) may contribute to the confusion around infant feeding options for optimal infant growth and survival.

The researcher commenced her search of literature on practical feeding techniques utilising breast milk that could be implemented by HIV-positive mothers in their homes as a strategy to prevent HIV transmission from mother to child. The decision to focus on exclusive use of breast milk was supported by literature suggesting that in South Africa supplementary foods were introduced early (SDoH 2004:1) and that exclusive breastfeeding is rarely practiced after three months (Omari et al 2003:156; Poggensee et al 2004:477). These behaviours could be (in the researcher's opinion) a result of conflicting messages provided by health care personnel who lack proper guidance on best practice infant feeding techniques.

Flash-heat, which is a new infant feeding method encouraged by the WHO was identified but not researched in great detail (Israel-Ballard et al 2005:175). Numerous questions around the technique were raised and need to be looked into to avoid additional confusion around infant feeding and HIV. The overall concern of the current study is whether the underlying social and familial environment in South African society is suitable for the successful implementation of exclusive adoption of the flash-heat method for four months.

1.7 PURPOSE OF THE STUDY

The purpose of this study was to develop practical guidelines for promoting supplementary infant feeding techniques for HIV-positive mothers.

1.8 RESEARCH OBJECTIVES

The objectives of this study were to

- identify the profile of HIV-positive women that can be targeted for promotion of a supplementary infant feeding technique termed flash-heat
- explore and describe the factors influencing HIV-positive mothers on the choice of feeding technique
- formulate practical guidelines based on the research findings and literature support for HIV-positive mothers promoting supplementary infant feeding techniques

1.9 CONCEPTUAL FRAMEWORK

A conceptual or theoretical framework is a set of ideas which provides the background or context for the research study. Miles and Hubberman (1994) maintain that a conceptual framework is a system of concepts, assumptions, expectations, beliefs and theories that supports and informs research.

A useful theory should provide a comprehensive conceptual understanding of things that cannot be readily understood; for instance why people interact and behave in certain ways.

The theoretical framework or theory used to approach this study is called the *Theory of Individual and Group Change* by Backer (2001). In his theory, Backer maintains that behaviour is more likely to change if; a person forms a strong positive intention or makes a commitment to perform certain behaviour; there are no environmental constraints that make it impossible to perform that behaviour; the person has the skills necessary to perform the behaviour; the person perceives that the advantages of performing the behaviour outweigh not performing it; the person believes that performing the behaviour is more consistent than inconsistent with their self-image or that it does not violate personal standards; the person's emotional reaction to performing the behaviour is more positive than negative, and; the person believes that she is able to perform the behaviour under a number of different circumstances.

The above framework is most suited to highlight the researcher's expectations of individual and group behaviour with the target group. It will provide the researcher with a different 'lens' through which to look at a potentially complicated social practice such as heating expressed breast milk and feeding it to infants at home and in public.

1.10 OPERATIONAL DEFINITIONS OF IMPORTANT TERMS

The following operational terms were used in this study.

Breast milk: The milk produced by a mother (during the late stage of pregnancy onwards) to feed her baby. It provides the primary source of nutrition for newborns before they are able to eat and digest other foods (Petropulos 2003:91). In this study, it refers to the milk a mother provides from her breast.

Infant: A child who is in the earliest stage of extra-uterine life. Age ranges from the first month after birth to approximately 12 months, when the baby is able to assume an erect posture (Medical dictionary 2011:1). In this study it refers to a baby in its first year of life.

Mixed feeding: Feeding the infant breast milk via breastfeeding, as well as use of infant formula (WHO 1998b:1). In this study it refers to feeding the infant breast milk and commercial infant formula.

Formula feeding: Feeding an infant commercial breast milk substitutes or other milk (WHO 2008:1).

Exclusive breastfeeding: Exclusively feeding breast milk; no other liquids or foods for six months or until the decision is made to stop breastfeeding if that occurs before six months of age (Piwoz, Huffman, Lusk & Zehner 2001:3). No other liquids or solids are given, with the exception of drops or syrups consisting of vitamins, mineral supplements, or medicines (WHO 1996:1).

Prevention of mother-to-child transmission of HIV: PMTCT programmes aim to prevent the transfer of a disease such as the spread of HIV through breast milk or through the placenta. The United Nations strategy to prevent the transmission of HIV to infants and young children involves: (1) prevention of HIV infection in general, especially

in women and young people; (2) prevention of unwanted pregnancies among HIV-positive women; (3) prevention of HIV transmission from HIV-positive women to their infants; and (4) provision of care, treatment and support to HIV-positive women, their infants and family (WHO 2007:6).

Flash-heat: Heat treating of milk to a temperature of 62°C in a water bath in a pot for a short period of time (Israel-Ballard et al 2005:175).

Abrupt weaning or early cessation of breastfeeding: An immediate cessation of breastfeeding which may be forced on the baby by the mother or on both mother and baby by circumstances (Piwoz et al 2001:3). Breastfeeding is stopped between three to six months (Thea et al 2006:1539).

AFASS criteria (definition described below)

Acceptable: The assessment by a health care provider on whether a mother is are able to afford the purchase of formula without compromising the entire family's nutritional status (WHO 2001:1).

Feasible: The assessment of a mother (or family's) time, knowledge, skills, and other resources to correctly prepare breast milk substitutes and feed the infant 8–12 times in 24 hours (WHO 2001:1).

Affordable: The confirmation from mothers that their choice of feeding is in consideration of possible cultural and social barriers, stigma and discrimination. Are they able to articulate the costs of infant feeding which include ingredients/commodities such as formula, fuel, clean water, and medical expenses that may result from unsafe preparation and feeding practices? (WHO 2001:1).

Sustainable: The assessment of a mother's financial status allowing the purchase of milk on a continual basis without any interruption (WHO 2001:1).

Safe: The assessment of a mother's ability to prepare formula in a correct manner using clean hands and utensils and stored hygienically (WHO 2001:1).

1.11 RESEARCH OVERVIEW

The purpose of the study was to develop practical guidelines for promoting supplementary infant feeding techniques for HIV-positive mothers.

The two approaches utilised for data collection were quantitative and qualitative. The quantitative approach enabled the researcher to learn the number and characteristics of new mothers who would use the flash-heat technique whereas the qualitative approach helped explore the reasons why HIV-infected mothers would or would not engage in this feeding technique. Furthermore, the quantitative approach allowed the researcher to test theory, whereas the qualitative approach aided in generating theory (Neill 2003). In-depth interviews (IDIs) were used with the qualitative approach to elicit individual perspectives, particularly when exploring this potentially sensitive topic. Questionnaires with the quantitative approach were administered by the researcher.

Written informed consent was obtained from the participants as per clinical guidelines. Participants were given a five-minute talk and demonstration on the flash-heat technique, exclusive breastfeeding, and the art of manual expression and the safe storage of flash-heated milk. This was followed by a one-minute question and answer session to allay any misconceptions and fears. The discussions were done in IsiZulu, Setswana and Sepedi. One hundred women were selected for the study. Thirty (30) were selected for the IDIs; however material saturation occurred after interviewing twenty (20) women and the researcher administered questionnaires to the remaining 70 participants.

All interviews were tape recorded. The recorded interviews were transcribed verbatim. Scripts were later coded. Observational notes were made and verbal and non-verbal communication cues such as tone of voice, appearance etc., were detailed.

A pilot study was conducted to test quantitative questionnaires and interviews with the target group.

1.11.1 Recruitment and sample collection

A total of 100 HIV-positive women from postnatal wards in an urban setting around Tembisa hospital were selected as and when they delivered over a period of one month. All the women were HIV-positive and had delivered a live, healthy infant either via Spontaneous Vertex Delivery (SVD) or Caesarean section (C/S) (Tembisa Hospital Records). The eligible respondents ranged in age from 18 to 45, as 18 is the legal age to provide consent for participation in the study and 45 (in the researcher's opinion) is an age still considered safe for childbearing. Participants came roughly from the same socio-economic group or had a similar background in relation to HIV and infant feeding. Being on ARV therapy and prior knowledge of PMTCT was not a requirement for participation in the study. Study participants were recruited after delivery and after all vitals were stable for both them and their infants.

Purposive (time/location) sampling was used to obtain the fixed sample size for the quantitative study and data saturation was used to guide the qualitative study sample size. The location was used more than once for sampling and women who delivered both at night and during the day were eligible for the study. Sampling continued for five days of the week, every week for one month.

The participant characteristics included (amongst others), age, place of residence, access to water and electricity in the home, educational level, employment, marital status, disclosure of HIV status, mode of delivery, etc. Some of these characteristics could highlight the participants' socioeconomic status (Wojcicki 2005:1) which could present more details of the key population participating in this study. In addition, these characteristics could influence infant feeding decisions (Wojcicki 2005:1).

1.11.2 Pre-analysis for qualitative data

Unique identifier codes were created for each participant. After all interviews were tape recorded, a full report (transcript) of the discussion was prepared which reflected the discussion as completely as possible, using the participants' own words. The key statements, ideas, and attitudes expressed for each topic of discussion were listed. The interviews were transcribed in the spoken languages which were isiZulu, SiPedi and

Setswana. The transcripts were translated into English and typed into an Excel worksheet after themes were identified. This was the first interpretation of the data.

1.11.3 Method of coding for qualitative data

Following the research questions as guides, every paragraph, or other section of text, was coded for relevant themes. As themes were developed, the researcher assigned a working definition to each code. Codes that were rarely used were dismissed and some categories broadened to accommodate lost codes.

1.12 QUALITATIVE ANALYSIS

An open coding system of analyses was used in this study to reduce the data to themes, categories and sub-categories. Tesch's (1990) eight-step model (in Creswell 1994:154) was used for data analysis. The in-depth interviews were taped using a digital tape recorder. Quantitative data was analysed using a statistical package for social sciences (SPSS) version 13.

1.12.1 Distribution analysis

Most statistical tests assume normal distribution in any study (Huck 2008) therefore the researcher will look at the distributional shape using skewness and kurtosis.

1.12.2 Correlation

Correlation is concerned with whether there is a relationship between two sets of scores and how strong or weak that relationship is, presuming that a relationship does in fact exist (Huck 2008). Pearson's correlation coefficients were calculated between the following variables:

- Will anyone prevent you from practicing the flash-heat technique?
- Do you believe you have all the skills to do the flash-heat technique?
- Do you believe you can do the flash-heat technique under a number of different circumstances at home?
- Do you think you can try the technique at home?

- Did the mother have a positive reaction to the flash-heat technique?
- Can you easily heat treat the milk?
- Can you express milk over a period of four months?
- Can you manually express milk at home?

1.12.3 Logistic regression

The researcher decided to run a logistic regression because of the use of one dependent variable (Will HIV-positive mothers adopt the flash-heat method exclusively for four months?) and a number of independent variables. This test was also used in order to analyse whether there was any relationship between the one dependent variable and the multiple independent variables. A logistic regression aided the researcher in finding out whether there is a probability that an event will occur, given a set of conditions (Sweet & Grace-Martin 2008). In this study it is the probability that HIV-positive women in Tembisa will adopt the flash-heat technique exclusively for four months as an infant feeding method.

1.13 ETHICAL CONSIDERATIONS

Ethical clearance to conduct the study was granted by the University of South Africa's Health Studies Research Ethics Committee (HSREC). Approval to conduct the study was obtained from the Medical Superintendent of Tembisa Hospital. A signed informed consent form for interviewing and tape recording was obtained from each participant and each interview was coded in order to protect their identities. Each participant was allowed to keep a copy of the consent form if she wished. The printed results of the research did not contain any identifying references to the participants.

1.14 CONCLUSION

This chapter entailed a review of the breastfeeding scenario in South Africa. It highlighted certain risk factors such as early weaning and mixed feeding and looked at the adverse effects of such feeding behaviour. The chapter subsequently went on to describe a new infant feeding technique termed flash-heat, its origin and perceived benefits in infant feeding and HIV prevention. An introduction to the research methodology was done. Quantitative and qualitative methods of data collection were

used for all 100 participants. The qualitative methods entailed the use of in-depth interviews with 30 participants and the quantitative aspect of the study employed the use of questionnaires administered to the other 70 participants. All required approvals were obtained for this study.

Chapter 2 discusses literature on infant feeding techniques and the model of choice by Backer (2001), called *the theory of individual and group change.*

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses literature on infant feeding techniques. It includes a discussion of manual expression of breast milk and the description of various techniques of heat treating breast milk for infant feeding. The chapter will characterise the different techniques and their effects on the nutritional quality of breast milk. The benefits and negative effects of not exclusively breastfeeding (EBF) are also discussed.

The second half of this chapter looks at the theoretical framework underpinning the study by Backer (2001), called *The Theory of Individual and Group Change.* Fishbein's Theory of Reasoned Action (1975) will also be highlighted to illustrate its significance to this study.

2.2 WOMEN AND HIV IN SOUTH AFRICA

In line with the purpose of this study, the researcher will touch on the proportion of HIV-positive women attending antenatal clinics and the socio-economic conditions of these women.

The prevalence rate of HIV in South Africa in 2009 was 17.8 % among those aged 14-49, while other age groups were particularly affected (UNAIDS 2010:1). Approximately 1 in 3 or 30% of women were living with HIV in 2009 (UNAIDS 2010:1). The Joint United Nations Programme on HIV/AIDS confers with the above and reports the national HIV prevalence rate among antenatal clinics in 2007 as 30.3%. The South African Department of Health (SDoH) reported a similar figure after conducting a study with a sample size of more than 33,400 women attending antenatal clinics across all nine provinces and found that 28% of women were living with HIV (National Department of Health (NDoH) 2009:1).

2.2.1 Age and risk of exposure to HIV

According to IRIN, PLUS NEWS (2009), new HIV infections in South Africa were twice as high in women aged 25 to 29 and 30 to 40, than among those aged below 20. There were also fewer new infections among women with tertiary education than those with lower levels. This view is shared by Tladi (2006:369), stating that South African women aged 15-49 with low levels of education had high levels of HIV infection. For the various age groups in the Gauteng province, UNAIDS (2008:1) found infection rates of 28.1% (age 20-24), 37.9% (age 25-29), 40.2% (age 30-34), and 33.2% (age 35-39). Jones and King (2005:1) state that more than 320,000 HIV-exposed babies were born in South Africa in 2002. These, as well as the studies/surveys conducted by the SDoH, have not specifically studied women of the same age brackets, but rather women of varying ages and in some cases, men. Therefore only poor comparisons on the relative risk to South African women in different age brackets can be made. What *is* highlighted in these studies is that women are at greater risk of HIV infection and this data should result in shifts in prevention programmes and care policies for this cohort, which uses bottom-up approaches.

2.2.2 Education and risk of exposure to HIV

Fadness, Engebretsen, Wamani, Semiyaga, Tylleskar and Tamwine (2009:124) in their Eastern Uganda study confirmed that the educational levels of HIV-positive women were generally lower than that of women from the general population. It was also found that better educated or socio-economically positioned women fed their children better than their less educated and poorer peers. They report that HIV-positive women were poorer than general population women. This view was challenged by Reither and Mumah (2009:127) who used data from the 2004 Cameroon Demographic and Health Survey and found that 4% of women with no formal education, 7% of women with primary education and 8% of women with secondary or more education tested positive for HIV in Cameroon. This view was supported by Wojcicki (2005:34) who after analysing 36 studies, found in 15 of them no association between socio-economic status (SES) and HIV infection, in 12 of them an association between high SES and HIV infection, in eight of them an association between low SES and HIV infection, while one study offered mixed results. This data is crucial in cautioning against the generalisation that low levels of education (which is one indicator used to determine SES) are directly

associated with HIV infection. This data also challenges Okigbo, Okibgo, Hall and Ziegler (2002:631) who aptly stated that “it is widely accepted that lower socio-economic status makes a group more susceptible to various health problems, including HIV/AIDS”. Regarding marital status, Reither and Mumah (2009:127) found that 3.5% of single women and 4.8% of married women tested positive for HIV. The higher rate in married women again suggests that one should not generalise that single women are more prone to HIV infection. With regards to access to piped water in their homes, it was found that 58% of urban residents had access and 87% used electricity as an energy source (South African Demographic Health Survey (SADHS) 2004:1).

Apart from the study by Jones and King (2005:1), which examines the actual proportion of HIV-exposed babies, the researcher has made inferences about the proportion of infants exposed to HIV in South Africa and in Gauteng from the data of antenatal women infected with HIV. In this study, the researcher will look at HIV-positive women in the postnatal wards in a district in Gauteng, and will aim to highlight the demographics of these women in terms of age, location, marital status, educational level, access to water and electricity, etc. This will provide a better context to the studies highlighted above.

2.3 MANUAL EXPRESSION OF BREAST MILK

All the nutrients required for good brain development is obtained from breast milk, including the antibodies commercialised milk (formula) does not contain (Israel-Ballard, Abrams & Coutsoudis 2007b:5). Manual expression of breast milk is a criterion for UNICEF Baby-Friendly Hospitals and, according to Israel-Ballard et al (2007b:5) should be taught to every mother for healthy exclusive breastfeeding. However, acceptability of touching breast milk by hand when expressing should be explored in detail as some ethnic groups in Uganda consider breast milk sacred and will not allow it to spill or fall to the ground or be mishandled in any way (Uganda Ministry of Health & Wellstart International 1994:22).

2.3.1 Comparison of milk volumes yielded using manual expression, hand-held pump, electric pump and the foot-pedal pump

Research on the comparison of milk volumes using the above techniques was done and revealed contradictory results. Becker, McCormick and Renfew (2008:2) searched the Cochrane Pregnancy and Childbirth Group's trial register from 1982 to 2007 to learn of any difference in milk volumes yielded through the use of manual expression, electric pump or non-electric pump. The aim of the study was to assess the acceptability, safety, effect on milk composition, bacterial contamination of milk and cost implications of a range of methods of milk expression, including hand expression and manual, battery-operated and electric pumps.

2.3.1.1 Electric and foot-operated pump result in greater milk volume

An electric and foot-operated pump yielded greater volumes of milk expressed over six days compared to hand expression (Becker et al 2008:2). This view was maintained by Slusher, Slusher and Biomdo (2007:125) who conducted a randomised controlled trial in Africa and used a double electric breast pump, a double non-electric pedal pump and manual expression. Significant differences were found in the mean milk volumes between the electric pump group and the manual expression group on day two. The breast pump yielded 173 ml and manual, 97ml. The mean milk volume on the first day was not significantly different (58 ml versus 67 ml) (Slusher et al 2007:125). No additional information was stated on why the results were 'not significantly different', leaving caveats in the study analysis particularly since most of the studies found that electric and manual breast pumps yielded significantly more milk volume than manual expression. What the above researchers do not state is whether expressing soon after birth or after a specified time period would make any difference to milk volume, using the same technique or a different one, as was found with Ohyama, Watabe and Hayasaka (2010:39).

2.3.1.2 Hand-held pump results in greater milk volume

Similar to Becker et al (2008:2) and Slusher et al (2007:125) and Paul, Singh, Deorari, Pacheco and Taneja (1996:87) compared two methods of breast milk expression, namely the manual and hand-held pump method and found that the volume of milk on

day 4 and 5 was greater in the hand-held pump method than the manual method. No mention was made of milk expressed on days 1 and 3 and the volumes yielded. In addition, it is not stated whether the manual method of expression resulted in a greater volume of milk expressed compared to the hand-held pump, leaving caveats in this study as well.

2.3.1.3 Manual method results in greater milk volume

Ohyama et al (2010:39) found results contrary to Becker et al (2008:2), Slusher et al (2007:125) and Paul et al (1996:87). The study by Ohyama et al (2010:39) was conducted with 11 women whose infants were in neonatal intensive care in a hospital in Japan and assessed expression of breast milk using the manual technique and electric breast pump six hours after birth. Net milk yield per woman was 2ml manually and 0.6ml by electric pump (Ohyama et al 2010:39). Could the time of postnatal expression play a significant role in the volume yielded by hand expression and by electric or manual pump? Ohyama et al (2010:39) clearly stated the postnatal period the study was conducted in, which provides the reader with some level of comfort in knowing what was being expressed was mainly colostrum. Dyer (2009:1) reports that women, who expressed colostrum at least 6 times daily during an infant's first 3 days of life, produced the most breast milk later on. It is only much later in the postnatal period that mature milk could be expressed as mothers' milk is established. Dyer (2009:1) also states that hand expression produces 'the most breast milk'; however, what is not stated is what this method of expression is compared to and what the volumes yielded were. It is the researcher's opinion that this statement should therefore be accepted with caution.

Interestingly, Fewtrell, Lucas, Collier and Lucas (2001:126) compared the efficacy of a mini electric pump (MEP) and a novel manual breast pump (MP). Sixty breastfeeding mothers used the two methods eight weeks postpartum. No significant difference was found in the milk volume or fat content using the two pumps.

The findings, particularly of Ohyama et al (2010:39), Becker et al (2008:2) and Slusher et al (2007:125), have implications for this current research as the researcher aims to explore whether HIV-positive mothers will use the flash-heat technique, which involves manual expression of breast milk (postnatally from birth) for a period of four months. From the studies above, it is evident that milk volumes yielded by hand expression

ranges from 2 ml to 97 ml from six hours after birth and longer, suggesting that this cohort of women could manually express sufficient amounts of breast milk to feed their infants over the specified time period.

2.3.2 Bacterial contamination

A particular concern for this study is the possibility of bacterial contamination of hand expressed samples since this study calls for expressing of breast milk by hand at home, in 'unsterile' conditions. The researcher's concern about the possibility of bacterial contamination is valid, taking into account the different home environments this cohort sample may come from. Boo, Nordiah, Alfizah, Nor-Rihaini and Lim (2001:274) studied rates of bacterial contamination of expressed breast milk obtained by manual expression and breast pumps in mothers with low birth weight infants. Results were encouraging and found that breast milk expressed manually had a significantly lower rate of contamination of staphylococci and gram-negative bacilli, compared to breast milk expressed by breast pump.

2.3.3 Cultural acceptability

The second concern raised by the researcher is whether manual expression of breast milk will be culturally acceptable to most South African breastfeeding mothers.

Uganda Ministry of Health and Wellstart International (1994:22) studied manual expression of breast milk in Uganda and found that there is a strong cultural prohibition against expressing breast milk and feeding it to a baby. Similarly in Rwanda, mothers considered it strange and unnatural to express breast milk for infant feeding (Wellstart International and Rwanda Ministry of Health 1996:29). Furthermore, taboos may also hinder the practice of expressing. Rwandan women for example, do not believe in having any physical contact with a second breastfeeding woman. If contact is established, the mother with 'insufficient' milk can pass the malady on to the one with more milk, thereby 'infecting' her with milk insufficiency (Wellstart International and Rwandan Ministry of Health 1996:1).

Israel-Ballard, Abrams and Maternowska (2006:48) studied the acceptability of manual expression of breast milk in detail in Zimbabwe, using 13 focus group discussions with

77 participants. Results proved that within the three urban and rural areas in Zimbabwe, various cultural prohibitions relating to manual expression of breast milk and feeding it to an infant existed. Most common cited prohibitions were that a non-breastfed infant acted as a prophet to reveal that either the mother or the father had been unfaithful, expression of breast milk was a sign of infidelity and those touching human milk become contaminated. One cultural prohibition learnt in South Africa, is that a live baby that follows a stillborn or a sibling that has died shortly after birth, should not be breastfed before a ritual is performed to cleanse that baby from evil spirits (personal communication, ward manager and postnatal nursing staff, Tembisa Hospital). The beliefs cited in these studies have significant bearing on the adoption of the flash-heat method in similar black communities in South Africa, which could as a result affect acceptability of the technique in its entirety.

Manual expression of breast milk gives a mother a certain level of control. Morrison (1999:5) aptly states that the mother who provides her own milk for her infant has absolute control over her milk supply and can assure her infant's food security for the entire lactation period. Being 'in control' of something is personally satisfying and the statement by Morrison (1999:5) should be used by health workers in counselling on infant feeding methods as HIV-positive mothers often have low levels of self-efficacy in relation to infant feeding (Doherty, Chopra & Colvin 2006:1).

2.4 PASTEURISATION METHOD OF DEACTIVATING HIV

The World Health Organization (WHO) is the pioneer agency in health promotion worldwide; however the researcher is of the opinion that some of its recommendations in the area of infant nutrition appear impractical in real-life situations. One example is the recommendation made on the heat treatment of human milk for infant feeding purposes. This is an infant feeding option encouraged by the WHO, although not well-defined for practical purposes (Israel-Ballard et al 2005:175). The WHO provides no instructions as to the length of time or temperature needed to maintain the nutritional value of milk while inactivating any HIV-1 which may be present (Israel-Ballard et al 2005:175). Any inactivation of harmful bacteria is via heat, particularly via boiling (Smith 2011:1). However, length of time for heating and method of heating should be examined as these can have devastating effects on health (Israel-Ballard et al 2005:175). The WHO recommendation of heat activation, although useful, could

potentially cause more harm than good if followed without any guidelines. Fortunately, researchers independent of the WHO have studied this option and have provided guidance on a safer approach highlighting specified heating times and vitamin content detained in the breast milk (Harding 2005:1).

The pasteurisation method is derived from a French chemist named Louis Pasteur who in 1864 discovered that liquids such as milk could be heated to a temperature slightly below boiling point and held there for a set amount of time to eliminate the most deadly bacteria. The process of pasteurisation is named after him in recognition of his contribution to food safety and disease (Smith 2011:1).

Breast milk pasteurisation is a High-Temperature Short-Time (HTST) method of heat treatment. The milk is brought to a temperature of 71.7°C and held there for 15-30 seconds before being rapidly cooled (Smith 2011:1). Other authors suggest that the boiling temperature be brought to 61°C for 15 seconds (Brook 1999:1). Pasteurisation is safe; however, this process could prove difficult if done at home where equipment such as temperature gauges and rapid cooling vessels are not available. It would be imperative to ensure that the correct temperature is reached in order for all bacteria to be safely deactivated. Not having the correct resources could result in this technique not being as effective as stated.

While pasteurisation kills many micro-organisms in breast milk, improper handling and storing (after the pasteurisation process) can re-contaminate milk (Smith 2011:1) However, those with access to a microwave oven could be tempted to microwave milk in an attempt to rid it of bacteria, as heat has been shown to deactivate harmful bacteria (Smith 2011:1). Microwaving could be seen as quick and might be viewed by some as adequate heat treatment of milk to rid it of harmful bacteria, given that sufficient heat is generated to heat and defrost food when used for everyday use. However, pasteurisation or heat treatment of milk should not be confused with microwaving as microwaving has uneven heat distribution which does not allow all milk particles to be heated sufficiently (Smith 2011:1). This could result in pockets of harmful bacteria still present in milk, making it unsafe for consumption.

2.4.1 Immunologic factors of heated milk

In light of the research on the susceptibility of HIV-1 to heat (Pennypacker, Perelson, Nys, Nelson & Sessler 1995:321), heat treatment of infected breast milk (which appears to be a simple, inexpensive strategy applicable in impoverished areas) should be viewed with some caution. This sentiment is shared by Israel-Ballard and others in the field that studied the negative impacts of excessive heat treatment on breast milk's immunologic factors, and questioned the long-term benefits of feeding heat-treated breast milk (Israel-Ballard et al 2005:175) and (Pennypacker et al 1995:321). This view is further supported by others who reported that exposure of breast milk to high temperatures (above 62°C) for long periods (30 minutes) causes' significant loss of immune functions such as IgM and lactoferrin. It also reduces IgA levels by 20% (Ford, Law, Marshall & Reiter 1977:29). Ford et al (1977:30) treated milk at 56°C and adhered to the temperature of below 62°C and found that IgA and iron-binding capacity in breast milk are conserved. Furthermore, they state that this treatment of milk should continue for 30 minutes.

In contrast, Orloff, Wallingford and McDougal (1993:13) found that at 56°C cell-associated HIV-1 was still detectable after heat treatment. In light of the above results on the various temperatures and times for pasteurisation to occur successfully, it is clear that Smith (2011:1), Pennypacker et al (1995:321), Israel-Ballard et al (2005:175), Ford et al (1977:29) and Orloff et al (1993:13) suggest that this method would be best suited for use in a laboratory setting or in large industrial sites where the temperatures and times are strictly monitored with the required equipment. Home use of this method of heat treatment would not be recommended as preparation of food is prepared in an informal manner, using minimal resources, usually in a social setting. Monitoring temperatures and cooking times closely in order to ensure that the correct times and temperatures are maintained, may make this method seem too complicated for mothers who want to heat treat their expressed breast milk in an uncomplicated manner. Slight deviations in temperature or time could potentially cause significant damage to the health of many infants and could have devastating results. Because of the dangers in time and temperature deviations, research into this feeding option should be encouraged.

2.4.2 Pretoria Pasteurisation

Pretoria Pasteurisation came about when Dr Bridget Jeffrey of Kalafong Hospital tested the use of placing a jar containing 50-150 ml of expressed milk into a pot of 400-500 ml of freshly-boiled water. The milk was left in the hot boiled water for 20 minutes and then cooled for 15 minutes, after which it could be fed to the infant (Israel-Ballard, Chantry, Donovan, Sheppard, Carlson, Lonnerdal, Sage & Abrams 2004:1). Equipment required for this method includes a simple aluminium pot, a peanut butter jar, a kettle to boil water and a clock. Unlike the flash-heat method where the water is boiled in a pot on a stove (Israel-Ballard et al 2005:175), here the water is boiled separately and poured into the pot which holds the glass jar and is allowed to stand (Israel-Ballard et al 2004:1). This method of pasteurisation has been called Pretoria Pasteurisation after being tested in Pretoria. Harding (2005:1) adds that with this method, the milk should be left to cool to 37°C. On examining the Pretoria Pasteurisation method, the researcher rated this method as being more practical and easier to implement by mothers at home, compared to the pasteurisation method described above. Pretoria Pasteurisation requires materials/resources easily available at home; however, this is not the preferred method of heat treating expressed breast milk for the purpose of this study.

2.4.3 Flash-heat

Flash-heat (FH) is similar to Pretoria Pasteurisation where milk is heated to high temperatures to rid it of harmful bacteria; however in the Pretoria method most of the nutritional qualities of milk are destroyed (UNICEF 2010:1). The significant difference is that flash-heat, unlike Pretoria Pasteurisation, brings milk to heat over a short period of time. This is referred to as High-Temperature Short-Time (HTST) (Dhar, Fichtali & Skura 1996:569). The HTST method works best to kill micro-organisms while retaining the nutritional value of the milk when compared to the High-Temperature Long-Time (HTLT) which Pretoria Pasteurisation follows (Chantry et al 2009:264). In the flash-heat method, cheap, readily-available equipment is used at home in resource-poor communities (Israel-Ballard et al 2007a:318).

The researchers Israel-Ballard and South African and Canadian colleagues examined the WHO-recommended strategy of flash-heating of expressed breast milk (Harding 2005:1). This is a method by which HIV-positive mothers express and heat their own

milk to 62°C. This high temperature reached in a short time is what is thought to destroy the HI virus. This method of heat treating expressed breast milk retains all the benefits of the nutrients and the immunological protection against infectious diseases necessary to keep a baby healthy. The technique was designed to mimic commercial flash-pasteurisation, HTST pasteurisation method. High-Temperature Short-Time methods more effectively kill micro-organisms while better preserving nutritional food value, when compared to Low-Temperature Long-Time pasteurisation (LTLT) methods (Dhar et al 1996:569).

In order to successfully flash-heat expressed milk, one is required to heat the breast milk and water together in a water bath. The breast milk (75-150 ml) is collected in a clean glass jar and placed in a pan with water and is allowed to boil uncovered. When the water boils, the milk is removed from the heat source and allowed to cool. The cooled milk can then be fed to the infant (Israel-Ballard et al 2007a:320). Similar versions of this technique exist, such as that discussed by Morrison (1999:7), who describes it as waiting for bubbles to appear around the edge of the milk before removing it from the heat source.

As can be expected with new evidence, uncertainty and speculation has surrounded the validity of the claims made by Israel-Ballard et al (2007a:321). The researchers themselves stated that “some uncertainties remain about how effectively the heating method eliminates infectious virus particles from breast milk”. Subsequently, they further researched the technique’s ability to rid breast milk of all HIV (Israel-Ballard et al 2007a:321).

The different studies conducted in Zimbabwe, Tanzania, South Africa and Kenya (Chantry, Morrison, Panchula, Rivera, Hillyer, Zorilla & Diaz 2000:325) on the FH technique of infant feeding were mainly qualitative and used focus group discussions and assessed acceptability of the technique as well as bacteriological safety of the expressed milk.

2.4.3.1 Flash-heat study in Zimbabwe

The FH technique was initially studied in Zimbabwe in 2001 with 13 focus groups consisting of mothers, fathers, grandmothers and birth attendants. The aim of the study was to assess acceptability of this technique. The initial results of the focus groups proved that these decision-makers questioned the practicality and acceptability of the technique and more importantly, its safety. However, opinions changed after this method was discussed in greater detail, focusing on its feasibility in the home setting (Israel-Ballard et al 2006:50). Participants in the Zimbabwe focus groups were highly impressed by the reduced cost of expressed, flash-heated expressed breast milk and believed that the method could eventually be applied in their homes. Women in Zimbabwe, as in many other African countries, already knew how to express breast milk, and the utensils needed to heat and feed the milk to their infants are usually available at home. The group's final stance was that decisions on safer infant feeding methods would require communication between the parents and extended family plus require intensive community education, counselling and support (Israel-Ballard et al 2006:56).

A second study in Zimbabwe looked at the feasibility of expressing and heat treating all breast milk fed to HIV-exposed, uninfected infants following six months of exclusive breastfeeding. Over eight weeks, 20 mother-and-baby pairs received intensive counselling on lactation, expressing and heat treating (EHT) breast milk, and on complimentary feeding. Quantitative and qualitative data was collected on the mothers' EHT experience, children's diets and anthropometric measurements. During the eight weeks, no faltering on growth measurements for height and weight were experienced. Additionally no barriers to the technique related to stigma were experienced. The researchers concluded that EHT can be a strategy for improving HIV-exposed but uninfected children's diets, after breastfeeding has stopped (Mbuya, Humphrey, Majo, Chasekwa, Jenkins, Israel-Ballard, Muti, Paul, Madzima, Moulton & Stoltzfus 2010:1481).

2.4.3.2 Flash-heat study in Tanzania

The objective of the study in Tanzania was to determine the feasibility of FH once complementary foods were introduced. In this longitudinal study, community health

workers followed up 100 HIV-positive mothers in Dar-es-Salaam weekly for nine months. Weekly surveys about infant health and feeding practices were done and unheated and heated milk samples were collected bi-weekly. The mean frequency of manual expression was 4.8 times daily (range 1-7). Mean daily milk volume was 435ml (range 60-1080 ml). Twenty-three out of seventy-three (23/73) unheated milk samples contained pathogens; all FH samples were bacteriologically negative. Only 50% of FH mothers disclosed their HIV status to their spouse and the community health workers observed that stigma may be an obstacle to implementing FH at home for some women (Young, Chantry, Ngonyani, Israel-Ballard, Ash & Nyambo 2009:443). There is a second ongoing study by Dr Caroline Chantry and Kiersten Israel-Ballard in Tanzania termed 'Feasibility and Pilot Efficacy of flash-heated Breast Milk to Reduce Mother-to-Child-Transmission of HIV in Tanzania'. This is a study secondary to the first and is investigating the feasibility of HIV-positive mothers' ability to effectively flash-heat after intensive peer-group counselling on infant feeding.

2.4.3.3 Flash-heat study in South Africa

To substantiate the researchers' claims that the FH method (which is HTST) kills micro-organisms while retaining the nutritional value of the milk, when compared to the HTLT method which Pretoria Pasteurisation technique follows, the researchers evaluated the impact of the flash-heat method on HIV-1 in breast milk samples of 84 HIV-positive mothers from Durban. Of 98 unheated samples, 31 tested positive for cell-free HIV-1. After flash-heating, "no evidence of the virus remained" (Israel-Ballard et al 2007a:319). Heating *did however reduce* the concentration of eight immunoglobulins (Igs) studied, but more than 66% of each was retained meaning that flash-heated milk is still superior to breast milk substitutes (Chantry et al 2009:264). On vitamin retention, the researchers were pleasantly surprised when results indicated that Vitamin A was not significantly affected by flash-heat and levels of Vitamins B12, C and folate increased (Israel-Ballard et al 2008:445). Furthermore, in 50 breast milk samples from the same cohort, when compared with unheated breast milk, flash-heated samples retained 90% or more of five of the six vitamin assays (Israel-Ballard et al 2007a:320). These investigations were done to replicate the original findings on Pretoria Pasteurisation (Harding 2005:1). This evidence puts the reader at greater ease in knowing that most of the nutritional qualities of the breast milk (which have been stated before) are not lost

when heat treating but are in fact retained, thereby still making it superior to formula milk.

Microbiological assays also indicated that breast milk could be safely stored at room temperature for eight hours after using the flash heat method (Israel-Ballard et al 2007a:320). This is a crucial statement as many do not have access to electricity and a refrigerator for safe storage of the heat-treated breast milk and could still safely use this method for infant feeding.

The above researches came to the conclusion that "flash-heat may be a safe and affordable method for home pasteurisation for HIV-positive mothers in developing countries, of particular value during times of greater risk for HIV transmission, such as during episodes of infant oral thrush or maternal mastitis or upon addition of complementary foods" (Israel-Ballard et al 2007a:319). However, the researcher has the following reservations about these FH studies. The study setting in South Africa was mainly laboratory-based where the environment is controlled and the conditions are sterile. Laboratory conditions leave little room for 'human error' as could be the case if this experiment/research was conducted in a home (real-life) setting which is often crowded and not ideal for research. An in-home setting comes with real-life situations which could have significant impacts on the validity of the claims laid by Israel-Ballard et al (2007a:319). There were concerns of possible contamination of breast milk after expressing at home, as well as while storing the milk prior to feeds and during feeding. Secondly, the acceptability study conducted in Zimbabwe included fathers, mothers, birth attendants and grandmothers. The presence of all these decision-makers in the same focus group could possibly have affected the gender dynamics of that group, resulting in biased views. The second study in Zimbabwe was conducted in a home-setting; however, the conditions for the study were yet again not similar to real life situations. Over eight weeks, the research participants all received intensive counselling on lactation, EHT of breast milk and on complimentary feeding. All antenatal mothers in South Africa receive once-off antenatal counselling on infant feeding methods (NDoH 2001:1) on a one-on-one basis with a nurse; however the counselling does not result in sound infant feeding choices. The intensive counselling received during the Zimbabwe study could have played a significant role in the final study outcome as no growth faltering or barriers related to HIV stigma were reported. These participants were biased in that they received valuable educational and

psychosocial support, enabling favourable study outcomes. Intensive counselling on infant feeding in this study could have touched on the finding that home foods are generally poorer in nutritional quality with deficits in energy, vitamin A, iron, calcium, zinc, and other essential nutrients, resulting in malnutrition (WHO 1998b:1). Also noteworthy is that the short time period (eight weeks) could be the reason there were no stigma barriers to the FH method observed in the home, as all personal reservations to the disease could have been withheld over that time period. In contrast, the Tanzania study was also conducted in a home setting; however it was nine months long and interestingly, stigma was identified as a possible barrier to implementing FH in the home.

After reviewing the pros and cons of the FH technique in a laboratory and home setting, the researcher concludes that if a mother exclusively fed heat-treated breast milk to her infant several times each day, or while introducing complementary foods, it could significantly impact the infant's nutritional intake as well as provide immune protection unique to breast milk, thus lowering risk of morbidity and mortality from HIV and non-HIV diseases. Secondary to this is the recognition that further research is warranted on bacterial contamination, feasibility in the home and acceptability of this method as interest varied (Israel-Ballard et al 2006:51). Not much is known about the mothers who are interested in this method and prefer it over all other feeding methods.

2.4.4 Holder Pasteurisation

The Holder method of pasteurisation has been used since the early days of milk banking (Jones & King 2005:1). Use of this method in breast milk pasteurisation was directly derived from its use in cow's milk samples in an attempt to rid the milk of disease-causing pathogens, making it fit for human consumption. This method is most suited for stripping contaminants such as HIV, human T-lymphoma virus, tuberculosis and other bacterial contaminants from breast milk (Douglas, Frances & Mary 2001:1).

This method successfully ensures that the bacterium responsible for tuberculosis in cattle is not transmitted to humans. Holder Pasteurisation of breast milk involves raising the temperature of the milk to 62.5°C and *maintaining that temperature for 30 minutes* (Jones & King 2005:1; Douglas et al 2001:1). The milk is then quickly cooled. The rapid cooling allows minimum destruction of milk components. Temperatures higher than

63°C result in significant losses of the milk's nutritional benefits. However lower temperatures effectively increase the retention of the milk's anti-infective agents such as Immunoglobulin A (IgA) (Jones & King 2005:1). This method is known to inactivate infectivity effectively of both cell-free and cell-associated HIV-1 in breast milk (Orloff et al 1993:14).

2.5 EXCLUSIVE BREASTFEEDING

"Exclusive breastfeeding, which is threatened by the HIV epidemic, remains an unfailing anchor of child survival" (Coutsoudis et al 2009:1).

Expressing and heat treating (EHT) breast milk and the benefits thereof were mentioned by Israel-Ballard et al (2006:48) as a good method of feeding infants during the transition from exclusive breastfeeding to complementary foods; however for this study, the researcher is looking into utilising this method of feeding exclusively from birth to four months.

Exclusive breastfeeding (EBF) is best for the long-term health of an infant. This finding is supported by many across the world, yet is not practiced widely across Africa. Exclusive breastfeeding is rare in West Africa and reasons for this behaviour remain unknown (Patel, Bland, Coovadia, Rollins, Coutsoudis & Newell 2010:437-445). A study found that out of 500 women, only 54% exclusively breastfed and 46% could not. The reasons for the poor EBF behaviour ranged from returning early to work, quenching baby's thirst and perception of the unattractiveness of a woman's breast if she breastfeeds (De Paoli et al 2001). Similarly, a study in Rwanda concluded that new mothers to male infants are separated from them for one to two days so that a simple ritual could be performed. During that time, the infant is fed on sorghum, banana drink or fruit juice (Wellstart International and Rwanda Ministry of Health 1994:22). Bland, Rollins, Slorash, Van Den Broeck and Coovadia (2003:778) also found that 46% of 149 women studied mix-fed their babies. From reviewing literature, it appears that although breastfeeding is practiced in African societies, exclusive breastfeeding is not maintained, though encouraged by literature and public health pioneers such as the WHO. On learning this, the researcher's assumption is that exclusive breastfeeding may not be viewed as critical by new mothers in the fight for infant health and survival, particularly with the impact caused by HIV and AIDS. This was evident from a study

with 130 mothers and their breastfeeding practices over six to nine months (particularly EBF) where 13% could not recall whether or not they gave their babies supplementary foods at 13 weeks (Bland et al 2003:778).

A study of 119 infants in Mtubatuba showed that only 10% were exclusively breastfed for six weeks and 6% for 16 weeks. Supplements, most commonly formula milk, were introduced once mothers perceived their milk to be insufficient (Bland, Rollins, Coutsoudis, Coovadia & Child Health Group 2002:615). Similarly, Fadness et al (2009:124) found in a study comparing breastfeeding practices with HIV-positive mothers and those from the general population, that more than half of all the mothers (total 962) fed their infants something in addition to breast milk during the first three days. The findings of this study support those of Becquet, Bland, Leroy, Rollins, Ekoulevi, Coutsoudis, Dabis, Coovadia, Salamon and Newel (2009:7397) which state that duration of exclusive breastfeeding remains poor with breastfeeding mothers. In support of Bland et al (2002:615) and Becquet et al (2009:7397), Coovadia et al (2007:1107) found that 1132 of 1372 (83%) infants born to HIV-positive mothers initiated exclusive breastfeeding from birth and the duration of cumulative exclusive breastfeeding was only 159 days. It is encouraging that in South Africa, high rates of exclusive breastfeeding were found, however, the duration remained poor (Becquet et al 2009:7397) as in the cases above.

A review of 20 studies on exclusive breastfeeding indicated that there was no evidence that breastfed babies gained sufficiently lower weight and length than their formula counterparts. Furthermore, the iron levels of breastfed and formula fed babies were comparable; however this should be viewed with caution as the iron levels of babies born in developing countries is already compromised (Kramer & Kakuma 2002:3517) due to other factors; possibly due to home-cooked (prepared) meals being nutritionally inferior (WHO 1998b:1).

A study in Zimbabwe, conducted with 4,000 HIV-positive mothers and their infants, found that early introduction of other foods in the first few months of an infant's life posed substantial health risks. Infants who were mixed-fed were four times more likely to have acquired HIV at six months when compared with infants who were exclusively breastfed. Those infants who were exclusively breastfed in the first few months of life were better off later, when replacement food was given along with breast milk.

Compared to these, babies who were mixed-fed early were four times more likely to have acquired HIV at 12 months (Iliff et al 2005:699). This study confirms earlier findings of other similar research (Coutsoudis et al 2001:379).

The Zimbabwe study also found that babies who were exclusively breastfed for the first three months, then fed water, tea or juice, were three times more likely to contract HIV by 12 months compared to those who were exclusively breastfed (Iliff et al 2005:700). This strengthens the statement that mixed feeding poses substantial risks to babies and their gastrointestinal health.

Past observational studies in South Africa suggested a protective role for exclusive breastfeeding against HIV transmission (Coutsoudis, Pillay, Spooner, Kuhn & Coovadia 1999:354). The initial study in South Africa did not indicate a statistically significant protective effect of early exclusive breastfeeding after also studying maternal risk factors. Subsequently, however, several other studies have suggested a strong and statistically significant protective effect of exclusive breastfeeding for infants for the first three to six months of life, compared with mixed feeding, in reducing the risk of postnatal transmission (Iliff et al 2005:699), and (Coovadia et al 2007:1107). But there were several limitations in these studies in terms of sample size, the inability to fully control for maternal virologic factors, and the difficulty in validating actual infant feeding practices, since most data on infant feeding was based on the report mothers gave.

One may be tempted to think that exclusive breastfeeding is questionable with an ailing HIV-positive mother. This, however, has been disproved by studies in Tanzania (Sedgh, Spiegelman & Larsen 2004:1043) and Zambia (Kuhn, Kasonde & Vwalika 2004), showing that breastfeeding does not pose any health risk or cause mortality to an HIV-positive mother.

2.6 INFANT FEEDING CHOICES HIV-POSTIVE MOTHERS MAKE

In chapter 1 the researcher alluded to the fact that HIV-positive mothers are still torn between the decisions to breastfeed or formula feed their babies. Feeding options available to HIV-positive women in developing countries are still limited. Social and cultural variability influences feeding practices within individual families, and feeding recommendations to this cohort of women must take this into account. Possible

reasons HIV-positive mothers do not know which infant feeding method to follow and maintain could be related to their social, financial and familial conditions as well as the lack of effective, sustained support from antenatal nurses. The international health fraternity has also made and retracted certain recommendations on infant feeding, possibly resulting in more confusion around the subject.

2.6.1 HIV-positive mothers making poor infant feeding decisions

A study in Uganda found that HIV-positive women appeared to make poorer infant feeding decisions compared to the general population mothers due to their fear of the association of breastfeeding and HIV transmission. They opted to mix-feed more frequently than their counterparts (Fadness et al 2009:124). Reasons for their mixed feeding behaviour other than the perception of insufficient food have not been further explored (Fadness et al 2009:124). This is similar to the belief of having insufficient milk even though it is extremely rare physiologically to have insufficient milk. Milk quantity is a function of demand and most perceptions are caused by insufficient suckling (Wellstart International and Rwandan Ministry of Health 1996:1).

It was stated that for 7% of all breastfeeding mothers in South Africa, supplementation of breast milk with other foods started early (SADHS 2003:1), that they believed that their breast milk was insufficient for growth (Sibeko et al 2005:32) and that they rarely practiced exclusive breastfeeding after three months (Omari et al 2003:156; Poggensee et al 2004:477). According to Lala (2000), other milks were introduced by 52% of mothers within the first month of feeding and within three months, 82% of mothers had introduced other milks to their infants. Similarly mothers in Rwanda feed their infants water before the milk comes in to “satisfy thirst” or to “cleanse the digestive system”. Sometimes the water is sweetened or salt added. After nursing is initiated, the same water is given at intervals until the mother’s white milk comes in (Wellstart International and Rwandan Ministry of Health 1994:1).

2.6.1.1 No breastfeeding for fear of vertical transmission

Chopra and Piwoz (2000:1) assessed the attitudes of 11 HIV-positive mothers regarding feeding their infants breast milk exclusively. All 11 mothers opted not to breastfeed and 10 of 11 refused to believe that exclusive breastfeeding results in lower transmission

rates when compared to mixed feeding. HIV-positive mothers all believed that they would definitely transmit the virus to their infant if they breastfed and they were not willing to take this risk. Similarly, Fadness et al (2009:124) found in a survey in Uganda, which consisted of 727 randomly selected general-population mother-infant pairs with unknown HIV status, and on 235 HIV-positive mothers, that supplementary foods were given to 150 (64%) infants of the HIV-positive mothers and 414 (57%) infants of general-population mothers. Exclusive breastfeeding of infants under the age of six months was more common in the general population than among the HIV-positive mothers. In studies by Chopra and Piwoz (2000) and Fadness et al (2009:124), counselling on up-to-date infant feeding options was given. However, women continued to make the poor feeding decisions mentioned above.

2.6.1.2 Infant feeding decision based on poor counselling

Infant feeding practices were not assessed based on the counselling provided; however the message that HIV is transmitted via breast milk may have resulted in these unwarranted decisions. Chopra, Doherty, Jackson and Ashworth (2005:357) evaluated the quality of counselling in South Africa through structured observations and exit interviews in three PMTCT pilot sites and found that counsellors did not use a comprehensive assessment of a woman's social and economic resources for implementing various feeding options. They found that counselling on infant feeding was done purely on the basis of the mother's HIV status.

The choices these mothers make on infant feeding could be based on what they think is most suitable according to their upbringing, or social pressure (Kritsonis 2005:1). Alternatively, the women's social and financial situations may be the primary forces behind the feeding decisions made for their infants. The Ethiopia study with HIV-positive mothers found that infant feeding decisions were influenced by disclosure of HIV status to a significant other (mainly spouse), household income and mode of delivery (Maru & Daidar 2009:114).

This study will provide the researcher with an indication of the infant feeding choices of HIV-positive mothers at Tembisa Hospital. Based on the theory that one's environment causes one's behaviour (Boeree 2007:1), the researcher will deduce that the current hospital environment plays a significant role in the feeding options chosen by these

mothers. The researcher will use a model based on theory to ascertain which principal/s were significant in explaining whether HIV-positive mothers in Tembisa would adopt the flash-heat method exclusively for four months.

2.7 THEORETICAL FRAMEWORK

Glanz, Rimer and Lewis (1997:1) described theory as "a set of interrelated propositions including concepts that describe, explain, or predict a phenomenon". Carlson and Sleet (2003:66) state that concepts are parts or "building blocks" of a particular theory (e.g., self-efficacy, social support, perceived susceptibility).

There is evidence to suggest that behaviour change is not a linear process but rather cyclical and that movement from one step to the next is a gradual process (Kritsonis 2005:1). Prochaska and DiClemente (1986) suggest that behaviour change is a five-step spiral process moving from pre-contemplation to the maintenance stage.

2.7.1 Description of study framework

The theoretical framework or theory used to approach this study is of behavioural change by Thomas E Backer (2001:20) called the *Theory of Individual and Group Change*. It was derived from four theories; these are *Bandura's Social Cognitive Theory (1977), Fishbein's Theory of Reasoned Action (1975), Kanfer's Theory of Self-Regulation and Self-Control (1970, 1971 and 1980)* and *Triandis*' *Theory of Subjective Culture and Interpersonal Relations (1977).* The theory of individual and group change is based on eight interrelated concepts which will aid the researcher in predicting behaviour to flash-heat with HIV-positive mothers.

2.7.1.1 Co-related theory

A theory that is closely related to the theory of choice is called *Fishbein's Theory of Reasoned Action (1975).* The theory of Reasoned Action states that a person's performance of behaviour is determined by that individual's intention to perform that behaviour (Kritsonis 2005:1). In other words, if a person intends or makes a conscious decision to do something (desired behaviour) then it is most likely that the person will do it. Two factors shape an individual's intention to change. These are that the individual's

attitude toward the behaviour should be positive for any change to occur, and the influence of the person's environment (subjective norm) is what shapes an individual's intention. That is, if the individual believes that conforming to the behaviour will lead to "good" outcomes and these outcomes prevent "bad" outcomes, then the person is most likely to change (Fishbein 2000). According to Albarracin, Johnson and Zanna (2005:1), intentions are good predictors of behaviour. Peer influences and motivation to comply with others' opinions also affect change in the individual. Self-efficacy is the most important characteristic for this theory (Kritsonis 2005:1).

2.7.1.2 The Theory of Individual and Group Change – Thomas E Backer (2001)

The theory by Backer (2001:20) states that a person will internalise the option of adopting an intervention (behaviour) in the following manner: First, the individual assesses whether the new behaviour is necessary. The person will look at what she/he is currently doing or not doing, and weigh the benefit of changing his/her behaviour against whether a particular problem caused by their current behaviour will be solved or not.

Thereafter the person will assess whether there are any barriers/constraints to changing to the new behaviour at home. These constraints can be emotional and social. In addition, the ability to perform the intervention is personally assessed. The behaviour should be easy to perform and the individual should have the required knowledge to understand the rationale for performing that behaviour. Two important concepts of the theory are that the behaviour does not change the individual's "sense of self" and that it presents more advantages to their state of health (in this case) than not doing it.

Subsequently, the individual should have an affinity to the newly-proposed intervention and the benefits of that intervention should be good in order for him/her to do it. This concept is related to *Fishbein's Theory of Reasoned Action* (1975), which states that a person that likes an intervention and makes a decision to do it, will perform that behaviour. Furthermore, this intervention should be performed under a number of different and difficult circumstances in the home such as overcrowding, disclosure or non-disclosure of HIV status, sharing of eating utensils and time constraints (among others). This concept is also related to *Fishbein's Theory of Reasoned Action* (1975), which states that an individual's environment at home or elsewhere is what influences

intentions to perform or not perform behaviour. And lastly, that the individual perceives pressure from a few significant others like parents, community members and nurses to perform the new behaviour.

The theory of individual and group change is fundamental to this study as an attempt to understand individual behaviour in relation to HIV and infant feeding using the flash-heat technique. The theory will assist the researcher in understanding the mothers' home environments, which are either favourable or not favourable to feeding their infants using a new technique. The theory will indicate that if a mother is committed to expressing breast milk by hand and feeding her infant only on the milk which is treated by using the flash-heat method for four months, has access to information regarding the infant feeding technique, and has the skills necessary to successfully express and flash-heat breast milk, we can predict that there is a high probability she will perform the behaviour. The probability that the mother will perform the behaviour would be predicted to increase even more if she also believes that using the flash-heat technique is worth her time and trouble, knows that her family will support her decision, believes that it is consistent with her values as a responsible mother, has no negative emotional reaction to it, and can do it under different conditions in her home.

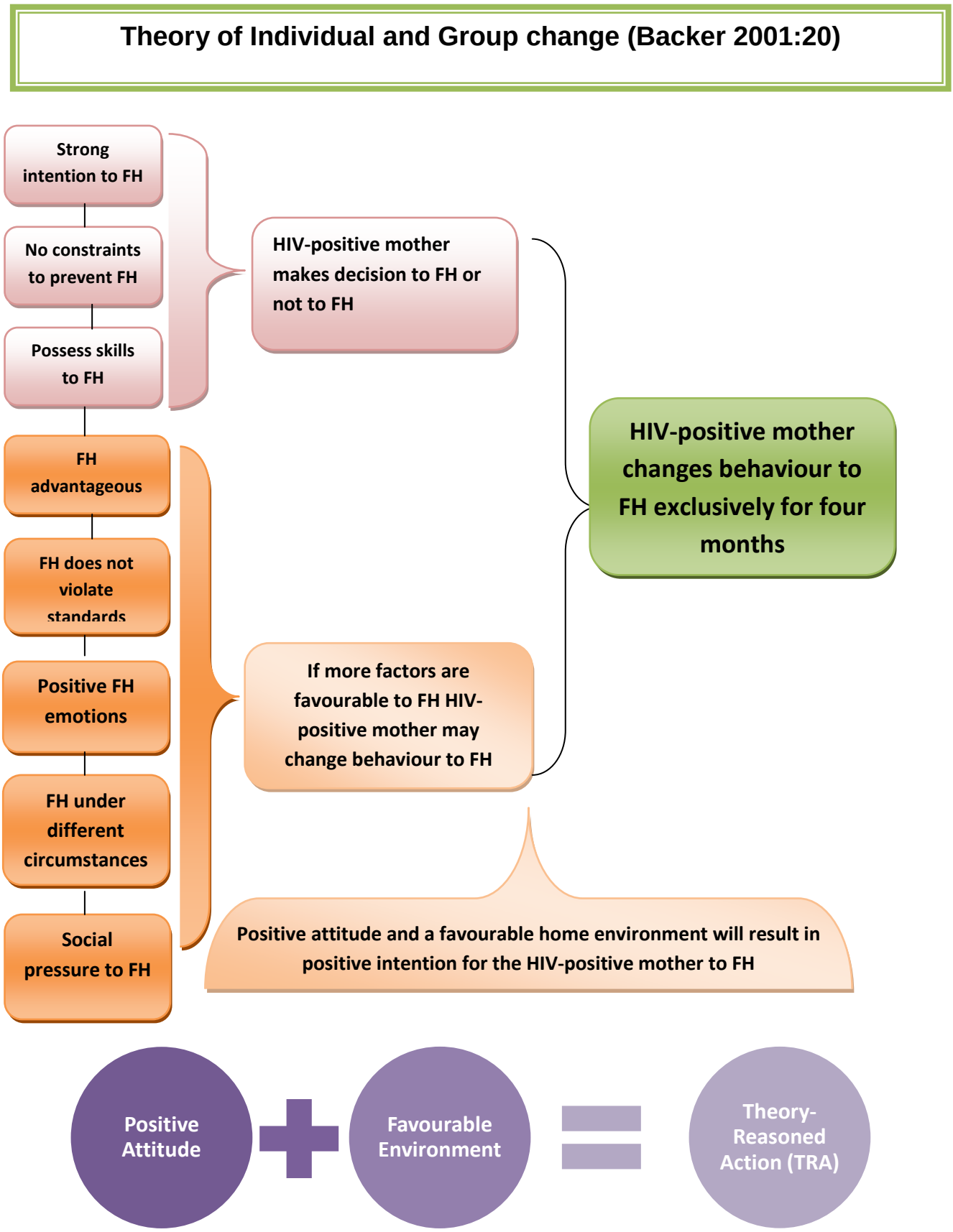

Figure 2.1 Schematic diagram of study theory

Adapted from (Backer 2001:20)

2.7.2 Framework support to study

Backer's (2001:20) theory of individual and group change has eight principles that support each other in realising behaviour. Fishbein (1995) adds that one or more of Backer's principles is needed for behaviour change to occur.

A) The first principle is that ***a person forms a strong positive intention or makes a commitment to perform certain behaviour.*** This implies that the person believes that the situation they are in is harmful to themselves or significant others and that their risk is reduced by performing certain behaviour. Furthermore, that the behaviour recommended by an intervention will lower that risk (THCU 2007:1). In this study, this could reflect as the mother perceiving her infant to be further at risk of HIV infection if she does not feed her infant exclusively on her breast milk. The new feeding technique was introduced to the mothers through a demonstration and discussion. Its health benefits related to lowering the risk of vertical transmission were explained in detail. Because HIV-positive mothers have a real need to protect their infants from HIV, this feeding technique will provide an option to assist with their feeding dilemma. The mothers will as a result verbalise preference of this method and their intentions to try or adopt it at home.

The above concept is similar to Prochaska and DiClemente's (1986) third step of their trans-theoretical model which is "preparation" to change behaviour in the five stage process. At that stage, the individual after not "being ready" and "getting ready" to change behaviour, starts "taking action" and it is usually within 30 days. In this study, the participants will verbalise their intentions with this new feeding technique and *that* will either confirm or not, their stage on the road to change in performing a new health behaviour. Backer (2001:18) adds in marketing of products, that if a person verbalises that he is interested in something, he will feel obligated and pressurised to buy that something.

Carlson and Sleet (2003:65) state that there are active and passive strategies useful for effective behaviour change and that there exists a relationship between the two. One cannot have a change in behaviour with one or the other. Both are essential. An active strategy is one that requires an individual to take an active role in protecting herself and

others around her. Which in this case is a mother protecting her infant by changing her feeding method and adopting a new evidenced-based method. A passive strategy on the other hand involves structural changes such as a change in community perspectives or the social environment or health policy. It is only when these two strategies merge that effective (and lasting) behaviour change will occur (Carlson & Sleet 2003:70).

B) The second principle of Backer's (2001:20) theory is that ***there are no environmental constraints that make it impossible to perform that behaviour.*** Constraints or barriers can be psychological such as anxiety and social pressure and tangible, such as poverty and poor access to support structures. These may occur at any level; namely personal, organisational, societal, etc. (THCU 2007:1).

Mothers are most likely to make a change to "positive" health behaviour if there are no clearly defined or visible constraints in their environment. This principle poses a problem as the researcher is of the opinion that South African society can display intolerance towards people living with HIV. A person may become disheartened or discouraged by certain obstacles or constraints, hindering a shift in behaviour (THCU 2007:1). However, our assumptions in this regard may not hold if mothers ignore societal prejudices. It is possible that, however difficult the circumstances, the behaviour of mothers will change for the better in terms of infant feeding practices.

In 1998, the Center for Disease Control and Prevention and the American Psychological Association co-sponsored a national conference on integrating behavioural and social science with public health. It was at this conference that the importance of an ecologic model in understanding and intervening in public health problems came about (Schneiderman, Speers & Silva 2001:1). Similar to THCU (2007:1), this ecologic model has a relation to this study. It states that health and wellbeing are affected by an ever-changing interaction among biology, behaviour and the environment, and this interaction changes over one's life (Kaplan, Everson & Lynch 2000:37; Sallis & Owen 1997:1; McLeroy, Bibeau & Steckler 1988:351). The relation to this study is that mothers make decisions on infant feeding based on the constraints and enabling factors in their social and home environment. The decisions these mothers make are not fixed and change as and when barriers such as stigma to HIV and AIDS and poor financial

status are lifted and the social environments become more conducive to perform a particular behaviour.

Three levels exist for translating the ecological model into action and these are described by Glanz and Rimer (1999:1). The first is the intrapersonal level, which refers to the influence of an individual's knowledge, attitudes and beliefs on her behaviour. Second is the interpersonal level, which refers to how significant the influence of other people such as family members, friends and co-workers is on an individual's behaviour. The intra- and interpersonal levels are sometimes called the "individual level." The third level is the community level, e.g. social and health policies and other societal influences, such as poverty.

C) The third principle of Backer's theory is that ***the person possesses the skills necessary to perform the behaviour.*** The person has the knowledge and practical ability to make the change in behaviour easier and doing the desired action properly so that maximum output is achieved (THCU 2007:1). Also known as "Self-efficacy", this is one's confidence in one's ability to take certain action and to maintain that action (Backer 2001:18). The flash-heat technique was taught and demonstrated to all mothers approached for participation prior to data collection. This was followed by a question and answer session. It was only after all were comfortable that they were able to perform the behaviour/technique that data collection commenced. They were taught the skills to successfully express, flash-heat and feed their babies. It is assumed that the more skills one has to perform behaviour, the easier that behaviour will become over time. Likewise it is assumed that if the mothers see that the behaviour is not difficult to perform, they will most likely verbalise a positive intention to doing it.

D) The fourth principle is that ***the person perceives that the advantages of performing the behaviour outweigh not performing it.*** People only perform certain behaviours because they believe that they will benefit significantly, that the advantages of the outcome of that behaviour far surpass the disadvantages. The benefits or costs can be yet again psychological and tangible. Psychological includes feeling withdrawn, anxious or uncomfortable. Tangible benefits include, for example, increased endurance (THCU 2007:1). If mothers believe that exclusive breastfeeding has numerous (stated) advantages and that those

advantages cannot be obtained via any other infant feeding means, then they are more likely to perform that behaviour because of the wish to realise those benefits for themselves and their infants. According to Chantry et al (2009:264) in research conducted on the FH technique, "Mothers in Africa have told us they will do anything to keep their babies alive". This statement supports this principal of the theory as stated by Backer (2001:20).

E) The fifth principle is that ***the person believes performing the behaviour is more consistent than inconsistent with their self-image or that it does not violate personal standards.*** The intended or desired behaviour should be relevant to the person's culture, beliefs, lifestyle and values (THCU 2007:1). According to Kluckhohn (1944), culture is not only derived from our up-bringing but also from our past experiences. A person's behaviour toward something or someone is directly related to the experience they encountered with that thing or person (i.e. something *that* person did in the past) or by their upbringing, which involves influences of significant others relating to something (i.e. attitudes of families to people living with HIV). Experiences from childhood, through to puberty and adulthood potentially have significant bearing on future actions. For example if a person grows up in a family that does not eat meat, not because of religious beliefs but because of choice, they are more likely not to eat meat than someone who grew up in a meat-eating family. The researcher believes that if mothers feel that they cannot express their breast milk and feed their babies with a spoon either at home or in the presence of other people because they are not comfortable with it, they are most likely not going to use this technique. Furthermore, this new proposed behaviour should not in any way violate their "sense of self" as this will cause anxiety which is perceived to be a barrier to performing this behaviour.

F) The sixth principle is that ***the person's emotional reaction to performing the behaviour is more positive than negative.*** A person's emotional reaction can be altered based on how she benefits or gets rewarded for her behaviour (THCU 2007:1). If the benefits or rewards she anticipates are good, she is more likely to perform that behaviour (in order to get that reward). Rewards can be tangible and psychological and can be provided by self or others. For example, if the mother feels good about the idea of feeding her infant her breast milk (because

of its previously-stated benefits) after it is heat treated, then she is more likely to perform this action. However, if there is some uncertainty about the behaviour, such as a feeling of being isolated because her HIV status may be revealed, she may not perform that behaviour.

G) The seventh principle is that ***the person believes that she is able to perform the behaviour under a number of different circumstances.*** The person has the ability and confidence to take action i.e. perform the behaviour of manually expressing breast milk, heating it and feeding her infant for a period of four months irrespective of external constraints in the family or community or work environment and maintaining that behaviour for as long as it is required. Various constraints exist like returning to work and not being able to perform the behaviour. Familial barriers exist, such as being expected to practice what was the norm across generations such as breastfeeding (Moodley et al 1999:681). Poverty and not having the means for fuel such as paraffin could affect the performance of the behaviour. A mother may not perform the specified behaviour if she perceives the barriers to be insurmountable.

H) The eighth principle is that ***the person perceives more social pressure to perform the behaviour than not.*** If the person perceives significant others such as her family members, community members, church elders and nurse supporting the behaviour, she will most likely comply (THCU 2007:1). This can take on many forms such as complying under the influence of a mother-in-law, a neighbour or a nurse at the local health centre. Because the researcher used IDIs and questionnaires as data collection methods, the possibilities of other participants introducing bias as in the case of focus groups, where stronger opinions may dominate the opinions of others, are abated. However, the researcher acknowledges that a mother may make a decision to perform this behaviour during the interview/data collection period, and then change that decision at home once faced with practical difficulties. It should be stated that it was not easy to apply this principal as the behaviour introduced was new and not yet known to significant others.

According to the Gielen and Sleet (2003:65) the first three principles (A, B and C) are required for any behaviour to occur, while the remaining principles (D, E, F, G and H) influence the direction of our intentions.

2.8 CONCLUSION

This chapter began with manual expression of breast milk and described various techniques in treating it, particularly using pasteurisation techniques for infant feeding. It also characterised the different techniques and their effects on the nutritional quality of breast milk. The second half of this chapter looked at the Theory of Individual and Group Change by Backer (2001:20) as the theory of choice for the study.

Chapter 3 will look at the method in which the research was conducted. It specifically addresses the research design, sample and sampling technique. Thereafter it looks at the procedures followed when conducting the research, the measuring instruments used, followed by the analysis. It concludes with the ethical considerations for the study.

CHAPTER 3

RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

Chapter 2 discussed literature on infant feeding techniques and a model by Backer (2001:18) called *The Theory of Individual and Group Change*. Chapter 3 discusses the method used to conduct the research. It specifically addresses the research design, sample and sampling technique for both the quantitative and qualitative research methods. Thereafter it looks into the procedure followed when conducting the research and the measuring instruments used. This chapter concludes with the ethical considerations for the study.

3.2 RESEARCH PURPOSE AND OBJECTIVES

3.2.1 Purpose of the study

The purpose of the study is to develop practical guidelines for promoting supplementary infant feeding techniques for HIV-positive mothers.

3.2.2 Research objectives

The objectives of this study are to

- explore and describe the factors influencing HIV-positive mothers on the choice of feeding technique
- formulate practical guidelines based on the research findings and literature support for HIV-positive mothers promoting supplementary infant feeding techniques
- identify the profile of HIV-positive women that can be targeted for promotion of a supplementary infant feeding technique termed flash-heat

3.2.3 Research questions

In light of the above objectives, three specific questions are addressed in this study:

- What is the mode of feeding HIV-positive mothers at Tembisa Hospital choose for their infants?
- How could the research be used to support HIV-positive mothers in making the correct infant feeding choice?
- What are the characteristics of HIV-positive mothers to whom supplementary feeding techniques could be promoted?

3.3 RESEARCH DESIGN

Burns and Grove (2005:296) define research design as the supporting structure of a study. Others suggest that it is the method in which the study was conceived, implemented and presented (Mouton 2000:56).

3.3.1 Quantitative research

3.3.1.1 Non-experimental research design

This study utilised a non-experimental research design in order to gain an understanding of the infant feeding behaviour of HIV-positive mothers. The quantitative approach enabled the researcher to understand the characteristics of new mothers who would use the flash-heat technique. There was no need to establish causality as the research design employed was not experimental (Howell 1999:1). In addition, there was no control or manipulation of the independent variables (Howell 1999:1). The non-experimental design was also employed in order for the researcher to make inferences regarding possible relationships between variables.

The research was conducted in two phases over the period 3 May to 10 June 2011. The first phase consisted of quantitative data collection with HIV-positive mothers on their infant feeding choices. The second phase included the collection of qualitative data with the same cohort of women. Questionnaires were administered by the researcher with the quantitative approach.

3.3.2 Qualitative research

The researcher aimed to explore the participants' perceptions of their ability to adopt the flash-heat technique of infant feeding. Therefore a qualitative approach was utilised for this research study. Qualitative research has the following characteristics among other:

- The researcher is mainly concerned with the process of the research, followed by the outcomes (Merriam 1991:110).
- The researcher becomes the primary research instrument (McCaslin &Scott 2003:453).
- Qualitative research is strategically conducted yet is flexible and contextual (Mason 2001:110) meaning that the researcher should be cognisant of the sensitivity of changing contexts and situations of the research environment.
- Qualitative research will produce culturally specific information about the values, opinions and social contexts of a sub-set of a population (Mack et al 2005:1).

The qualitative research design aided the researcher in exploring why HIV-positive mothers would or would not engage in this feeding technique. It allowed the researcher to explore in detail the phenomena studied (Neill 2008:1).

3.3.2.1 Descriptive research

The purpose of utilising a descriptive research design was to document the perceptions/feelings of HIV-positive women on adopting the flash-heat technique of infant feeding. Merriam (1991:110) so aptly states that the interview seeks a "holistic description and explanation" of the subject under study.

3.3.2.2 Contextual research

Lincoln and Guba (1985:44) suggest that a phenomenon be studied in its natural setting because individuals draw meaning of situations from their context. It is for this reason that the researcher conducted the interviews in the two postnatal wards at Tembisa Hospital.

3.3.2.3 Explorative research

In addition to descriptive research, the researcher utilised an exploratory research method. This method was used in order for the researcher to familiarise herself with the concepts of the problem under study to facilitate development of insights (Howell 1999:1).

3.4 RESEARCH METHOD

3.4.1 Study area

3.4.1.1 Quantitative and qualitative studies

The research was conducted in the two postnatal wards at Tembisa Hospital which is a regional hospital located in the Northern Service Delivery Region in Ekurhuleni. The two wards admitted mothers and infants who were delivered either via Spontaneous Vertex Delivery (SVD) or via Caesarean Section (C/S) for observation and management of possible puerperal complications prior to discharge. The daily number of SVD and C/S varied between 20 and 30. The patients' HIV status was known to them and staff on admission to the postnatal wards and participation in the study was subject to the researcher confirming the patients' HIV status with hospital records. All HIV-positive postnatal mothers were eligible for participation in the study and were subsequently recruited.

The two postnatal wards had four units of eight beds occupying 32 patients each, when at full capacity. Ward staff included registered nurses and midwives, a family planning counsellor, an obstetrician, dietician, administration staff and cleaners.

Antenatal women were given health education talks (at every visit as a group) which include two main methods of infant feeding which is exclusive formula feeding or exclusive breastfeeding. Tembisa Hospital provided formula for infants in the postnatal wards as part of the national PMTCT strategy (National Department of Health (NDoH) 2001). Parlagon was the brand of choice.

The initiation of breastfeeding in the postnatal wards was delayed as mothers rested after labour. Because of sensitivity to this, postnatal staff offered to look after infants in nurseries while the mothers rested, further delaying the time of breastfeeding initiation. On discharge from the postnatal ward, a family planning nurse provided health education on contraception and on infant feeding; primarily breastfeeding and its contraceptive qualities if done exclusively.

3.4.2 Study sample

3.4.2.1 Quantitative and qualitative studies

One hundred and sixteen participants (116) agreed to participate in the research. Seventy (70) participants were selected to complete questionnaires. Ten (10) participants who completed questionnaires were excluded from the study. The exclusions were based on criteria such as age (under 18) and the rest were excluded after the administration of initial questionnaires indicated that the respondents did not fully understand what was required of them and ticked all the boxes on the questionnaires as opposed to ticking only those that applied.

The sample entailed a cross-section of HIV-positive women living in Gauteng province, mainly Tembisa. Participants came from roughly the same socio-economic group or had a similar background in relation to being HIV-positive. They also had similar concerns regarding their blood status and the dilemma of infant feeding. The choice of breastfeeding or formula feeding the current infant was insignificant with regards to participation as the views of both breastfeeding and formula feeding mothers were critical. Being on ARV therapy as well as prior knowledge of Prevention of Mother-to-Child Transmission (PMTCT) programmes were not inclusion criteria; however being HIV-positive and over 18 years were.

The participant characteristics included (amongst others) age, place of residence, access to water and electricity in the home, educational level, employment, marital status, disclosure of HIV status, mode of delivery, etc. Some of these characteristics could highlight the participants' socioeconomic status (Wojcicki 2005:18) which could present more details of the key population participating in this study. In addition, these characteristics could influence infant feeding decisions (Maru & Daidar 2009:110).

The sample for qualitative research should ideally be small (Miles & Huberman 1994). In-depth interviews were conducted with 30 women; however, the data of 20 women was used in this analysis as data saturation was reached (Miles & Huberman 1994). Six (6) women who were invited to do in-depth interviews were excluded from the study. The exclusions were based on criteria such as them being under the age of 18 years.

3.4.3 Sampling technique

3.4.3.1 Quantitative and qualitative studies

Purposive, convenient criterion sampling was used to obtain the sample size because the researcher wanted to access a particular/specific subset of women (Burns & Grove 2005:293). In purposive sampling, a sample or case is chosen because it illustrates a phenomenon that is of interest for a particular study (Silverman 2000:342) and the purposeful selection of participants represents a vital decision point in qualitative research (Creswell 1998:1). Non-probability sampling technique was utilised to collect data from the convenient sample and enabled the possibility of a mother chosen for this study being unknown (Whitley 2002:246). Convenience sampling enabled representative members of the larger HIV-positive mothers' population to participate (Stewart & Shamdasani 1990:53). The location was used more than once for sampling. Recruitment continued for five days of the week, every week for approximately one month.

All the HIV-positive mothers were approached for participation in the study after all their vital signs were established and after the health education talks were given. The researcher had access to all the women who were one day post-delivery, after they congregated in one area for the health education talk prior to discharge. Specific access to HIV-positive women was allowed as these women were escorted into a room for PMTCT education and medication.

Women who delivered via SVD were discharged from the postnatal ward on day two (2) and those who delivered via C/S, after approximately four (4) days. One hundred (100) women between the ages 18-45 were recruited for this study. The significance of the

age range is that 18 is the legal age to provide consent for participation in a study and 45 (in the researcher's opinion) is an age still considered safe for childbearing.

Because of the short admission time of women who delivered via SVD, they were recruited shortly on admission to the postnatal ward after all vitals were stable and ward processes were completed.

3.5 DATA COLLECTION

3.5.1 Data collection instrument

3.5.1.1 Quantitative study

Measuring instruments refer to the mechanisms used to measure all variables in the study. Researcher-administered questionnaires were used to gather the data for the quantitative study. The instrument contained four sections.

Part A. Information on the biographical details of the participants was collected in order to allow the researcher to summarise the sample for the study, and was used for descriptive purposes only. The questions asked in the demographic section of the questionnaire were general, so as to maintain anonymity of the participants. The questions in this section were aimed at collecting information on the participants' age, level of education, marital status, ethnic group, occupation, tenancy, receipt of support grant, access to water and electricity in the home and number of children

Part B. Details were collected on the current/new infant's sex, weight, mode of delivery, gestation period and number of days admitted. Information on the mother's access to formula and who enabled that access validated the current practice the researcher observed in the postnatal wards. Information on planned feeding practices with the current infant provided details on the mother's feeding intentions and feeding details of the last sibling provided information on habit and ease of breastfeeding if done before.

Part C. The mother's general health collected information on signs of Tuberculosis infection, disclosure of HIV status, the desire to breastfeed even while HIV-positive, current condition of breasts, and contraceptive use.

Part D. The flash-heat technique. This part of the questionnaire collected information firstly on whether the mothers understood the technique. If the answer to this question was 'no' the researcher would discuss the technique again to ensure efficient comprehension prior to the commencing with the next section. Information was collected on all the required stages of the flash-heat technique from expressing manually into a glass bottle, heat treating the breast milk, cooling the milk and spoon-feeding, exclusively for four months. Additional questions such as what they liked and disliked about the flash-heat method, whether they believed that the flash-heat method prevented mother-to-child transmission of HIV, and what feeding vessel they preferred to use when giving their babies flash-heated milk. The last three questions focused on whether the mothers believed they could flash-heat under a number of different circumstances, and if they believed that there was anyone at home that would prevent them from flash-heating, and lastly whether they believed they had the skills required to flash-heat at home after it was demonstrated to them.

The question path on the questionnaires used for quantitative analysis was not open-ended, but contained prepared responses based on past literature on the views of respondents in research on this technique conducted in South Africa, Kenya, Zimbabwe and Tanzania (Israel-Ballard et al 2007a:318).

3.5.1.2 Qualitative study

The instrument used to collect data for the qualitative study included the following;

- **Guidance questions**

The mechanism utilised for the in-depth interviews consisted of guidance questions to guide the interview and to keep it focused. The question path was open-ended resulting in opinions outside the scope of prepared responses.

- **Literature control**

A literature control was done with the aim to "interpret and synthesize" research done in the same field (Poggenpoel 1993:1). A control of literature was conducted to compare

and contrast results obtained by this current study with that of past research. Similarities and differences were identified as well as the overall contribution of the research study (Poggenpoel 1993:1).

- **Research notes**

Foster, Sapsford and Jupp (1996) suggest that field notes be recorded for participant behaviour, expressions or lack thereof. The researcher recorded informal notes on the ward processes/routines to validate findings from the in-depth interviews. Personal notes were also recorded throughout the research process. These reflected the researcher's feelings, perceptions and experiences of the interviews as well as the research environment.

- **Ensuring trustworthiness**

The researcher applied aspects of Guba's model in Krefting (1991) in an attempt to ensure trustworthiness of qualitative data. The aspects discussed below are credibility, applicability, and neutrality.

- ***Credibility***

Credibility is the first criterion used to ensure trustworthiness in a study (Shenton 2004:64). It refers to a study measuring what it is intended to measure (Shenton 2004:64). The researcher used the credibility criterion to ensure that findings from the in-depth interviews were accurate and in line with current practices in the post natal wards at the Tembisa Hospital. This was achieved by:

- Triangulation

Triangulation may involve the use of different methods for data collection (Shenton 2004:65). For this study various different strategies of data collection namely, in-depth interviews, field notes and observation were used to ensure and validate credibility of the study.

- Observation

Observation was also used to ensure credibility of the study. This was done by watching the verbal and non-verbal cues of the participants which afforded a richer context of the information provided; particularly information obtained from asking sensitive questions and information relating to participants' emotional reaction to the new feeding technique.

- Reflexivity

This is a process of exploring personal perceptions and feelings and integrating this understanding into the research. Shenton (2004:64) suggests that this is the process of evaluating the research project as it unfolds. The researcher maintained this by recording detailed field notes throughout the research process.

Applicability

Applicability/transferability refers to the extent to which study results can be generalized to other settings (Trochim 2006:57). The researcher ensured this by interviewing the participants in the most natural setting for the phenomenon under study i.e. in the postnatal wards with postnatal mothers and infants. Furthermore, the researcher provided a full description of the participants' feelings and perceptions and recorded data as accurately as possible.

Neutrality

Neutrality is likened to being objective and not allowing one's prejudices to bias research results (Lincoln & Guba 1985:44). It is the extent to which the findings are the participants' product. No information obtained from the in-depth interviews was in any form manipulated by the researcher. The researcher was constantly aware of the danger of bias and ensured throughout the research that she refrained from judgment in order to protect the integrity of all the HIV-positive mothers. In addition, participant bias was avoided by ensuring that the interview atmosphere was pleasant and positive, thereby making it a favourable environment for the interviews.

3.5.2 Data management

3.5.2.1 Quantitative study

All the completed questionnaires were locked up by the researcher and kept safe in an area free from access. The questionnaires contained no identification names and markers that could be associated to any participant. These questionnaires were kept locked up until the research was accepted by the examiners. Thereafter all the data and questionnaires would be destroyed by the researcher.

3.5.2.2 Qualitative study

In-depth interviews were conducted and taped using a digital tape recorder. The interviews were saved on USB flash drives provided to each of the two field workers. All data was transcribed and then translated accordingly from isiZulu and SiPedi into English. Data analysis was performed on English transcripts.

The researcher initially planned to manually organise and analyse data by cutting out narrative and using a large surface area to paste them together in themes, categories and sub-categories. Arrangements were made to make copies of the translated transcripts, leaving the originals for verification. All the equipment required for cutting and pasting was organised as well as the space for analysing the narratives. After reading through the transcripts, it was realised that significantly more space would be required to analyse the data in that manner. The second option of using Tesch's (1990) eight-step model was explored using an Excel (version 2007) programme for data organisation. The researcher preferred to use the Excel programme because of its ease of use and its convenience in cutting and pasting similar themes, categories and sub-categories together. The researcher also looked at using the NVivo programme for qualitative data analysis but however preferred utilising Tesch's (1990) eight-step model in Excel.

The data was entered according to unique participant identity number i.e. B4, B5, B6. The letter B indicated that it was qualitative data that was collected as this was a two-tiered research study, with quantitative data assuming the letter A prior to the number.

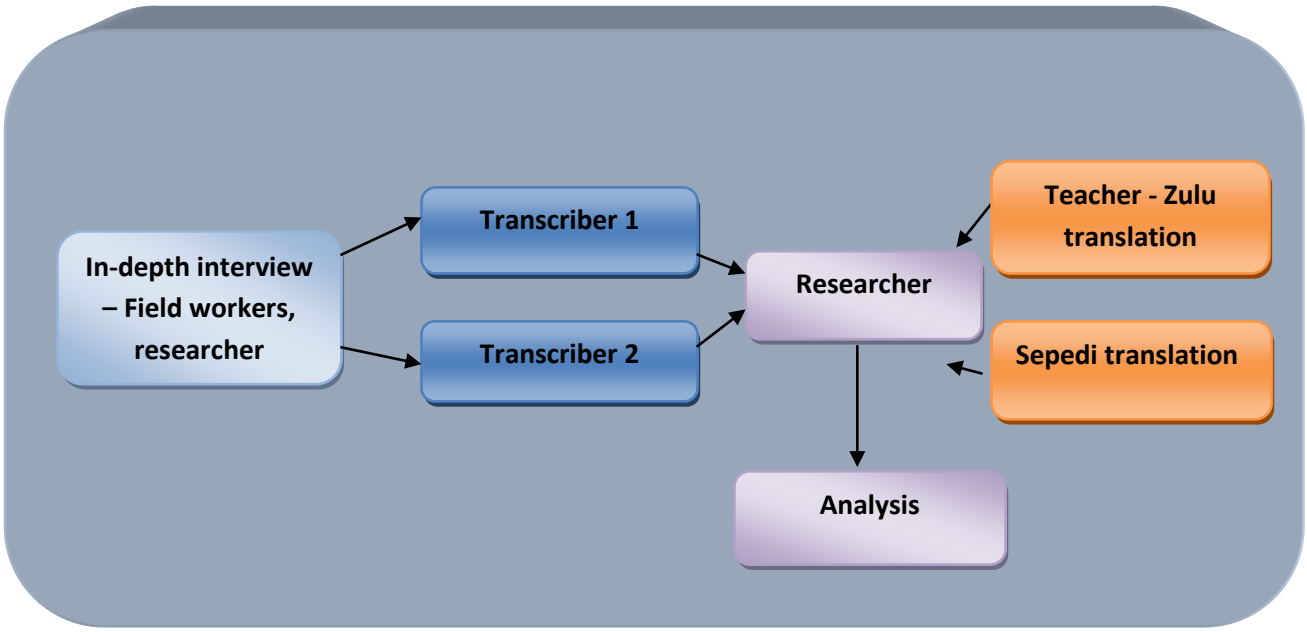

Figure 3.1 Overview of data management

3.5.3 Data collection procedure

3.5.3.1 Quantitative and qualitative studies

The research and data collection process involved 10 stages.

The *first stage* involved getting prior approval from the Chief Executive Officer of the Tembisa Hospital in order for the research to commence.

The *second stage* involved developing the recruitment/inclusion criteria, the questionnaire, in-depth interview questions, and the participant consent and information sheets. Participant inclusion/exclusion criteria based on the purpose of the study were established upfront. The researcher used the criteria as a basis to screen all potential applicants for inclusion in the study. Demographic information such as age, previous pregnancies and previous breastfeeding experience were collected from both the in-depth interview group as well as the group completing questionnaires.

The *third stage* involved translating the consent form and questionnaire into isiZulu.

The *fourth stage* involved securing a venue for the interviews and administration of questionnaires. Rooms in both postnatal wards were used for the interviews.

The *fifth stage* involved recruitment of prospective participants. All interested participants were personally escorted to the interview room where the purpose of the study was explained and where they were invited to participate in the study. Consent was administered to the participant upon verbal agreement of participation. Recruitment was done from both the postnatal wards for SVD and C/S births.

The *sixth stage* involved a discussion of the flash-heat technique of infant feeding. This discussion was mainly led by the researcher. The discussion took approximately five minutes, followed by a one minute question-and-answer session. The purpose of the discussion was to familiarise the participants with the new infant feeding technique in order for them to understand it, prior to interviewing them and administering the questionnaires. The researcher chose to assume that participants had limited knowledge of the technique and needed to understand it in order to comfortably do the interviews.

The *seventh stage* involved collecting the data. Postnatal staff provided the researcher with a list of the number of HIV-positive women who had delivered approximately six hours prior. This list was used to invite participants for participation. All the in-depth interviews were taped on a digital voice recorder and the recording was immediately saved on a computer and a flash drive for easy data management.

The *eighth stage* involved capturing the quantitative and qualitative data using a statistical package for social sciences (SPSS) program (version 19) and Excel (version 2007). The input of quantitative data was simultaneous with the completion of questionnaires.

The *ninth stage* involved transcribing the qualitative data. The saved data was transcribed by two transcribers. The data was transcribed as and when the interviews were conducted. The data required translation to isiZulu, Setswana and SiPedi, which

were the languages the interviews were conducted in. These interviews were translated back to English for analysis to commence.

The *tenth* stage involved the analysis of the transcribed and quantitative data. Themes, categories and sub-categories were identified and analysed for the qualitative data and descriptive analyses were done for the quantitative data.

3.5.4 Pilot study

3.5.4.1 Quantitative and qualitative studies

The researcher conducted a pilot study over a period of two days to ascertain whether the question path and time taken to complete the questionnaires were acceptable for the participants. The researcher had initially allowed the participants to self-complete the questionnaires and found that the concept of completing a questionnaire was not understood by eight (8) respondents who completed the questionnaires. The two (2) participants who completed them correctly omitted certain sections of the questionnaire. The researcher decided to self-administer the questionnaires based on the outcome of the pilot. The participants who were excluded from the study were between the ages 25-35 and were all single. A few participants were employed and others not. Those who were employed worked as domestic workers (2) and a tea lady in an office (1). The number of live children between them was 13. Secondly, questions that resulted in confusion or hesitation to answer were revised. These were:

(1) ‘Cultural group’ revised to ‘ethnic group’
(2) ‘Are you HIV-infected?’ revised to ‘are you HIV-positive?’
(3) ‘Do you believe the FH method can protect your baby from HIV?’ revised to ‘can FH PMTCT of HIV to your baby?’

The last three questions were reworded from ‘Do you believe that you would be able to FH even in difficult circumstances at home? Please state whether you think FH is difficult or easy to do?’ to ‘Believe can do FH under diff circumstances? Believe have all the skills to FH?’ and ‘Will anyone prevent you from FH at home?’ The revision was necessary as the first set caused some confusion in the responses during the pilot phase.

Initially the researcher thought that the question 'has your partner tested for HIV?' would cause some uneasiness with the participants; however it was answered by all the women interviewed. It was included because the researcher felt it necessary to ask as it could give context to the familial situation the mothers were in, which could in turn affect their decision to adopt this feeding technique or not.

Lastly, the pilot study allowed the researcher to plan effectively when and how data was to be collected as the postnatal wards were busy and the researcher did not want to upset ward routine.

3.6 DATA ANALYSIS

3.6.1 Quantitative study

Data was manually cleaned prior to running any statistical analysis. Quantitative data was analysed using a Statistical Package for Social Sciences (SPSS) program (version 19). SPSS was used to provide descriptive data and to analyse inferential statistics. Demographic descriptors were calculated for the sample of 70 participants in terms of frequencies and percentages. The descriptive statistics were employed primarily for the purpose of describing the sample.

3.6.1.1 Distribution analysis

Most statistical tests assume normal distribution in any study (Huck 2008:460) therefore the researcher will look at the distributional shape using skewness and kurtosis. The measure of skewness should ideally be between -0.5 and +0.5 but however is acceptable if it is between -1.0 and +1.0. The measure of kurtosis is acceptable if it is between -1.0 and +1.0 (Phakiti 2010:45).

3.6.1.2 Correlation

Correlation refers to the relationship between two variables (Trochim 2006:90). The measure of the degree or strength of this relationship is represented by the correlation coefficient (Howell 1999:1). Correlation is concerned with whether there is a

relationship between two sets of scores and how strong or weak that relationship is; that is, if it can be proven that a relationship does exist (Huck 2008:462). Pearson's correlation coefficients were calculated between the following variables (Phakiti 2010:47):

- Will anyone prevent you from FH?
- Believe have all the skills to do FH?
- Believe can do FH under a number of different circumstances at home?
- Try technique at home?
- Mother has a positive reaction to FH?
- Can you easily heat treat the milk?
- Express for 4 months?
- Manual expression at home?

3.6.1.3 Logistic regression

On examining the nature of the data the researcher decided to run a regression because the data was mainly numerical in nature (Menard 2009:21). Furthermore, the researcher planned to predict whether HIV-positive mothers would adopt the flash-heat method exclusively for four months. On further examination, it was decided to run a logistic regression because of the use of one dependent variable (Will HIV-positive mothers adopt flash-heating exclusively for four months?) and a number of independent variables. A logistic regression assisted the researcher in finding out whether there was a probability that an event would occur, given a set of conditions (Sweet & Grace-Martin 2008:1). In this study it was the probability that HIV-positive women in Tembisa would adopt the flash-heat technique exclusively for four months as an infant feeding method.

3.6.2 Qualitative study

The researcher ensured that a sample of the translated transcripts was validated by an independent person who could speak SiPedi and Setswana to avoid misinterpretations. Unique identifier codes were created for each participant to allow for anonymity and ease of analysis. After all in-depth interviews were tape-recorded; a full transcript of the discussion was prepared by two transcribers located in a different city to that of the researcher. The discussion was reflected as completely and accurately as possible

using the participants' own words. The key statements and ideas expressed were listed.

After the transcripts of the discussion were prepared, the participants' statements were coded. Finer sub-codes were made to capture as much as possible. The data was inputted onto a Microsoft Excel spreadsheet for ease of analysis.

An open coding system of analyses was used in this study to reduce the data to themes, categories and sub-categories. Tesch's (1990) eight-step model (in Creswell 1994) was used for data analysis; however the researcher used the first seven steps for analysis as there was no need for utilisation of the eighth step which was to recode the data. The initial coding was sufficient for analysis to commence. These steps were:

Get a sense of the whole

The transcripts were read through and ideas, questions and observations were made in the margins as and when these presented themselves.

Pick one document

One very interesting interview was picked as the one used for writing thoughts in the margin as they emerged. The shortest transcript was initially picked for this purpose, then the most interesting one was later chosen. The researcher used that to get a sense of what the main points were.

Complete the task

Thoughts were recorded with several interviews/transcripts. A list of all the topics was made and similar topics were clustered together and arranged using an Excel workbook.

Abbreviate the topics as codes

The list of topics was abbreviated as codes which were written in a column next to the appropriate narrative.

Group like topics together

Topics that related to each other were grouped together. This was done very easily using the Excel workbook.

Abbreviate each category and alphabetise them as codes

Abbreviations were decided on for each category and these were alphabetised as codes.

Preliminary analysis

All the data belonging to various categories was assembled for preliminary analysis.

3.7 LIMITATIONS OF THE RESEARCH

3.7.1 Quantitative study

One limitation of the study according to Hopkins (2008:1) is that descriptive studies usually need a sample of hundreds or even thousands to obtain an accurate estimate of the relationship between variables. Furthermore, the sample size of 70 used to run a logistic regression may have been too small. According to Hsieh, Block and Larsen (1998:1623) a sample size of 150 would be ideal for a logistic regression at a 0.05 and 0.01 significance level.

3.7.2 Qualitative study

This research focused on topics such as HIV status, choice and reasons of infant feeding, contraceptive use, partners' health-seeking behaviour and the behaviours of significant people in the lives of new mothers, which may have caused the participants discomfort. Limitations are characteristic of this study simply because of the intricate nature of research. This was evident in the qualitative study when a few women would not respond to the reasons for their feeding behaviour. They would remain quiet upon further questioning. It was understood that they were uncomfortable with further engagement on that issue and they were discouraged from answering questions they were not comfortable with.

A second limitation is that the research was conducted in Gauteng province, thus findings could not be generalised to the wider population.

3.8 ETHICAL CONSIDERATIONS

3.8.1 Quantitative and qualitative studies

Ethical clearance to conduct the study was granted by the University of South Africa's Health Studies Research Ethics Committee (HSREC). Approval to conduct the study was obtained from Chief Executive Officer of Tembisa Hospital. There was full disclosure of the study to the participants, its requirements and the uses of their contributions. A signed informed consent form for interviewing and tape recording was obtained from each participant and each interview was coded in order to protect their identities. The printed results of the research did not contain any identifying references to the participants. Those participants who requested a copy of the consent form were allowed one. All women recruited for the study had the benefit of learning about the flash-heat technique regardless of their willingness to participate in the study or not.

3.9 CONCLUSION

This chapter discussed the method in which the research was conducted for both the quantitative and qualitative studies. It addressed the research designs, samples and sampling techniques. Thereafter it looked at the procedure followed when conducting the research and the measuring instruments used. It concluded with the ethical considerations for both studies.

CHAPTER 4

REPORTING STUDY FINDINGS AND DATA ANALYSIS METHODS

4.1 INTRODUCTION

Chapter 3 discussed the method in which the research was conducted. It addressed the research design, sample and sampling technique. The chapter further explained the procedure followed when implementing the research, the data-gathering instruments used and the plan for the analysis of data. This chapter describes the findings from the in-depth interviews (IDIs) with postnatal HIV-infected women at Tembisa Hospital within six to 12 hours after delivery.

4.2 CONSTRUCTION OF STUDY

The researcher decided on conducting research on alternative infant feeding techniques as a method of reducing vertical transmission of HIV after working with many Non-Governmental Organisations providing services to orphaned and vulnerable children. The choice to study infant feeding techniques was made after research papers suggested that vertical transmission of HIV should be prevented with antiretroviral provision to the mother when in labour and postnatally to the infant. Failing that, other techniques should be targeted very early on postnatally. Thus, with the researcher's passion for promotion of breastfeeding, the study was initiated.

The second step was deciding on the sample area. Initially, the researcher thought that postnatal women would be targeted when they returned for their postnatal checks at six weeks. On further analysis the following conclusions were made:

1. It may take longer than one month to reach the sample size of 100 women as a few may go home or to their in-laws for support postnatally with their babies and would attend postnatal clinics closer to home.
2. Getting postnatal women to consent to interviewing for an hour with a crying baby may not be practical.

3. Anonymity may not be upheld with HIV-positive women who are requested to go to a room elsewhere in the clinic to be interviewed.
4. The study venue may have to be a local clinic in Tembisa and not the hospital as women are referred to the clinics for postnatal checks.

The researcher also considered interviewing antenatal women at the antenatal clinic at Tembisa Hospital. This seemed most practical as the research questioned their willingness to adopt the flash-heat method exclusively for a period of four months as a strategy to prevent HIV transmission. The researcher felt that infant feeding techniques should be promoted to women antenatally to provide sufficient time to decide on a feeding mode that is best for the infant. The infrastructure at the antenatal clinic at Tembisa Hospital did not allow for an interview room and the researcher felt it impractical and an inconvenience to the mothers to interview them at a location far from their clinic visit. The decision to interview postnatal women a few hours after delivery and after their and their infants' vital signs were stable was made.

4.3 ACCESSING THE PARTICIPANTS

Permission to conduct the research at Tembisa Hospital was obtained from the Chief Executive Officer. On receipt of permission to commence research, the researcher met with senior staff members regarding the nature of the research and research team and the proposed time frame. The medical superintendent, head of paediatrics, matron and sisters in charge of the two postnatal wards, the premature unit and of labour ward were all met with.

The researcher spent three days observing the ward routines in the maternity, postnatal wards and premature unit in an attempt to gather sufficient information on ward routines for planning purposes. It was observed that the maternity unit was short-staffed and very busy, thus not creating a favourable environment for interviews. Secondly, the mothers appeared in distress while in labour and very tired post-delivery.

The observation in the premature unit revealed that the mothers also appeared distressed due to their infants' illness and not in a position to be interviewed as they did not want to leave their premature infants for the interview process. It was on observation of the ward routines in the two postnatal wards, that the researcher felt the interviews

could be conducted as postnatal mothers were already given health talks in the wards in groups as part of hospital policy. Secondly, prevention of mother-to-child transmission (PMTCT) counselling was conducted in a room in both postnatal wards and accessing these mothers prior or post-PMTCT was easy and would not cause further suspicion.

After considering the two postnatal wards as the location for the interviews, the two registered nurses/midwives in charge of the wards were met with to discuss and verify findings of the researcher's observations, and their willingness to participate in the research. Two rooms were subsequently offered as interview rooms that the researcher could use for research purposes.

4.4 PROFILE OF STUDY PARTICIPANTS

Thirty (30) mothers participated in the IDIs. Their age range was 20 to 45 years, mean 35.4. Most were of Zulu ethnic group (12) followed by Xhosa (5), Sotho (4), Pedi (4), Tswana (2), Venda (2) and Tsonga (1). Twenty five (25) mothers were single and five were married. Employed mothers totalled 17, and 13 were unemployed. Those who were employed all worked as domestic workers. Sixteen (16) lived with their boyfriends, (5) with their husbands, (8) with relatives and (1) lived alone. The number of mothers who were aware of their partners' HIV status was 8.

The total number of children recorded included the current infant. Mothers with one child each totalled (8), two children (8), three children (12), four children (1) and five children (1).

The number of mothers who delivered via Caesarean Section (C/S) was 11, Spontaneous Vertex Delivery (SVD) was 15 and via SVD with a tear (episiotomy), four. Nineteen (19) mothers report that their current infant was not planned. Fifteen (15) mothers were breastfeeding and fifteen (15) were formula feeding.

The number of mothers who had disclosed their HIV status to a significant other was 16. Five (5) disclosed to a relative, seven (7) to a boyfriend, three (3) to a husband and one (1) to a counsellor.

A few of the mothers (10) were offered formula by a nurse (9) and a counsellor (1), for reasons such as being HIV-positive (3), their belief that they had insufficient milk (4) and because they asked for it for fear of transmission of HIV to their infants (3).

Table 4.1 Profile of study participants (n=30)

Thirty (30) participants with age ranged from 20-45 years, mean 35.4							
Level of education	Std 6	Std 6-7	Std 8-9	Std 9-10	College		
Number of participants	5	5	6	11	3		
Ethnic group	Zulu	Xhosa	Sotho	Pedi	Venda	Tswana	Tsonga
Number of participants	12	5	4	4	2	2	1
Marital status	Single	Married					
Number of participants	25	5					
Employment	Employed	Unemployed					
Number of participants	17 Domestic workers	13					
Living with	With boyfriend	With husband	With relatives	Alone			
Number of participants	16	5	8	1			
Total children	1	2	3	4	5		
Number of participants	8	8	12	1	1		
Mode of delivery	C/S	SVD	SVD tear				
Number of participants	11	15	4				
Breastfeeding behaviour	Currently breastfeeding	Formula feeding					
Number of participants	15	15					
Disclosed HIV status	Yes	No					
Number of participants	16	14					
Disclosed to whom	Relative	Boyfriend	Husband	Counsellor			
Number of participants	5	7	3	1			
Partner tested for HIV	No	Yes					
Number of participants	22	8					

4.5 CONTEXT OF STUDY LOCALE

The two postnatal wards had four units of eight beds occupying 32 patients each when in full capacity. Ward staff included registered nurses and midwives, a family planning counsellor, an obstetrician, dietician, administration staff and cleaners.

All the participants had their HIV tests done and confirmed when they booked at antenatal clinics at local Tembisa clinics as well as at the hospital. A few participants had known of their status prior to this pregnancy and others were diagnosed upon booking. Those who were newly diagnosed with HIV faced the challenge of dealing with the diagnosis and the fear of not wanting to infect their infants. The researcher noticed that the environment in both postnatal wards was welcoming, and supportive to both the participants and the research team; however the milieu was quiet with slight tension in the air at times with a few mothers whispering among themselves. That made it seem that the mothers were not completely free or at ease in the wards. A few of the participants appeared emotionally withdrawn or perhaps tired due to labour. It was on further probing that it was learnt that a few of these mothers were concerned about their infants' health since they were infected with HIV.

Most of the mothers did not fully understand the PMTCT programme. It was only when the researcher explained the PMTCT programme did they confirm that they were given anti retrovirals (ARVs) during labour. The mothers also did not understand that the ARVs given to them supplemented the ARVs given to their infants on discharge in order to prevent vertical transmission of HIV.

On a particular day the ward environment was sombre due to a maternal death and that required that the researcher spend more time with the mothers prior to the interview as each one shared her emotions. The researcher prior to each day observed the routine and emotional environment after briefly talking to the new mothers, and briefed the field workers on their interview approach. The entire ward context set the tone for the interviews.

Tembisa Hospital is a baby-friendly hospital and has a baby-friendly policy initiative. This initiative calls for breastfeeding promotion and support and discourages the use of commercial formula for feeds. To encourage and promote breastfeeding, infants are to

be put to the breast within an hour of birth. The practice at Tembisa Hospital is that most infants were not put to the breast immediately after birth, but several hours later on admission to the postnatal ward. The time delay between delivery in the maternity (labour) ward and admission to the postnatal ward was approximately five hours and longer. The time delay was to allow more deliveries in the labour ward so that the new mothers could be discharged to the postnatal wards as a group. Individual discharge and transfer to the postnatal wards were not possible due to staff shortages in the labour ward.

Those mothers who wished to breastfeed were assisted with correct positioning and latching of the baby after admission processes were done in the postnatal ward. However, because the time between birth and the first feed was extended, infants appeared lethargic, possibly due to their glucose levels dropping to low levels. A few mothers were offered formula at the hospital as part of the PMTCT strategy (National Department of Health (NDoH) 2001:1). Parlagon (which is a variety of commercial infant formula) was the brand of choice.

On discharge from the postnatal ward, a family planning nurse provided the mothers with a talk/discussion on contraception and on infant feeding; primarily breastfeeding and its contraceptive qualities if done exclusively.

4.6 CONDUCTING IN-DEPTH INTERVIEWS

The IDIs were conducted over a period of approximately one month from 3 May to 10 June 2011. On average six interviews were conducted daily by the research team. The team included the researcher (who sat in the interviews and interjected when things seemed unclear) (Lincoln & Guba 1985) in Hoepfl (1997:44), and two field workers. All were registered nurses and midwives and had obtained Masters Degrees in Public Health (MpH). The field workers had the benefit of speaking a language (Zulu) that the researcher was not fluent in and came with extensive experience doing IDIs.

The research was conducted in the two postnatal wards at Tembisa Hospital. The two wards admitted mothers and infants who were delivered either via SVD or via C/S for observation and management of possible puerperal complications before discharge. The daily number of deliveries varied between 15 and 20.

Prior to conducting the interviews the researcher was provided with a list of HIV-infected mothers who had delivered a live infant the previous night or early morning. The mothers were invited to participate in the interviews either before or after PMTCT counselling was provided by the ward staff. A demonstration of the flash-heat technique was done for all mothers approached for participation regardless of their willingness. Printed slides were shown and a discussion on the technique was done followed by a question-and-answer session. Consent was obtained from those who were interested in participating. The tape recorder was then switched on and the interviews commenced. The initial interviews were short (30-35 minutes). The researcher's concern with the short time was that the mothers would not get to tell her in detail their feelings on the new infant feeding method, especially as this was a source of concern for them.

4.7 DATA PROCESSING AND MANAGEMENT

In-depth interviews were conducted and taped using a digital tape recorder. The interviews were saved on USB flash drives provided to each of the two field workers. The field workers sent the data to two transcribers. The transcribers transcribed all the data and mailed it to the researcher by registered mail. The researcher checked all the transcripts for completion. Data analysis was commenced on the receipt of the English version of the interviews.

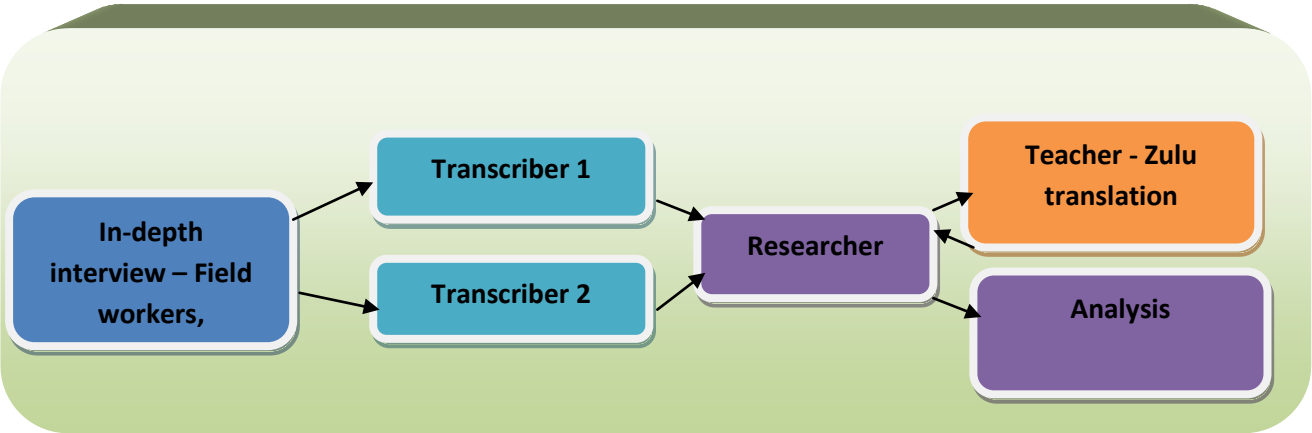

Figure 4.1 Overview of data management

4.8 OVERVIEW OF DATA ANALYSIS

Data analysis was conducted on all the data that was gathered in the study which in included observations of venue and participants' verbal cues and field notes.

4.8.1 Organisation of data

The researcher initially planned to manually organise and analyse data by cutting out narrative and using a large surface area to paste them together in themes, categories and sub-categories. Arrangements were made to make copies of the translated transcripts leaving the originals for verification. All the equipment required for cutting and pasting was organised, as well as the space for analysing the narratives. After reading through the transcripts, it was realised that significantly more space would be required to analyse the data in that manner. The second option of using Tesch's (1990) eight-step model was explored using an Excel programme for data organisation. The researcher preferred to use the Excel programme because of its ease of use and its convenience in cutting and pasting similar themes, categories and sub-categories together. The researcher also looked at using the NVivo programme for qualitative data analysis but however preferred utilising Tesch's (1990) eight-step model in Excel as she was more comfortable with this approach.

The data was entered according to unique participant identity number i.e. B4, B5, B6. The letter B indicated that it was qualitative data that was collected as this was a mixed-method research study, with quantitative data assuming the letter A prior to the number. Data analysis focused on exploring the possibility of HIV-infected mothers adopting the Flash-heating method exclusively for four months as an infant feeding technique to prevent mother-to-child transmission of HIV.

4.8.2 Technique used for data analysis

An open coding system of analysis was used in this study to reduce the data to themes, categories and sub-categories. Tesch's (1990) eight-step model (in Creswell 1994) was used for data analysis; however the researcher used the first seven steps for analysis as all the codes initially set were sufficient and there was no need to recode the data.

These steps were:

- *Get a sense of the whole*

The transcripts were read through and ideas, questions and observations were made in the margins as and when these presented themselves.

- *Pick one document*

One very interesting interview was picked as the one used for writing thoughts in the margin as they emerged. The researcher used a pragmatic approach to avoid the risk of losing any significant ideas from the interview by picking the most interesting first. This was followed by picking the shortest transcript to learn of any extremes in interviews. The researcher used this approach to get a sense of what the main points in the narrative were. (See figure 4.2).

Legend: P- participant, M-moderator, FH-Flash-heat

P- I understood that if you are HIV positive you are not supposed to have babies, but if you have them like I do, you are supposed to use this method to feed them. You use a glass bottle after washing it to express your breast milk into. You are supposed to wash your breast before expressing into the bottle. When you are done expressing, you take a pot and place it on a stove. Into the pot you add 2 cups of water. When the water boils you know that the disease in the milk is gone.

M- How do you feel about using this method at home to feed your baby with?

FH method is helpful

P-Yes, I am going to use this method when I get home because it will help me a lot.

Positive to feeling FH

M- How will it help you?

P- Money.... things are not cheap, especially formula.

FH viewed as cheaper, formula is expensive

M-Okay, how do you feel about touching your breast milk while expressing into a glass bottle?

Positive re use of own milk

P- I will feel okay after all it is my milk and there is no reason to be disgusted by touching breast milk. It is good and we are supposed to feed our babies this milk.

knows benefits of breast milk

M-Okay then, so how would you feel if you had to express your precious milk into a bottle?

Positive re: glass bottle

P-I will feel good about it because I will be doing my baby a favour so that he can grow and carry on with his life.

not concerned about expressing into glass bottle

M-How do you feel about heating your breast milk. Honestly how would that make you feel?

Positive re heat treating

knows benefit of heat treating

P-Yes it is good to heat treat the milk so that it can be clean from all germs.

M-So you see yourself expressing, heat-treating, cooling and feeding your baby the treated milk with a spoon?

sees FH not to be a concern

P- Yes I can. Doing that is not a problem at all. There is nothing that can trouble me when it comes to my children. I want them to live a good life.

10

Figure 4.2 Insert from a transcribed narrative

- *Complete the task*

Thoughts were recorded with several interviews/transcripts. A list of all the topics was made and similar topics were clustered together and arranged using an Excel workbook.

- *Abbreviate the topics as codes*

The list of topics was abbreviated as codes which were written in a column next to the appropriate narrative. (See workbook 1).

- *Group like topics together*

Topics that related to each other were grouped together. This was done very easily using the Excel workbook. (See workbook 1).

- *Abbreviate each category and alphabetise them as codes*

Abbreviations were decided on for each category and these were alphabetised as codes. (See workbook 1).

- *Preliminary analysis*

All the data belonging to various categories was assembled for preliminary analysis.

Formulation of catagories, and codes from narrative JUNE 2011					
ID	**THEME 1**	**CODE**	**CATEGORY**	**CODE**	**NARRATIVE**
B9	Mothers feeli	MF01	Postitive feeling	Pos01	I don't have a problem with this method but who is going to do all this because I am working?.... But for the sake of my baby I will have to see what I can do.
B23	Mothers feeli	MF01	Postitive feeling	Pos01	Hm... It is like how our mothers used to feed us many years ago only breast, so for me it is not a problem. I can use it because I know that it is good for my baby. The disease will not get to my baby with this method because the germs are killed with the boiling water. Very good.
B7	Mothers feeli	MF01	Postitive feeling	Pos01	What do people do when they use this method and they go to work? I am working with temporary work and will have to leave my baby with someone at home. Now, that person does not know that I am like this (HIV positive) and she will not understand what to do.
B10	Mothers feeli	MF01	Postitive feeling	Pos01	I feel ok about using this method because I live with people who will understand what I am doing.
Subcatagory 1 Touching breast milk					
B4	Mothers feeli	MF01	Touching w expr	Tou2	That depends on an individual. Some mothers may struggle to express and it may cause them to stop, but for me as long as you try to be clean and your nipples are not cracked and do not have sores and there is no blood, then you can express your breast milk and not worry about touching it. But if you see that there are sores in your breast or blood, then you must not feed your baby at all. I also do not have a problem with touching my milk. It is my milk. No, I will not be stressed because it is not blood, but breast milk.
B6	Mothers feeli	MF01	Touching w expr	Tou2	I will feel okay after all it is my milk and there is no reason to be disgusted by touching breast milk. Some women may be disgusted because they may think that it is unnatural or should not be touched at all. It is good and we are supposed to feed our babies this milk.
Subcatagory 2 Expressing into glass bottle					
B19	Mothers feeli	MF01	Express glass bo	Exgl3	Glass bottle? Ah I think it will break. What if it breaks when you are still expressing? Then all your milk is finished. Then the baby what will she drink. This method will not work if all the milk is not there for the baby to drink. (Interviewer: how will the bottle break) When you push it over and it falls.
B24	Mothers feeli	MF01	Express glass bo	Exgl3	How do I clean the glass bottle? (Interviewer: what do you mean?) I mean do I have to boil it in water first? Because I think that is too much work before feeding the baby. Also by the time the baby eats, you you don't have any more parafin left for cooking. (Interviewer: no you just clean it with soap and water like I said in the presentation) Oh... then it is ok.
B26	Mothers feeli	MF01	Express glass bo	Exgl3	I have a problem with my breasts. There is no milk so this will not work for me so nicely. You see even if I touch my breast I don't feel any milk. So for me this thing will cause stress on my part because there will be very little milk.
Subcatagory 3 Heat treating					
B10	Mothers feeli	MF01	Heat treating	HT4	I feel okay about heating my breast milk in the pot. It is the same as making a feed using formula, say S26. You also have to boil water to make the feed. It is the same method because you also boil water and wait for it to cool. Then after cooling you pour into a baby bottle to feed the baby with. With this FH method it is the same as you express your breast milk into something then you put that into a pot containing water to boil so that all the germs are killed, then you feed your baby once it has cooled. Heating breast milk is important because you kill all the germs that can get into the milk when you are expressing. The breast milk is very important and it is better than feeding your baby formula milk. The formula milk does not have everything that a baby needs to grow and breast milk does. Heating the milk kills the germs.
B19	Mothers feeli	MF01	Heat treating	HT4	Eish...that one is difficult. As long as the people say it is good for the baby then it is ok, but I wonder if the baby will like the taste of the milk.
Subcatagory 4 Regular feeding bottle					
B7	Mothers feeli	MF01	Baby bottle	BB5	For me I don't know about the spoon. I like it but I think it will not work for the baby when it grows because it will need more food and the spoon will not be right for more food. Especially 4 months. The babies eat more at 4 months. (Interviewer: so what method do you prefer?) I prefer the baby bottle because it is big.
B3	Mothers feeli	MF01	Baby bottle	BB5	Yes I can spoon feed even though it will be very slow. I think I will use a syringe. A syringe is faster. It won't waste time especially for me because I work and I am going to leave my baby with someone and that person will not spend time feeding my baby. She will just feed a short while and say that the baby is full. You know what I mean?

Figure 4.3 Workbook 1: Excel workbook showing themes, categories, codes and narrative

Workbook 1 above depicts the participant ID number, first theme, respective code for the theme/topic and category and subsequent code.

Below is a table depicting the themes, categories and sub-categories identified from the interviews.

Table 4.2 Themes, categories and sub-categories of the perceptions of HIV-positive mothers of the flash-heat method of infant feeding

Themes	Categories	Sub-categories
1: Mothers' feelings about the flash-heat method of infant feeding	Women share positive feelings about using the flash-heat method to feed their infants	Positive feeling about touching breast milk by hand while expressing
		Positive feeling about expressing breast milk by hand into a glass bottle
		Positive feeling about heat treating breast milk in a pot on a stove
		Prefer to use regular feeding baby bottle over spoon-feeding
2: Mothers' views on a reasonable period for using the flash-heat method and introduction of supplementary diet	Differing views on the number of exclusive flash-heat months	Flash-heat and exclusive feeding for one month
		Flash-heat and exclusive feeding for four months
		Flash-heat and exclusive feeding for six months
3: Reports from mothers concerning different feeding methods	Cost of flash-heat method versus formula feeding	Flash-heat method is cheaper than formula
	Breast milk reliable versus formula which is unreliable	
	Formula versus breast milk which is considered healthier	
4: Mothers' perceptions of significant others regarding flash-heat infant feeding technique	Mothers' perceptions of the external influences on their infant feeding decisions	Mothers' perceptions of nurses as having significant influence on their chosen feeding method

Themes	Categories	Sub-categories
		Mothers' perceptions of relatives as having significant influence on their chosen feeding method
5: Mothers' perceptions of home circumstances and the feasibility to flash-heat	Mothers perceive that they could flash-heat under any circumstance at home	Mothers believe that they could flash-heat without full disclosure at home
		Mothers believe that they could flash-heat even if the home environment does not allow it
6: Mothers' choice of preferred feeding options	Formula as current feeding option chosen	
	Change of initial feeding method to flash-heat	

Through thematic content analysis the following themes were compiled: 1) Mothers' feelings about the flash-heat method of infant feeding; (2) Mothers' views on the reasonable period for using the flash-heat technique and the introduction of supplementary foods; (3) Reports from mothers concerning different feeding methods; (4) Mothers' perceptions of the opinions of significant others on flash-heat implementation; (5) Mothers' descriptions of home circumstances and the feasibility to flash-heat and lastly; (6) Mothers' choice of preferred feeding options.

These six themes, their categories and sub-categories are discussed in detail in this chapter along with verbatim quotations from the interviews.

4.9 THEME 1: MOTHERS' FEELINGS ABOUT THE FLASH-HEAT (FH) METHOD OF INFANT FEEDING

Each mother was shown slides of the FH method of feeding which was complemented by an explanation of the method by the field workers who were two trained professional nurses. After the mothers asked questions for clarity on the method and consented to

participate in the IDIs, the main question that was asked for exploring their feeling on the FH method was:

4.9.1 How would using this method at home to feed your baby make you feel?

Participant B23 said: *"Hm.. It is like how our mothers used to feed us many years ago...only breast. So for me it is not a problem. I can use it because I know that it is good for my baby. My baby will not get sick with this method because the germs are killed with the boiling water".*

One working mother raised her reservations about this technique as she felt that she could not implement and use it effectively because of her absence from her infant.

She (Participant B9) said: *"I don't have a problem with this method but who is going to do all this because I am working? But for the sake of my baby I will have to see what I can do".*

A second working mother (Participant B7) said: *"What do people do when they use this method and they go to work? I am working with temporary work and will have to leave my baby with someone at home. Now, that person does not know that I am like this (HIV-positive) and she will not understand what to do".*

This question was probed by asking

4.9.2 What do you think about touching your breast milk while expressing?

Participant B4 said: *"That depends on an individual. Some mothers may struggle to express and it may cause them to stop, but for me as long as you try to be clean and your nipples are not cracked and do not have sores and there is no blood, then you can express your breast milk and not worry about touching it. I do not have a problem with touching my milk. It is my milk. No...I will not be stressed because it is not blood, but breast milk".*

Participant B6 said: *"I will feel okay after all it is my milk and there is no reason to be disgusted by touching breast milk. Some women may be disgusted because they may*

think that it is unnatural or should not be touched at all. It is good and we are supposed to feed our babies this milk".

The question was further probed by asking

4.9.3 Tell us how expressing your milk into a glass bottle would make you feel?

Participant B19 said: *"Glass bottle..? Ah I think it will break...What if it breaks when you are still expressing? Then all your milk is finished. Then the baby...what will she drink? This method will not work if all the milk is not there for the baby to drink. (Interviewer: how will the bottle break?) When you push it over and it falls"*.

Participant B24 said: *"How do I clean the glass bottle? (Interviewer: what do you mean?) I mean do I have to boil it in water first? Because I think that is too much work before feeding the baby. Also by the time the baby eats, you don't have any more paraffin left for cooking". (Interviewer: no you just clean it with soap and water like I said in the presentation) Oh...then it is okay".*

Participant B26 said: *"I have a problem with my breasts. There is no milk so this will not work for me so nicely. You see even if I touch my breast I don't feel any milk. So for me this thing will cause stress on my part because there will be very little milk".*

The next question asked was:

4.9.4 Do you see yourself heat treating your breast milk and cooling it?

Participant B10 said: *"I feel okay about heating my breast milk in the pot. It is the same as making a feed using formula, say S26. (S26 is a brand of commercial infant formula). You also have to boil water to make the feed. It is the same method because you also boil water and wait for it to cool. With this flash-heat method it is the same as you express your breast milk into something then you put that into a pot containing water to boil so that all the germs are killed, then you feed your baby once it has cooled. Heating breast milk is important because you kill all the germs that can get into the milk when you are expressing".*

Participant B19 said: *"Eish...that one is difficult. As long as the people say it is good for the baby then it is okay, but I wonder if the baby will like the taste of the milk". Eish is a word used to express everything ranging from frustration to surprise to disapproval. It is also used for everyday acknowledgement of things you can't change like" Eish, the traffic is bad today (Urban dictionary 2008:1).*

The next question asked was

4.9.5 Do you see yourself spoon-feeding your baby?

Participant B7 said: *"For me I don't know about the spoon. I like it but I think it will not work for the baby when it grows because it will need more food and the spoon will not be right for more food. Especially four months. The babies eat more at four months. (Interviewer: so what method do you prefer?) I prefer the baby bottle because it is big".*

Participant B3 said: *"I think I will use a syringe. A syringe is faster. It won't waste time especially for me because I work and I am going to leave my baby with someone and that person will not spend time feeding my baby. She will just feed a short while and say that the baby is full. You know what I mean?"*

4.10 THEME 2: MOTHERS' VIEWS ON A REASONABLE PERIOD FOR USING THE FLASH-HEAT METHOD AND INTRODUCTION OF SUPPLEMENTARY DIET

The mothers were asked the following questions to assess how long they thought they could use the flash-heat method for feeding their infants. In addition and most concerning is that some of them thought they needed to introduce supplementary food to the exclusive breastfeeding diet.

The question that was asked was:

4.10.1 For how many months do you think you could express breast milk, heat it and feed your baby?

Participant B9 said: *"One month. My first baby I breastfed for one month then my milk went dry. So I had to get milk in the tins from the shop to feed the baby. My baby was*

fine, he did not get sick. I am going to do that again because I can see I don't have more milk again".

Participant B19 said: *"Four months and I will check whether the baby is growing well and that he doesn't look like a child that has HIV. I will not rush to stop this feeding method if my child is growing up well".*

This question was probed by asking:

4.10.2 At what age do you think a baby needs to supplement its diet with other food?

Participant B4 said: *"Oh...the nurses say six months. I think as adults you know, we believe that there are many things that we need to give babies when they are born. We believe their umbilical cords will not heal if we do not give them something to drink. We believe their fontanels will not close if we do not put something on the head. We do these things because we are told to do them by our people at home".*

Participant B26 said: *"Ah....I think at one month. The nurses did not tell me anything about how long to feed my baby. My mother and sister I stay with say that I must wait for one month before I feed anything, then after one month I can give something like porridge to the baby". The word Ah is expletive, meaning that it is a word that has no meaning but has a grammatical function in a sentence (Urban dictionary 2008:1).*

Participant B10 said: *"I think at four months we need to give babies porridge so that they can sleep. If you give them only milk, they will cry all the time then people will say you are not feeding the child right".*

4.11 THEME 3: REPORTS FROM MOTHERS CONCERNING DIFFERENT FEEDING METHODS

Mothers were questioned on the flash-heat method of infant feeding compared to that of formula feeding.

The question asked was

4.11.1 What are your feelings about using this flash-heat method compared to formula feeding?

Some of the responses were;

Participant B27 said: *"It is good. It is also cheap. It does not waste money unlike when you have to buy the formula from the shop. Most of us do not have money. I don't have all the money to buy formula for my baby".*

Participant B4 said: *"You know if you go to the clinic sometimes, the nurses send you back saying there is no formula. Then you suffer because at the clinic they say not to give your baby water, no tea, no what-what, strictly milk for six months. So what do you do?"*

Participant B21 said: *"Some people still talk about you when they see a tin of milk when you leave the clinic. They say things...many things. I am sure they are also going to talk about this method, but at least with this method it is better because you will not short milk for the baby".*

4.12 THEME 4: MOTHERS' PERCEPTIONS OF SIGNIFICANT OTHERS ON FLASH-HEAT IMPLEMENTATION

The mothers were asked to explain who they thought plays a significant role in shaping their feeding decisions. This person could be living with them or not. They needed to identify someone whom they thought had the power to affect their decision on the most suitable feeding method.

The question asked was:

4.12.1 Who and/or what has the power to change your mind after you chose a method to feed your baby?

Participant B26 said: *"The people I stay with. They are my relatives. They always tell me what to do with my babies. Even the last babies. Now with this one, sjoe I don't know".*

(Sjoe - pronounced "shoe". It is expletive. i.e. is a word that has no meaning but has a grammatical function in a sentence) (Urban dictionary 2008:1).

Participant B19 said: *"Yes at home...it is my mother. At the beginning, the first baby they saw was the one that died. I breastfed the baby and now they are saying that I should not breastfeed this one but I want to because I know it is healthier...(Interviewer: do they know that you are HIV-positive?) No they don't know I am HIV-positive".*

Participant B6 said: *"Me...I will have to say it's the nurses. They tell us what to do with our babies and they are not happy if we do not do as they say". Sometimes you go there and if they find out you are not doing what they told you to do then they shout at you".*

4.13 THEME 5: MOTHERS' DESCRIPTIONS OF HOME CIRCUMSTANCES AND THE FEASIBILITY TO FLASH-HEAT

Participants were asked what their home environments were like and whether they thought they could practice the flash-heat technique comfortably in that environment.

The question asked was:

4.13.1 Please explain whether you would be able to flash-heat at home under difficult situations?

Participant B24 said: *"Yes, I live with my husband and he does not know my status. I will just tell him that I do not like to breastfeed the baby, besides I will not stay with him full time...I will do it when I cook because he is not there when I cook. Eish...actually I don't care even if he asks me".*

Participant B26 said: *"No, I will not use this method in front of other people in the house they will have to leave. I will not have to worry about what I tell them, because I will not do it in front of them...Also they will not like it if I use the same pot to put the breast milk in...And using the same spoons...Eish. They will ask me why I am doing that. I am just saying with HIV I am not the only one that has it, but with this method, it is still new. I will*

be one of the first ones to use it...you see. I don't want many questions from other people".

4.14 THEME 6: MOTHERS' CHOICE OF PREFERRED FEEDING OPTION

Participants were asked what their current feeding option was for their infant and why they preferred that over alternatives.

The specific question asked was:

4.14.1 What feeding method have you chosen for your new baby and please tell us why you prefer that method?

Participant B3 said: *"For me…I don't have enough milk in my breasts. That is my problem. Even with my first daughter I did not have enough milk. So I will just go and buy Nan formula. But If I had milk, I would follow this procedure because it is good and cheap."*

Participant B10 said: *"The nurses said I must breastfeed and I will do it. Also I am happy to breastfeed because I have too much milk. Some women here don't know what to do because they don't have money and they don't have the natural milk also".*

Participant B7 said: *"I am going to formula-feed my baby. I was going to buy Parlagon to feed my baby with. Parlagon makes babies grow well that is why the hospital uses it. They don't get sick easily. I did not breastfeed with my first baby and that is the reason why I am not going to breastfeed this baby".*

The question was probed by asking:

4.14.2 Would you change your feeding method that you first chose to the flash-heating one?

Participant B21 said: *"Okay. You explained this method to me and I understand it. I want to do it at home...I trust this method. I will be feeding my baby my milk. I won't have money for formula. You know how expensive the milk in the tins is. They say that*

you can get milk at the clinics, but no one told me to come and get milk. Even so the other ladies said that the Government does not have enough milk because it gets finished and there is nothing for the babies".

Participant B23 said: *"Me...I think that I would change to this method because it is very good. It will make my baby grow with no illness. Medicine is expensive so it's better to prevent illness and going up and down to the clinic and the hospital. Transport is expensive. So it is better to use this method".*

4.15 CONCLUSION

This chapter described the findings from the IDIs with HIV-positive postnatal women at Tembisa Hospital within six to 12 hours after delivery.

Most mothers had a positive response to the new Flash-heat technique. They believed that is was good for their infants and that heat treating their breast milk would result in their infants being HIV-free. They believed that this method was cheaper than formula feeding because their own breast milk was used. They expressed positive feelings about touching their breast milk while expressing and had no adverse feelings of expressing into a glass jar.

Most mothers preferred to feed their infants using a regular baby bottle because they believed that the proposed spoon would result in delays in feeding. A few mothers reported that they would use a syringe for feeding because of the speed involved and the benefit of not spilling the milk.

The mothers believed that they could use the flash-heat method for a period of one month and others for four months. They believed that supplementary foods are to be introduced at one, four and six months. This information was provided to them by nurses and relatives. Mothers also believe nurses and relatives to have significant influence over their infant feeding option.

Most mothers believed that they could use this flash-heat technique in their homes without full disclosure of their HIV status and could practice it in the absence of others. They initially opted to formula feed but later became biased towards the flash-heat

method of feeding. However, their belief of having insufficient milk appears to pose a stumbling block to using this method for feeding.

Chapter 5 discusses presents the findings from quantitative data.

CHAPTER 5

PRESENTATION OF FINDINGS OF QUANTITATIVE DATA

5.1 INTRODUCTION

Chapter 4 described the six themes identified during qualitative data analysis. The themes, their categories and sub-categories were discussed in detail along with verbatim quotations from the interviews and relevant literature control for validation.

This chapter presents the results of the statistical analysis that was performed on the data using the SPSS software package. The first part of the chapter seeks to characterise the women found in the study group according to their level of educational attainment, their age profile and their breastfeeding practices, amongst others. It begins with a presentation of the demographic data for the study area. This results in a profile of HIV-positive mothers at Tembisa Hospital who do not fall within the Affordability, Feasibility, Acceptability, Sustainability and Safe (AFASS) criteria set by the WHO (to identify women who are eligible for formula feeding) and for whom the guidelines could be used to promote flash-heat as an alternative infant feeding method (guideline presented in chapter 7).

Thereafter, the chapter culminate in regression analysis to better understand the factors that appear to influence whether an HIV-positive mother is likely to attempt the flash-heat method. In the regression model, the dependent variable is "Will HIV-positive mothers adopt FH?" As explained below, the logistic regression model is most suitable for survey data of this nature where responses are of a binary nature (Menard 2009:21). A statistical model is developed showing the independent variables that appear to drive the likelihood of an HIV-positive mother adopting the recommended technique.

5.2 DESCRIPTIVE STATISTICS

5.2.1 Socio-demographic characteristics of the respondents

5.2.1.1 Age

Age distribution of the respondents is shown in table 5.1. Their age ranged from 18 years to 45 years. More than half of the respondents 38(54.3%) were 36 years or older.

Table 5.1 Age distribution of the participants (n=70)

Age group	Frequency	Percent
≤20 yrs	5	7.1
21 – 25 yrs	15	21.4
26 – 30 yrs	9	12.9
31 – 35 yrs	3	4.3
36 – 40 yrs	22	31.4
41 – 45 yrs	16	22.9
Total	**70**	**100.0**

5.2.1.2 Education

Regarding education level of the mothers, majority (91.4%) had high school education (table 5.2).

Table 5.2 Education level of the participants (n=70)

Level of education	Frequency	Percentage
< Std 6	2	2.9
Std 6-7	13	18.6
Std 8-9	27	38.6
Std 10	24	34.3
College	3	4.3
Higher	1	1.4

5.2.1.3 Marital status

Majority (77.1%) of the mothers were single (figure 5.1).

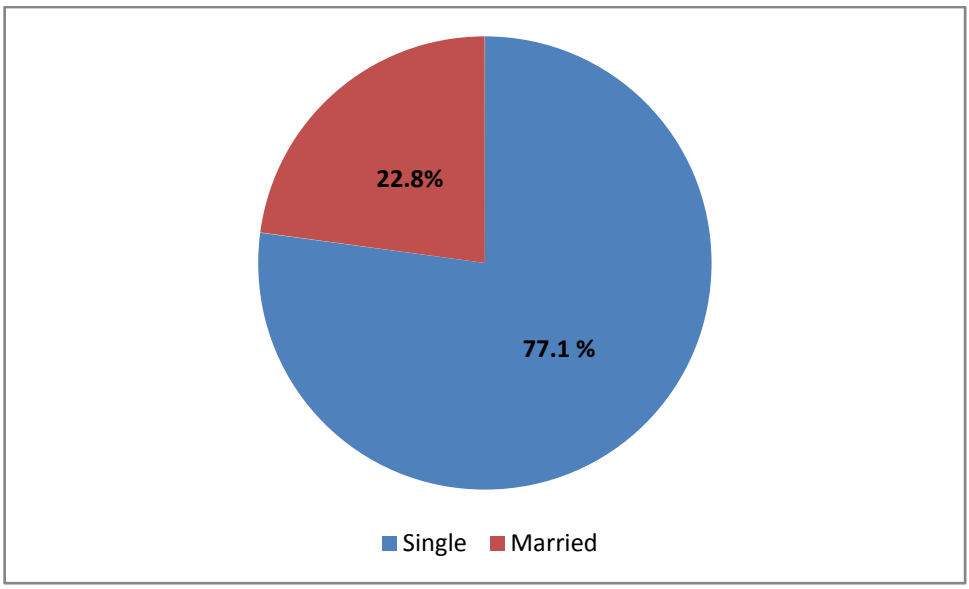

Figure 5.1: Marital status of the participants (n=70)

5.2.1.4 Employment

Most of the mothers (n=54) (77.1%) were unemployed (figure 5.2). Among those employed mothers (n=16; 22.9%), 50% worked as a domestic worker (figure 5.3).

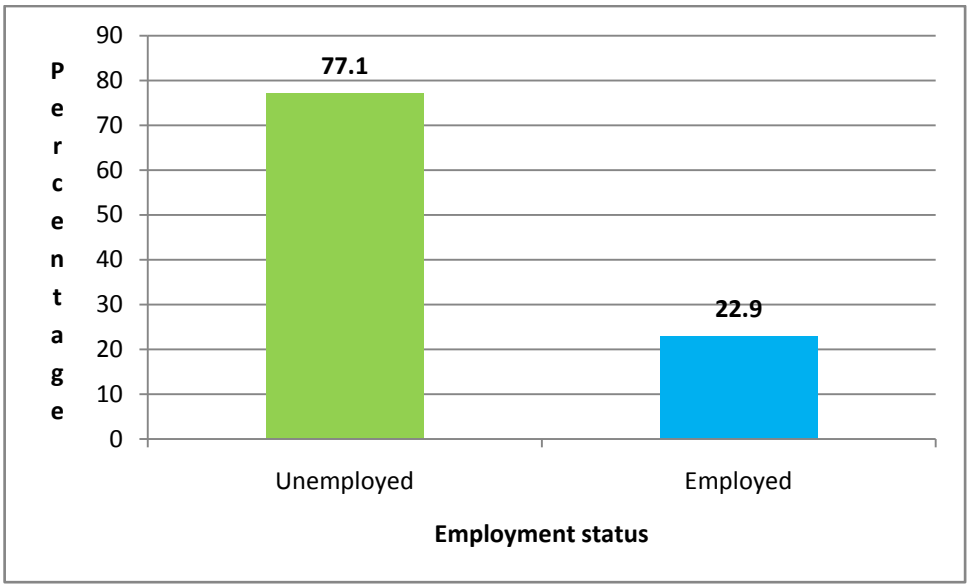

Figure 5.2: Employment status of the participants (n=70)

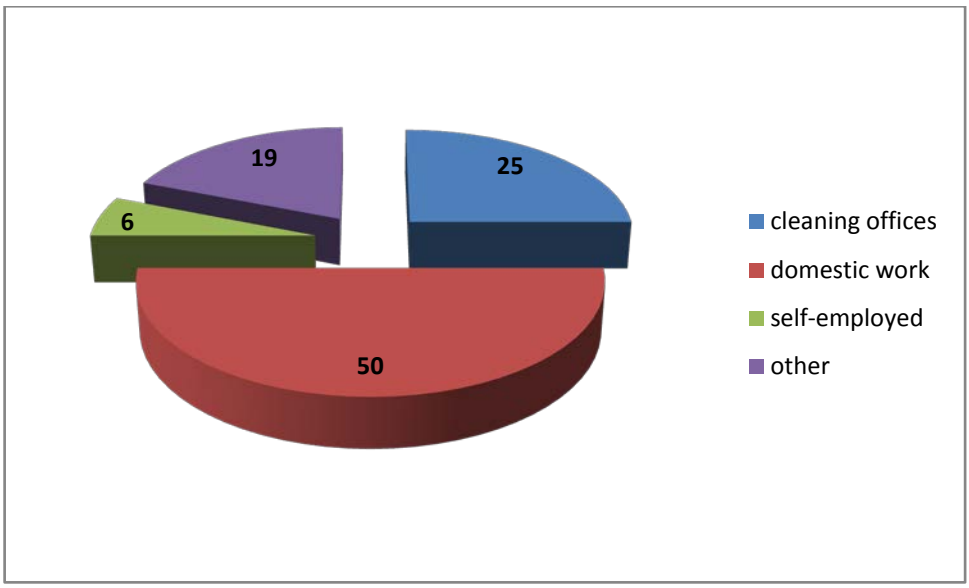

Figure 5.3: Occupations of employed participants (%)

5.2.1.5 Residency

The majority (46%) of mothers lived with their relatives. Distribution of residency is shown in figure 5.4.

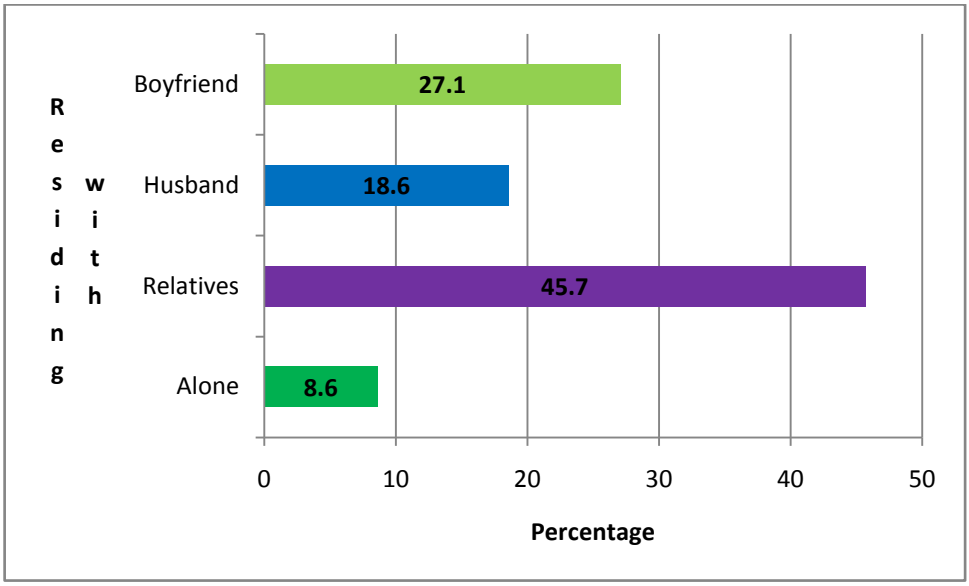

Figure 5.4: Residency of the participants (n=70)

5.2.1.6 Financial aid

Just under a third of the mothers reported that they received financial support (31%) (figure 5.5).

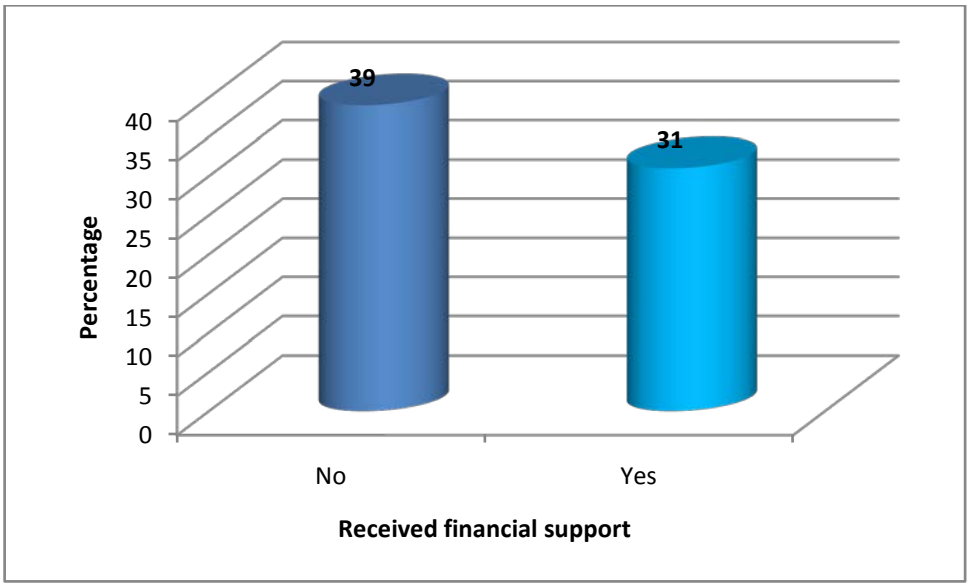

Figure 5.5: Access to financial support (n=70)

5.2.1.7 Access to water and electricity

Access to water and electricity are summarised in table 5.3. More than a third (40%) and more than a tenth (14%) did not have access to running water and electricity respectively.

Table 5.3 Participants' access to running water and electricity (n=70)

Variables	Frequency	Percentage
Accessing running water		
No	28	40.0
Yes	42	60.0
Have electricity		
No	10	14.3
Yes	60	85.7

5.2.1.8 Fertility and contraceptive usage

Data on women's fertility indicated that almost three-quarters (73%) of the mothers had between two and three live children, and majority (81%) of the mothers reported not having used any form of contraception prior to their last pregnancy (table 5.4).It was surprising to see that almost a quarter (24%) of the pregnancies reported by participants was not planned.

Table 5.4 Fertility and contraceptive use among the participants

Variables	Frequency	Percent
No of children		
1	12	17.1
2	36	51.4
3	18	25.7
4	2	2.9
5	2	2.9
Used contraceptives prior to last pregnancy		
No	57	81
Yes	13	19
Baby Planned		
No	17	24.3
Yes	53	75.7

Table 5.5 shows breastfeeding behaviour of the participants. Less than half (43.2%) of the participants were breastfeeding their infant. Reasons for not breast feeding is indicated in table 5.5.

Table 5.5 Breastfeeding behaviour of the participants

Variables	Frequency	Percent
Currently breastfeeding		
No	38	51.4
Yes	32	43.2
Reasons for not breastfeeding n=38		
Painful breasts	1	2.6
Relatives do not want me to breastfeed	1	2.6
Work	11	28.9
Twins	3	7.9
HIV-positive	1	2.6
Worried I will infect baby	1	2.6
Try formula	3	7.9
It looks difficult	12	31.6
Got formula from clinic	1	2.6
Not enough milk	4	10.7

5.2.1.9 HIV disclosure

Disclosure of the mothers' current HIV status was ascertained by first identifying whom they lived with, then asking whether they had disclosed their HIV status to that person (or people).About two-thirds of the participants (63%) had disclosed their status to the people they were residing with. Just over half of them disclosed their status to their relatives and husband (56.3% and 53.8%) respectively.

Table 5.6 HIV disclosure status of the participants

Variables	Frequency	Percent
Disclosed HIV Status		
No	26	37.1
Yes	44	62.9
Disclosed to (living with)		
Relatives (n=32)	18	56.3
Husband (n=13)	7	53.8
Boyfriend (n=19)	15	78.9
Alone (n=6)	4	66.7

5.2.1.10 Current medication use

All HIV-positive women in the study were given antiretroviral (ARV) medication (Nevirapine) as part of the national PMTCT strategy (NDOH 2001). However, majority (76%) of the women interviewed reported having taken such medication during labour and all of them indicated that they took medication for HIV.

Table 5.7 Current medication use among the participants

Currently taking medication	Frequency	Percent
No	17	24.3
Yes	53	75.7

5.2.1.11 Flash-heat at home under different circumstances

Most of the mothers (74%) reported that they would use the flash-heat method at home as a feeding method for their infants (figure 5.6).

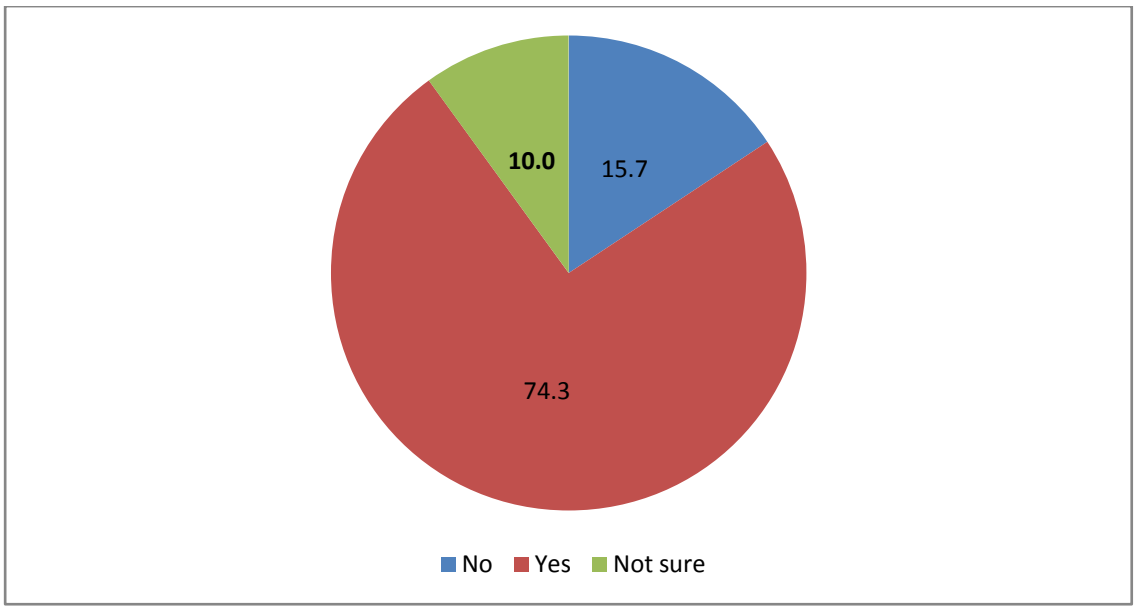

Figure 5.6: Utilisation of flash-heat method at home (%)

5.2.1.12 Heat treatment of expressed breast milk

Following a demonstration of the flash-heat technique, the majority (83%) of the mothers reported that they could heat treat their expressed breast milk in a pot on a Primus stove until the water boils as required by the flash-heat guideline (figure 5.7).

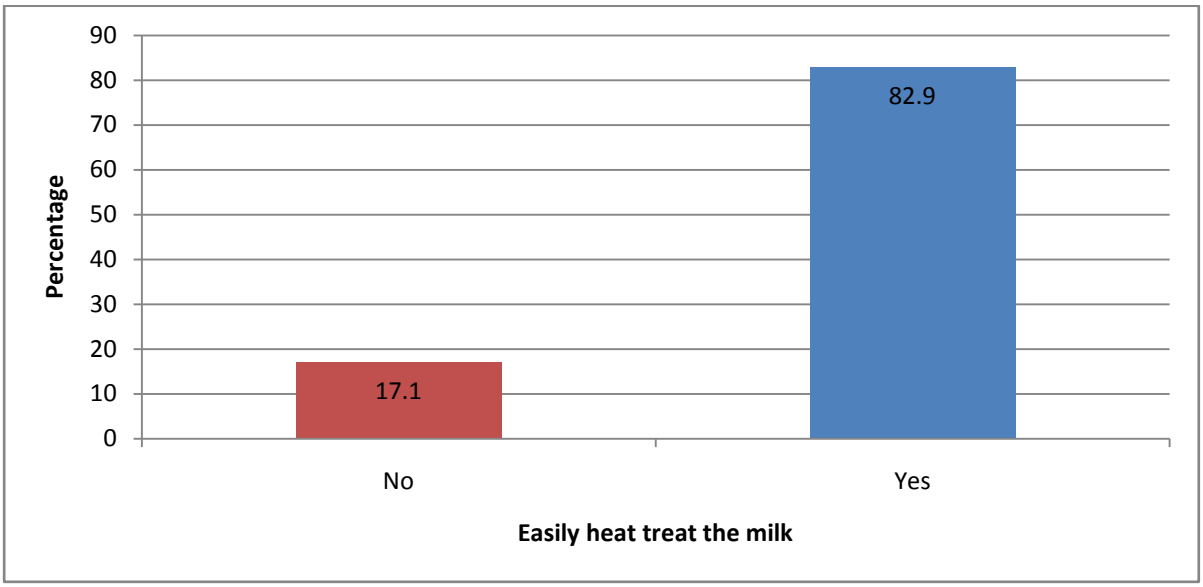

Figure 5.7: Proportion of women can heat treat the milk (%)

5.2.1.13 Barriers to adopting flash-heat reported by the participants

Regarding barriers to flash-heat at home, more than two-thirds (71.4%) of the mothers felt that they would not be troubled by anyone affecting their ability to flash-heat at home (figure 5.8).

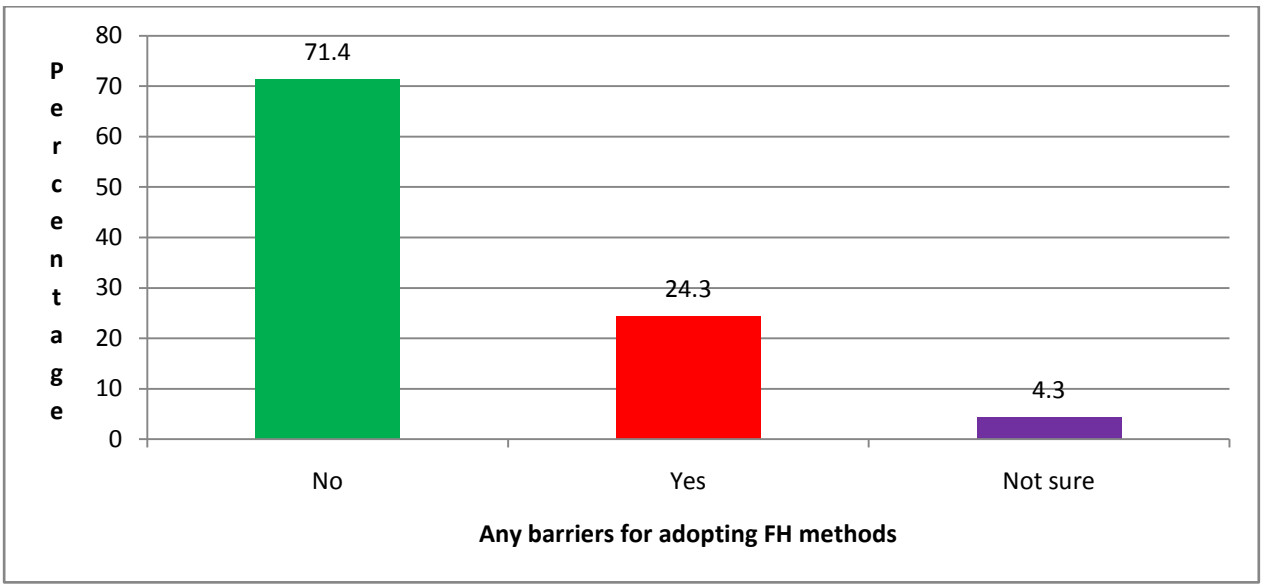

Figure 5.8: Barriers for adopting FH methods at home (%)

5.3 INFERENTIAL STATISTICS

Chi-squared test of association was used to find the association between adopting FH and all other variables. Table 5.8 shows the association between demographic variables and adopting FH. None of the demographic variables were found to be significantly associated with adopting FH (p>0.05).

Table 5.8 Association between demographic variables and adopting FH

Variables		Will HIV+ mothers adopt FH		Chi-squared value	P-value
		No	Yes		
Age	18-20	4	1	9.141	0.116*
	20-25	11	4		
	25-30	9	0		
	30-35	3	0		
	35-40	12	10		
	40-45	13	3		
Marital status	Single	40	14	0.006	0.941
	Married	12	4		
Educational level	< Std 6	1	1	8.117	0.123*
	Std 6-7	11	2		
	Std 8-9	19	8		
	Std 10	20	4		
	College	1	2		
	Higher	0	1		

Variables		Will HIV+ mothers adopt FH		Chi-squared value	P-value
		No	Yes		
Work	No	41	13	0.333	0.564
	Yes	11	5		
Live with whom	Alone	6	0	6.172	0.112*
	Relatives	20	12		
	Husband	9	4		
	Boyfriend	17	2		

*Fishers exact test

Regarding socio-demographic variables, the study did not find any variables that had any association with adopting FH (p>0.05) (table 5.9).

Table 5.9 Association between socio-demographic variables and adopting FH

Variables		Will HIV+ mothers adopt FH		Chi-squared value	P-value
		No	Yes		
Running water	No	20	8	0.199	0.655
	Yes	32	10		
Have electricity	No	6	4	1.246	0.264
	Yes	46	14		
Receive child care grand	No	27	12	1.178	0.278
	Yes	25	6		

It was found that there were significant associations between adopting FH and belief FH prevent transmission, heat EBM at home, express for four (4) months, and can easily heat treat the milk (p<0.05).

Table 5.10 Association between adopting FH and other variables

Variables		Will HIV+ mothers adopt FH		Chi-squared value	P-value
		No	Yes		
Currently breastfeeding	No	25	13	3.141	0.076
	Yes	27	5		
Disclosed status	No	19	7	0.032	0.859
	Yes	33	11		
Believe FH Prevent transmission	No	43	10	5.355	0.021
	Yes	9	8		
Heat EBM at home	No	2	13	31.130	<0.001
	Yes	50	5		
Express for 4 months	No	1	11	32.979	<0.001
	Yes	51	7		
Can you easily heat treat the milk	No	2	10	25.171	<0.001
	Yes	50	8		
Mother positive reaction to FH	No	37	14	0.297	0.586
	Yes	15	4		

5.4 LOGISTIC REGRESSION ANALYSIS

Backward stepwise binary logistic regression analysis was carried out to find the significant predictor for adopting FH. The logistic regression model is used to predict the factors which most influence the adoption of FH. From the inferential analysis, the variables that were significantly associated with adopting FH were initially included in the regression analysis. Then those variables that did not contribute significantly to the overall model were removed from the model. The final step of the analysis results are shown in table 5.11. The result highlighted that those mothers who reported that they could heat Expressed Breast Milk (EBM) at home were 24 times more likely to adopt FH compared to those who could not heat EBM at home (OR=24.23, p=0.001). Also those mothers who report that they could express milk for 4 months had 22 times more chances of adopting FH than mothers who reported that they could not express for 4 months (OR=21.60, p=0.016). Statistically, the relationship between the two independent variables and the dependent variable is robust.

The variable ‘Believe can do FH under a number of different circumstances at home’ was also significant but became insignificant when run together with the variables Heat

EBM at home and Express for 4 months probably due to the presence of multicollinearity. Nonetheless, the model provides evidence that HIV-positive mothers who express for four months and can easily heat treat the milk are more likely to adopt FH as an infant feeding method.

Table 5.11 Stepwise logistic regression analysis output

Independent variables[a]	B	Wald	p-value	Odds Ratio (OR)	95% C.I. for OR	
					Lower	Upper
Heat EBM at home	3.188	10.334	0.001	24.233	3.470	169.221
Expressfor4months	3.073	5.773	0.016	21.596	1.761	264.790
Constant	-2.574	24.031	<0.001	0.076		

a. Variable(s) entered on step 1: Believe FH Prevent transmission, Heat EBM at home, Express for 4 months, Can easily heat treat the milk.

5.5 CONCLUSION

This chapter presented the statistical analyses run on the data using SPSS. Initially it presented the demographic data profiling HIV-positive mothers at Tembisa Hospital who fall outside the AFASS criteria and for whom the guidelines the researcher has developed (see Chapter 7) could be used to promote flash-heat as an alternative infant feeding method. Thereafter correlations and regressions run on the data were presented. Several regressions were run and the model that was most useful was: HIV-positive mothers who express for four months and heat treat their expressed breast milk are more likely to adopt flash-heat as an infant feeding method.

CHAPTER 6

DISCUSSION OF FINDINGS

6.1 INTRODUCTION

The previous chapter presented findings of the analysis from the in-depth interviews (IDIs) conducted with HIV-positive women at Tembisa Hospital. Interviews were conducted with women within six to 12 hours after delivery. This chapter therefore focuses on the discussion of findings and is presented in two sections; namely Sections A and B. The first section interprets and discusses findings based on data analysed from in-depth interviews. Six themes were identified from the IDIs and they include:

- Mothers' feelings about the flash-heat method of infant feeding
- Mothers' views on the reasonable period for using the flash-heat technique and introduction of supplementary diet
- Reports from mothers concerning different feeding methods
- Mothers' perceptions of significant others on flash-heat implementation
- Mothers' descriptions of home circumstances and the feasibility to flash-heat and lastly
- Mothers' choice of preferred feeding options

These six themes, their categories and sub-categories are discussed in detail in this chapter, along with literature control.

Section B discusses the findings based on the analysis of quantitative data. This section includes descriptive statistics such as age, education, marital status, breastfeeding, disclosure of HIV status, profile of HIV-positive mothers most likely to adopt flash-heat as an infant feeding method, and predictor variables on flash-heat behaviour.

6.2 RESEARCH FINDINGS

6.2.1 Characteristics of HIV-positive mothers most likely to adopt flash-heat as an infant feeding method

A total of 30 HIV-positive mothers were interviewed and most of them belonged to the Zulu ethnic group and resided in the Tembisa area.

- They were between 20-45 years old and most (73%) were single.
- Most of the mothers indicated that they were living with their boyfriends.
- Less than half of the participants had a Standard (Std) 9 level of education.
- Most of the participants were unemployed and had on average three children.
- Most participants had disclosed their HIV status to their boyfriends, but they also reported that their sexual partners had not been tested for HIV.
- The majority of the participants stated that they had not planned for their last pregnancies but had spontaneous vertex deliveries (SVD).
- Approximately half of the participants indicated that they had planned to breastfeed their infants.

The age profile of 20-45 years (above) is supported by the finding from a research study which suggested that new HIV infections were twice as high in women aged 25 to 40 than among those aged below 20 (IRIN, PLUS NEWS 2009:1). Similarly, the finding related to education levels which indicates that less than half of the mothers (n=11) had attained a Std 9 level of education is in agreement with the finding by IRIN, PLUS NEWS (2009:1) which suggests that there were fewer HIV infections among women with higher education than those with lower levels.

6.3 THEME 1: MOTHERS' FEELINGS ABOUT THE FLASH-HEAT METHOD OF INFANT FEEDING

The participants were first asked about the technique in its totality, taking into account its anti-HIV protective benefits, then about the individual steps in implementing the flash-heat method. The purpose of this approach is that the flash-heat technique involves three distinct steps of implementation; namely, expression into a glass bottle, heat treatment and finally spoon-feeding (Israel-Ballard et al 2007a:319).

6.3.1 Category 1 – Women share positive feelings about using the flash-heat method

The method was demonstrated to the mothers prior to the interview, followed by a short discussion. Surprisingly, the results indicated that mothers immediately believed in this method, particularly its safety. They verbalised that they would use the flash-heat infant feeding method at home because it would keep their infants healthy. They believed that it is an easy (simple) method that could keep their infants safe from HIV infection. This finding was in contrast to the findings by Oguta et al (2001:1), where HIV-positive mothers in Kenya felt that Expressing and Heat Treating (EHT) breast milk was alien and could not be accepted. Similarly, this finding was also in contrast to the findings of Israel-Ballard et al (2006:48) who in their Zimbabwe study with mothers, fathers, grandmothers and birth attendants, observed that initially the EHT of breast milk was met with scepticism. The scepticism was caused by potential obstacles such as believing that the taste of the milk would change resulting in the method not being accepted by the family (Israel-Ballard et al 2006:48).

6.3.1.1 Subcategory 1.1 – Positive feeling about touching breast milk by hand while expressing

According to the findings of this study, many women felt that they do not have a problem touching their breast milk while expressing by hand because it is their own and is natural. They were comfortable with touching their breast milk with clean hands which are free from cuts and open wounds. The feelings they shared were primarily positive because the milk was to be heat treated after expression. This finding was in contrast to the findings by Uganda Ministry of Health and Wellstart International (1994:22) where most of the Ugandan women expressed disbelief, amazement and even horror at expressing breast milk. In addition, none of the mothers reported that they were contaminating their milk in any way while expressing, or felt they themselves were being contaminated. The above finding of non-contamination was in contrast to that of Israel-Ballard et al (2006:49) who found that expression of breast milk was a sign of infidelity and those touching human milk become infected themselves.

The choice of word to describe their breast milk as “natural” is interesting as breast milk is a natural substance from a mother’s body and it is the researcher’s opinion that it can instil in a mother a sense of “conforming to nature”. Women elsewhere in Africa have stated that touching expressed breast milk was against their culture and reported touching it as being unnatural (Steel & Sserunjogi 1993:3). Strong feelings against expressing and touching their breast milk and later feeding infants the same breast milk have been reported as strange and unnatural (Steel & Sserunjogi 1993:3).

6.3.1.2 Subcategory 1.2 -– Positive feeling about expressing breast milk by hand into a glass bottle/jar

The findings from this study indicated that most mothers did not have any problem with expressing their breast milk into a glass peanut butter or jam bottle in preparation for heat treatment. They verbalised feeling comfortable about expressing into a jar as long as it was thoroughly cleaned.

A few mothers stated that they had insufficient milk and would not manage to express for this reason. This finding confers with findings of Uganda Ministry of Health and Wellstart International (1994:22), Yetayesh and Haidar (2009:107) and Seidel, Sewpaul and Dano (2000:24) who found that Ugandan, Ethiopian and South African HIV-positive mothers felt that they could not use alternative infant feeding methods because of their fear of having insufficient breast milk. The feeling that mothers have insufficient milk is real; however this belief remains unsubstantiated as breast milk is generated on a “supply and demand” basis (Uganda Ministry of Health & Wellstart International 1994:18).

An interesting point is that none of the mothers indicated a concern that the milk they expressed into the glass bottle might be insufficient for feeding their infants for four months. Mbuya et al (2010:1481) found in their study that 19 out of the 20 mothers stopped EHT due to inadequate milk production at 4.5 months after already introducing complimentary foods to their infants’ diets. However, the same study reported that scientific reasons for the decrease in expressed milk volume over time could not be found as the frequency of expressing episodes increased over time (Mbuya et al 2010:1481). In support of this, studies indicated that expressing breast milk manually

and using an electric pump resulted in various milk volumes ranging from 2 ml-97 ml (Ohyama et al 2010:39; Slusher et al 2007:125) from birth to six hours later.

According to the results, one mother stated that she feared that the milk would spill when expressing into the glass bottle. She believed that the "mouth" of the bottle was not large enough for easy expressing. Even after it was suggested that she could use a larger bottle, she still maintained that she would spill when expressing. Another mother believed that the glass bottle would break when handling it. This is a new finding as the acceptability studies conducted by Israel-Ballard et al (2006:48) and Mbuya et al (2010:1481) focused on the acceptability of expressing breast milk and on feeding the infant the heat-treated Expressed Breast Milk (EBM), but did not mention acceptability of the use of the glass jar in particular.

The study results also showed that a minority group of mothers expressed pain on expression as a concern. This is similar to Israel-Ballard et al (2006:48) who found in their Zimbabwe study that some women found breast milk expression painful the first few times.

6.3.1.3 Subcategory 1.3 – Positive feeling about heat treating breast milk using a pot on a stove

The results showed that most mothers were positive about heat treating expressed breast milk prior to feeding their infants. They further stated that the process of heat treating was similar to preparing a formula feed, where one needs to boil water and allow it to cool and then mix the infant formula. They knew and understood the benefits of heat treatment as killing germs and HIV. The finding that most mothers understood the benefits of heat treating is in line with Israel-Ballard et al (2006:48), who in their Zimbabwe study found that most of the HIV-positive participants interviewed knew the benefits of heat treatment of breast milk to be that of killing germs.

According to the findings of this study, most of the HIV-positive participants interviewed were positive about their ability to express their breast milk and heat treat it according to the prescribed flash-heat method. They were confident that they would be able to produce the desired flash-heat results at home. This was encouraging as the technique was newly introduced and demonstrated only once prior to the interviews. The

confidence in their ability to use this new feeding technique was in contrast to Israel-Ballard, Abrams and Maternowska (2006:51) who in a South African study found that HIV-positive mothers often have low levels of self-efficacy in relation to infant feeding.

Furthermore, the findings of this study suggested that participants assessed the suitability of infant feeding on whether it would be appropriate for their infants as well as for themselves. This finding was encouraging and indicates that one cannot choose a feeding method purely on the suitability of one person, but of both the infant and all those involved in his/her care. This finding is similar to that by Israel-Ballard et al (2006:48), who conducted a study on HIV-positive mothers in Zimbabwe and their findings showed that caregivers, mothers, fathers, grandparents and extended family needed to agree on the most effective method of feeding for the infant.

In addition, the results of this study indicated that one participant required more training to become more confident with the technique. Similar findings were recorded by Israel-Ballard et al (2006:48) and Bentley et al (2002:1) who found that Zimbabwean mothers, fathers, grandparents and birth attendants felt that they required more training to master the flash-heat technique because it was a new feeding method.

6.3.1.4 Subcategory 1.4 – Prefer to use regular feeding bottle over spoon-feeding

According to the findings of this study most mothers preferred to use a regular baby bottle to feed their infants. They however did not raise bacterial contamination as a concern when using it. Neither was any mention made of the possible social effects like stigmatising or alienation bottle-feeding may cause in their communities. Not many mothers voiced any concerns about the cleanliness of baby bottles and the possible dangers these pose with infant feeding. This is similar to the finding by Chopra and Piwoz (2000:1) who reported in their study of the effects of prevention of mother-to-child transmission (PMTCT) programmes on the breastfeeding counselling practices of healthcare workers in Khayelitsha in the Western Cape Province, that bottle-feeding was not associated with detrimental health and social effects.

Additional findings from this study indicated that the participants regarded a cup and syringe as alternative feeding instruments (to the infant feeding bottle). They indicated that they could use those to feed their infants with.

6.4 THEME 2: VIEWS ON THE NUMBER OF MONTHS MOTHERS FEEL COMFORTABLE USING THE FLASH-HEAT METHOD AND INTRODUCTION OF SUPPLEMENTARY DIET

The findings indicated that participants had differing views on the number of months they would use the flash-heat technique and exclusively feed their infants on breast milk. In addition, the timing of the introduction of supplementary diets for their infants varied. In section 6.5 these different time periods are highlighted and their implications discussed.

6.4.1 Category 2 – Differing views on the number of months mothers could exclusively use the flash-heat technique

The findings from this study proved that the number of months participants felt comfortable using the flash-heat method as well as exclusive feeding on breast milk varied from one to four to six. In addition the participants reported that they received inconsistent and incorrect information from the nurses. Other mothers reported that they did not get any information from the nurses on infant feeding at their antenatal clinic visits. The finding that no infant feeding information was provided by nurses is contrary to the national PMTCT programme which provides that every mother should be given counselling on infant feeding by nurses when attending antenatal clinics (National Department of Health (NDoH) 2001:1).

The mothers who received varying infant feeding information attended antenatal clinics in one of the clinics in Tembisa as well as at the hospital and report to have received some of the information from nurses. A few participants reported that they did not receive any information from nurses. However, there were a few mothers who had also attended these same clinics, including hospital, and could repeat correct information on infant feeding. This finding suggests that the information provided by the nurses is both incorrect and inconsistent or that the information provided by the nurses is correct but could not be recalled effectively by the antenatal mothers. The finding that women received poor education on infant feeding options is supported by Chopra and Piwoz (2000:1) who studied the impact of mother-to-child transmission programs on the breastfeeding counselling practices of healthcare workers in Khayelitsha and found that

registered nurses were inadequately trained on feeding options for HIV-positive mothers.

Furthermore, the study findings demonstrate that registered nurses advised mothers to breastfeed for three to four months. This is not a phenomenon unique to South Africa and is supported by Rwanda Ministry of Health and Wellstart International (1992:21), who undertook a qualitative study on infant feeding practices and beliefs (attitudes and cultural context) and found that the health information given to Rwandan mothers by nurses was significantly misguided.

6.4.1.1 Subcategory 2.1 – Flash-heat and exclusive feeding for one month

According to the study findings, a few mothers reported feeling comfortable with the flash-heat method for one month only. One mother who attended antenatal clinic at Chris Hani Baragwanath hospital (in Gauteng province) and came to live in Tembisa with her mother in her last month of pregnancy stated that she could not remember receiving information from any nurse about feeding methods for her new infant. She was told by the people she lives with (mother and sister) that she should exclusively feed her baby milk for one month before introducing supplementary foods. The findings of mixed feeding in this study is supported by Bland et al (20023778) who studied 119 infants in Mtubatuba in KwaZulu-Natal and found that only 10% were exclusively breastfed for six weeks and 6% for 16 weeks, and that supplements (most commonly formula milk) were introduced.

Encouraging women to exclusively feed their infants expressed breast milk will remain a challenge because of the lack of correct and consistent information provided by the nurses as was reported in this study.

6.4.1.2 Subcategory 2.2 – Flash-heat and exclusive feeding for four months

Further findings of this study indicated that a few participants were comfortable feeding their infants exclusively on flash-heated milk for the required four months of this study. Surprisingly, when asked why they felt that they could only flash-heat for four months, none volunteered an answer, suggesting that they were perhaps not comfortable with the flash-heat method for an extended time period. This group of HIV-positive mothers

reported differently to those who comfortably stated that they could flash-heat for 6 months. The findings that HIV-positive mothers would consider implementing the flash-heat technique for one and four months are new, as acceptability of the flash-heat method was only studied by Israel-Ballard and colleagues from the age of six months (Israel-Ballard et al 2006:48) and not four months as was the scope of this study.

According to the findings from this study, only a few participants talked about introducing supplementary foods earlier than six months. This would imply that the rest of the participants (majority) believed in exclusively feeding their infants either breast milk or commercial infant formula. This finding is in support of Chopra and Piwoz (2000:2) who found that other milks were introduced by 52% of mothers in Khayelitsha within the first month of feeding and by 82% of mothers within three months. The finding is however contrary to other research which indicates that exclusive breastfeeding was not widely practiced across Africa; however though the rates of exclusive breastfeeding were high in South Africa, they were not maintained (Becquet et al 2009:7397).

6.4.1.3 Subcategory 2.3 – Flash-heat and exclusive feeding for six months

In this study most of the participants indicated that they were comfortable using the flash-heat method and extending the study required four months to six, because they believed six months was the right time for the introduction of supplementary foods. This finding is encouraging yet counterintuitive because the flash-heat method is a new feeding method, not known by many HIV-positive mothers. The finding is contrary to studies conducted in South Africa which suggest that 7% of all breastfeeding mothers supplemented breast milk with other foods early (SADHS 2003:1), and rarely practiced exclusive breastfeeding after three months (Omari et al 2003:156; Poggensee et al 2004:477).

According to the study findings, the participants' reported that they received the information to exclusively feed their infants breast milk for six months from the clinic and hospital nurses. This finding is in line with the national PMTCT programme which states that all antenatal mothers should be offered infant feeding counselling when attending clinic during pregnancy (National DoH 2001:1). Furthermore, the information received

on exclusive breastfeeding for six months is correct and consistent with national and international criteria (WHO 2010:1).

However, a primary concern highlighted earlier is that antenatal mothers claimed to have received either no information on infant feeding or some information on breastfeeding only up to four months and on breastfeeding up to six months exclusively. This is consistent with the findings by Seidel et al (2000:24) who state that no information was given to antenatal mothers in a KwaZulu-Natal hospital and Bentley et al (2002:1) who state that nurses educated HIV-positive mothers in Durban incorrectly, advising them to formula feed as opposed to counselling on all methods. Reasons for the provision of inconsistent and incorrect education were not explored as that was not the purpose of this study; however research suggests that it is due to poor training (Chopra, Shaay, Sanders, Sengwana, Puoane, Piwoz & Dunnett 2000:1; Chopra et al 2005:357).

6.5 THEME 3: COMPARISON OF FEEDING METHODS

According to the findings of this study, all participants unanimously chose the flash-heat method of infant feeding over that of feeding on commercial infant formula. Reasons for their choice varied from the flash-heat method being good and better than infant formula, to the importance of using their own milk to feed their infants and the milk supply being reliable. Cost was also highlighted as a reason for choice. Section 6.7 highlights the mothers' perceptions of this technique when comparing it to infant formula feeding.

6.5.1 Category 3 – Cost of flash-heat method versus cost of feeding infant formula

These study findings indicate that most of the participants mentioned the cost of infant formula milk as prohibitive and them not having the financial means to purchase the formula as a concern.

6.5.1.1 Subcategory 3.1 – Flash-heat method is cheaper than formula milk

According to the study findings, the participants reported the flash-heat technique to be cheaper than feeding their infants formula milk. They said that they would use the technique because they found it financially beneficial. The mention of the cost factor in deciding on a feeding method is encouraging as it indicates that Affordability which is the first acronym in the AFASS criteria was taken into account when deciding on which method was appropriate for their situations. Furthermore, it indicates that the choice of feeding was not made on the basis of "just liking" the flash-heat method, but on financial considerations. This is consistent to the finding by Chopra et al (2000:1) that mothers would breastfeed exclusively by default because of the cost of formula feeding. Similarly, Chopra et al (2005:357) and Seidel et al (2000:24) found that cost was the primary factor considered for choosing a feeding option.

It should be mentioned that the entire AFASS criteria which include feasibility, availability, safety and sustainability was not taken into account by the participants when deciding whether to breastfeed or formula feed their infants. This suggests that the mothers decide on a feeding option based on incomplete criteria, which could give false assurance that their chosen method will have a positive effect on child survival. The WHO endorsed the AFASS criteria as a mechanism to assist women in identifying which method of infant feeding is best, taking into account their social, familial, financial and other conditions (WHO 2001:1). The key is that nurses sit with mothers (prior to choosing a feeding method) to identify any foreseeable/perceived obstacles that they may encounter with their chosen method and look at ways of managing those. If the obstacles prove insurmountable, the next alternative feeding method should be looked at using the same approach. It is imperative that nurses continue supporting antenatal mothers with efficient, effective, correct and consistent counselling on infant feeding methods using the AFASS criteria (Bland 2007:164).

These study findings also indicated that one participant could use the flash-heat method and feed her infant for more than six months, but would rely on the child support grant received by Government to purchase formula milk during that period. This indicates once again that the decision on a feeding method is not made taking into account the complete AFASS criteria, but rather on a reliance on external factors (child support

grant) which may or may not provide the financial support for the purchase of the formula milk.

6.5.2 Category 4 – Breast milk which is reliable versus formula milk supply which is considered unreliable

The South African National Department of Health provides free infant feeding formula milk for a period of six months as part of its PMTCT programme (National DoH 2001:1). Unfortunately this study indicates that many mothers and infants do not have access to this formula because of inconsistent supplies to local hospitals and clinics. One participant reported that she was advised to formula feed her infant exclusively, but found that infant formula was not available at the clinic when she needed it for infant feeding. Another participant stated that the supply of formula at the clinics is unreliable and results in anxiety when deciding on a suitable feeding option for infants who already feed on formula milk. The inconsistent supply of infant formula at clinics and hospitals was also found by Ukpe, Blitz, Hugo and Theledi (2009:337) who studied 33 mothers enrolled in a PMTCT programme at a primary health care clinic in Mpumalanga and found that the nurses attributed poor clinic attendance to the frequent non-availability of formula milk.

In this study the findings showed that HIV-positive mothers found having breast milk readily available for their infants very comforting to them. This suggests that mothers need to be assured of the consistency and reliability of their infants' milk supply, whatever that option is. This finding is supported by Morrison (1999:5) who stated that the mother who provides her own milk for her infant has absolute control over her own milk supply and can assure her infant's food security for the entire lactation period.

6.5.3 Category 5 – Breast milk is healthy versus formula milk which is considered unhealthy

Findings of this study showed that most mothers unanimously preferred the use of breast milk with the flash-heat method over formula milk because the breast milk they will feed their infants is healthier. They were very content about heating the milk to rid it of all germs. They were able to articulate their confidence in knowing that their infants would grow strong and healthy when fed on expressed breast milk especially after

germs have been eradicated. They valued the status of their infants' health and knew which feeding option to adopt in order to maintain that health status.

The nutrient value of breast milk and its relation to infant growth and development was well understood by most mothers. This is in contrast to the finding by Bentley et al (2002:1) who studied the effect of breastfeeding promotion on the rate of exclusive breastfeeding with 155 mothers at KwaMashu and Cato Manor in KwaZulu-Natal and found that 34 mothers felt formula milk to be as good as breast milk.

6.6 THEME 4: PERCEPTIONS OF SIGNIFICANT OTHERS ON FLASH-HEAT IMPLEMENTATION

The findings indicated that most mothers felt they could flash-heat under various circumstances at home. Others felt that they could not practice it and their reasons are discussed below. The perceptions of whom or what affects the infant feeding decisions of these mothers are also highlighted in section 6.9 below.

6.6.1 Category 4 – HIV-positive women's perceptions of the external influences on their infant feeding decisions

According to the findings, most of the participants interviewed relayed that they make their own decisions on feeding their infants. They however find that there are people who would also exercise their opinions and even insist that their method is more appropriate for the infant. These alternative people would insist on their feeding method in spite of the mothers' chosen option. They identified nurses mostly as those who have significant influence over them in relation to the choice of feeding option for their infants as opposed to their boyfriends, husbands, mothers or mothers-in-law.

6.6.1.1 Subcategory 4.1 – Mothers' perceptions of nurses as having significant influence on their chosen feeding method

The findings of this study indicate that most of the participants were not allowed to choose the best feeding option for them and their infants during counselling sessions but rather that they were "told" by nurses which method of feeding to chose. The participants in this study relied on the advice of health workers in deciding on the best

infant feeding option, similar to Doherty, Chopra and Colvin (2006:1) who studied 665 HIV-positive mothers and their babies in three PMTCT sites in South Africa and found that the power and influence of health workers over mothers' feeding choices were high. The culture of "telling" mothers what option to choose for their infants may cause significant impacts in child health, development and survival as the mothers may feel obliged to follow that "advice" even amidst financial and economic difficulties at home. Furthermore, "telling" does not represent giving mothers a "choice" in making decisions on infant feeding. This is consistent with Chopra and Piwoz (2000:1) who in their Khayelitsha study found that HIV-positive mothers were not allowed any choice regarding infant feeding. All mothers were "told" not to breastfeed and they all complied (Chopra & Piwoz 2000:1). This is also consistent with Seidel et al (2000:24) who state that nurses in a KwaZulu-Natal hospital made mothers feel guilty for exercising their own judgment on feeding options.

The behaviour of nurses "telling" patients what health options are best for them could be explained by the findings of Leshabari, Blystad, De Paoli and Moland (2007:18) who describes that Tanzanian nurses felt they were expected by antenatal mothers to advise or "tell" them which feeding method is best. Failure to do so was seen as the nurse not knowing her work. Nurses felt that they could not adapt to counselling which is seen as allowing mothers to decide for themselves; even when they make incorrect choices (Leshabari et al 2007:18). This finding by Leshabari et al (2007:18) is fundamental in understanding the counselling behaviour of nurses and requires a relook at counselling content and training for public health sector nurses.

6.6.1.2 Subcategory 4.2 – Mothers' perceptions of relatives (mothers and mothers-in-law) as having significant influence on their chosen feeding method

The findings from this study illustrated that most of the participants used their own judgement in making feeding decisions for their infants because of their commitment to their health and wellbeing. However, a few participants report that mothers and mothers-in-law play a significant role in that feeding decision. The influence of mothers and mothers-in-law on infant feeding decisions came primarily because of the participants' need to move to their relatives' homes for support after the births of their infants. It was seen by the participants as customary to do so.

The mothers who moved to relatives shortly before and after delivery have also reported that they had to go back on their initial choice of infant feeding method because of the pressure from these relatives. Furthermore, they report feeling helpless because they wished to protect their infants; however could not do so because they had not disclosed their status to anyone. Full disclosure of HIV status to those involved in child-rearing is essential in order to comfortably nurture an infant from birth and beyond. The disclosure is pertinent in allowing for the understanding of other caregivers on the choice of certain feeding options. With full disclosure, relatives could comfortably decide on the best feeding option as opposed to insisting on their preference. Similarly Israel-Ballard et al (2006:48), also found in an acceptability study of the flash-heat technique in Zimbabwe with parents, grandparents and birth attendants that decisions on safer infant feeding methods would require communication between the parents and extended family.

The experience of family influence in infant feeding decisions after moving in with relatives was supported by the findings of Falnes, Tylleskar, De Paoli, Manongi and Engebretsen (2010:13) who studied 446 postnatal mothers who brought their infants for immunisation to the reproductive and health clinics in Kilimanjaro, northern Tanzania. They found that the mother-in-law saw her responsibility as making decisions on the infant's health after the mother moved to her home shortly after birth. The move would result in support provided by their mothers and mothers-in-law like cooking and cleaning that their boyfriends and husbands could not provide with a newborn infant (Falnes et al (2010:13). Unfortunately the move to live with relatives also resulted in being subject to influences on how to nurture the infant. This, according to these mothers can be a source of anxiety as their opinions in child rearing are not valued at a crucial point in their infants' lives.

The findings of this study also indicate that a few of the participants' own mothers significantly influenced infant feeding decisions. This would imply that nurturing of a child is not one person's responsibility i.e. just that of the mother, but also that of the immediately family and other relatives, including the community these mothers find themselves in. These findings are consistent with Yetayesh and Haidar (2009:107) who studied HIV-positive mothers in Addis Ababa, Ethiopia, and found that close family members significantly influenced infant feeding decisions.

6.7 THEME 5: MOTHERS' PERCEPTIONS OF HOME CIRCUMSTANCES AND THE FLASH-HEAT TECHNIQUE

According to the results, most participants felt that they could fully implement the flash-heat method at home which involves expressing their breast milk by hand into a glass bottle, heat treating the milk on a stove and feeding their infants the milk after it has cooled. The participants understood that all the steps in the flash-heat process need to be followed to adhere to the flash-heat methodology and enable healthy infants. Section 6.11 explains why they felt that they could use the flash-heat technique in difficult home environments.

6.7.1 Category 5 – Mothers' perceive that they could implement the flash-heat method under any circumstance at home

In this study, most mothers confidently reported that they would be able to use the flash-heat method at home in its entirety. They stated they would be able to do so under different circumstances such as not disclosing their HIV status to the people they lived with and sharing eating utensils after using these to express breast milk into. Very few mothers said that they were unsure or that home circumstances would not allow them to use the flash-heat method and spoon feed.

6.7.1.1 Category 5.1 – Mothers' believe that they could use the flash-heat method without full disclosure of their HIV status at home

As mentioned earlier, the flash-heat technique requires full disclosure of one's HIV status in order to be implemented effectively because breast milk needs to be expressed and heat treated using home equipment like a pot and stove, and cooled without a refrigerator (if none is available) and fed to the infant. The flash-heat technique cannot be implemented effectively if one's HIV status remains undisclosed. The findings of this study indicate that most participants felt they did not have to disclose their HIV status because they could find innovative ways of dealing with the new feeding method. The participants, who reported this, lived with their in-laws, boyfriends and husbands. Most of these participants had not disclosed their HIV status to all of the people they lived with but however reported that they would be able to use this method because of their commitment to the health and wellbeing of their infants.

This finding is supported by Mbuya et al (2010:1481) who studied 39 HIV-positive mother-and-baby pairs and the feasibility of heat treatment of expressed breast milk of babies six months of age in rural Zimbabwe. Mbuya et al (2010:1481) found that all the participants were able to disclose their expression and heat treatment practice without needing to disclose their HIV status as well. Similarly, the findings of Young et al (2009:443) who studied the flash-heat method in Tanzania found that 50% of the women had not disclosed their HIV status to their spouse but planned to continue the use of the flash-heat method.

6.7.1.2 Category 5.2 – Mothers believe that they could use the flash-heat infant feeding method even if their physical home environment did not allow it

These study findings' indicate that a few mothers felt their homes to be structurally unsuitable in terms of size or ease of movement to implement all the steps of the flash-heat technique. Furthermore, they mentioned that relatives may be uncomfortable using the same utensils as the ones used for EHT of their breast milk. The home environment plays a significant role in whether or not mothers can effectively use this method. Sufficient room is required for mothers to comfortably express breast milk from both breasts into a glass jar. Overcrowding would result in anxiety for the mothers while expressing, possibly affecting the quantity of expressed breast milk. It is encouraging that the mothers raised the structural conditions of their homes as a concern for the effective implementation of the technique, because the sustainability of the flash-heat method rests on, amongst other things, the ease and comfort of its use in the home, as is the case for the use of eating utensils.

This finding was similar to Mbuya et al (2010:1481) who found that the home environment affected the efficient implementation of the flash-heat technique, specifically mentioning sharing of household chores. In their study, mothers and mothers-in-law assisted with or completely took over household chores, resulting in the easy uptake and use of the flash-heat method (Mbuya et al 2010:1481). The flash-heat acceptability study in Zimbabwe by Israel-Ballard et al (2007a:318) did not specifically mention structural barriers to using the flash-heat method in the home such as those found in this study, but rather made findings on a lack of emotional support from relatives. This finding is therefore new as the studies by Mbuya et al (2010:1481) and Israel-Ballard et al (2007a:318) did not mention the barriers to implementing the flash-

heat method in the home caused by structural unsuitability as well as use of eating utensils for EHT.

6.7.1.3 Category 5.3 – Mothers believe that it is not against personal standards to use the flash-heat infant feeding technique

Study participants were asked whether implementing the flash-heat technique at home would be relevant to their culture, beliefs, lifestyle and values. The flash-heat method entails expressing and heat treating breast milk, which other mothers may find unacceptable.

The findings indicated that most felt that the flash-heat method would not affect their opinion of self. They also mentioned that there was nothing in their individual cultures that suggested that they could not use the flash-heat method for infant feeding. This finding is contrary to that of Coutsoudis (2005:11) who studied 315 mothers enrolled into a MTCT prevention programme in Durban and found that EHT of breast milk was not acceptable to most of the mothers, as there was a possibility of it being associated with witchcraft.

6.8 THEME 6: CURRENT FEEDING OPTION

Mothers were asked about the feeding option they used before the introduction of the flash-heat method whilst in hospital. The study results showed that most of the participants chose/opted to feed their infants on commercial infant formula despite Tembisa Hospital being a baby-friendly hospital supporting the baby-friendly hospital initiative.

6.8.1 Category 6 – Commercial infant formula as current feeding option chosen

The findings of this study indicated that most of the mothers decided antenatally that they would not breastfeed after they were diagnosed HIV-positive. Findings showed that the participants believed HIV was present in their breast milk and breastfeeding would expose their infants to HIV. This finding is consistent with earlier findings where mothers verbalise that they would protect their infants from HIV and would do anything

in order to enable that. This is consistent with the findings by Chopra and Piwoz (2000:1), who assessed the attitudes of 11 HIV-positive mothers in Khayelitsha regarding feeding their infants breast milk exclusively in the context of being HIV-positive. All 11 mothers opted not to breastfeed because they believed that they would definitely transmit the virus to their infant if they breastfed and were not willing to take that risk.

6.8.2 Category 7 – Change of initial feeding method to the flash-heat method

According to the results of this study, all of the mothers believed in the health benefits of the flash-heat method. Most of the mothers verbalised that they were very comfortable with it and a few said that they would consider using it at home. These mothers had initially chosen to feed their infants on formula milk and in some cases only agreed to do so because of perceived pressure from nurses. A few of the mothers requested support in changing their feeding option from formula milk to the flash-heat method with the nurses after the interview. This change of intention is consistent with Israel-Ballard et al (2006:48) who found in their Durban study that mothers subsequently changed their minds to consider using the flash-heat method at home as a feeding option.

6.9 DISCUSSION OF QUANTITATIVE FINDINGS

6.9.1 Descriptive statistics

6.9.1.1 Age

According to the results 31% (n=22) of the participants were in the 36-40 age bracket. This finding is not very different to the 33.2% found by UNAIDS (2008:1) in the 35-39 age bracket and is in line with the findings by UNAIDS and National Department of Health (NDoH) stating that approximately one in three or 30% of women were living with HIV in 2009 (UNAIDS 2010:1) and 28% of women attending antenatal clinics were living with HIV (NDoH 2009:1). The study findings suggest that the prevalence rate in this age bracket is lower than that of UNAIDS, as the data collected by UNAIDS was done a few years ago. The result of the last age bracket (41-45) was lower (23%) than that of UNAIDS (2008:1) which was 28.1%. The South African Department of Health study estimated that 29.4% of pregnant women (aged 15-49) were living with HIV in 2009.

This suggests that the researcher's finding is in line with the national prevalence rate as since 2006 HIV prevalence among pregnant women has remained relatively stable (AVERT 2011:1).

The next age bracket with the highest HIV prevalence was 41-45 (22%) (n=16) followed by 2125 (20%) (n=15). The researcher observed a 54% infection rate in the age group 36-45, which could be related to the research results of IRIN, PLUS NEWS (2009:1) suggesting that new HIV infections were twice as high in women aged 25-40 than among those aged below 20. This similarity in the rate of HIV infections should be viewed with caution as the age groups overlap slightly.

6.9.1.2 Education

The findings of the study indicated that the educational levels of the participants ranged from obtaining a level lower than Standard (Std) 6 level of education to higher than college. Nearly thirty nine percent (38.6) (n=27) of mothers reached a Std 9 level of education (Grade 11), followed by 34% having reached Std 10 (Grade 12) which is considered having completed formal school education. Nineteen percent (19%) of the women only reached Std 7. Women with college education and higher accounted for 4.3% (n=3) and 1.4% (n=1) respectively. The findings on the HIV infection rate by age suggest that those having reached a Std 9 level of education (Grade 11) had the highest infection rate when compared to those who reached Std 7 (Grade 9). This finding is in contrast to Tladi (2006:369) who states that South African women with low levels of education had high levels of HIV infection and Fadness, Engebretsen, Wamani, Semiyaga, Tylleskar and Tamwine (2009:124), who add that the educational levels of HIV-positive women were lower than that of women from the general population. The findings from this study are, however, supported by Reither and Mumah (2009:127) who indicate that relative to women with no formal education (4%) and women with primary education (7%), women with secondary or more education (8%) tested positive for HIV in Cameroon. These inconsistent findings suggest that education attainment cannot be used to generalise exposure to HIV infection; however it cannot be ignored when targeting specialised programmes or alternative feeding techniques.

6.9.1.3 Marital status and employment

This study found the number of unemployed women to be 78% (n=54) which was high. The number of single women was 77% (n=54), also high. This suggests that these women might have been at greater risk of entering into risky sexual partnerships because of their economic situations (Campbell & Kelly 1995:365). Fifty percent (50%) of employed women worked as domestic workers.

6.9.1.4 Financial support

The findings indicate that 44% (n=31) of the mothers receive a child support/care grant from the Department of Social Welfare. The picture of women receiving grants is mixed, as those having access to water and electricity in their homes as well as those without have registered and receive child support grants. Moreover, some working mothers also report receiving a child support grant for their older child/ren. The financial status of the mothers' spouses was not questioned and would have provided the researcher with a greater appreciation of their financial situation. The information on their employment, marital status and financial sources provides the reader with an understanding of the mothers' choice of infant feeding.

6.9.1.5 Access to water and electricity

According to the findings of this study, more than a third of the mothers had no access to running water in their homes (40%) (n=28). Participants with access to electricity accounted for 14% (n=10). The AFASS criteria also look at access to free running water in the safe preparation of infant feeds, particularly formula. The safe preparation of formula feeds could be compromised for the mothers lacking access to safe water in their homes. Access to a fridge was not determined, which could have provided the researcher with more detail regarding the ability to store formula safely and effectively.

6.9.1.6 Contraception use

The findings of this study on the women's fertility indicate that seventy-three percent (77%) of participants had between two to three live children and 2.9% had more than four children each. Eighty one (81%) percent of the mothers reported not having used

any form of contraception prior to their last pregnancy. Many of the 13% of women who used contraception used oral contraceptives but subsequently fell pregnant. Poor compliance to method use for some mothers was caused by distance of travelling to the clinic for repeat dosage, poor nurse attitudes towards them and forgetting to get next dose from the clinic. The mothers (81%) appeared unperturbed about not using any contraceptive method and getting pregnant with an unplanned pregnancy. The majority of the mothers reported that they did not take any contraception method at all, yet appeared surprised that they subsequently conceived. Their high unemployment rate may have led them to engage in risky sexual behaviours (Campbell & Kelly 1995:365). A small number of women report having been on an oral contraceptive and were confident that they were consistent in taking it, however they still conceived.

6.9.1.7 Breastfeeding

The findings indicate that more than half of the 70 mothers (51%, n-38) did not breastfeed or intend to breastfeed their current infant. Further questioning revealed that most mothers were diagnosed HIV-positive with this subsequent pregnancy and made a decision not to breastfeed their new infant for fear of vertical transmission. The data suggest that 32% of the mothers thought that it looked difficult to breastfeed. This finding is contrary to that of Coovadia et al (2007:1107) suggesting that breastfeeding is a practice most South African mothers adopt after the births of their infants. The percentage of mothers willing to breastfeed in this study is low compared to that of the findings of the study by Coovadia et al (2007:1107), who found that 83% of infants born to HIV-positive mothers in South Africa were exclusively breastfed from birth; however, the duration of exclusive breastfeeding was only 159 days. Furthermore, findings of this study indicate that most Pedi and Zulu mothers breastfed their previous baby/ies and verbalised their desire to continue breastfeeding even when HIV-positive. Most Xhosa women reported not breastfeeding due to “insufficient” or “no milk”. The significance of this behaviour is not well understood but the desire to breastfeed may be related to specific cultural influences.

6.9.1.8 Disclosure of HIV status

Sixty-three percent (63%) of the mothers disclosed their status to a significant other. Fifty-four (54%) disclosed to their husbands, 79% to their boyfriends, and 56% to a relative. The low rate of disclosure to husbands could result in detrimental consequences such as getting re-infected with HIV as only 3% of husbands tested for HIV and knew their status (not shown here). It is the researcher's opinion that the disclosure to a relative suggests that mothers are looking for support, however they prefer this from someone who cannot "leave" them i.e. a spouse or boyfriend, which would put them in further financial difficulties. Having a spouse or boyfriend leave after disclosure of HIV status could exacerbate their economic situation if they were dependent on their partner. Doherty et al (2006:1) found high rates of disclosure; however these rates were within the breastfeeding and formula feeding groups and the disclosure was not specified.

6.9.1.9 Current medication use

The study findings indicate that 76% (n=53) of the mothers were on medication for HIV. Many mothers did not understand the PMTCT programme and could not relate their dose of anti-retroviral (ARV) to prevent the transmission of HIV from mother-to-child. They assumed that the treatment was for them only and some expressed concern about whether their infant would also be given medication. The mothers did not know the name of the ARV given to them. Understanding the PMTCT programme could help the mothers easily explore other strategies of preventing further transmission of HIV to their infants.

6.9.1.10 Adoption of flash-heat as a feeding method

According to the study findings, 74% of the mothers reported that they could use the flash-heat method under a number of different circumstances at home, which may suggest if given the opportunity to explore this technique in detail; more mothers could opt to use it. Ten percent (10%) of the mothers were uncertain that they could use the method at home in different circumstances. This finding suggests that there may be other factors affecting the adoption of the method at home. Most of the mothers who said they would use the method felt that they could heat treat the milk easily. They felt

that no one at home would prevent them using the method, followed by some who thought that was a possibility and a few who were not sure. Some of the findings are consistent with the feasibility study by Mbuya et al (2010:1481) who introduced the technique to rural women and assessed its feasibility a few weeks later. They found that HIV-positive mothers in a rural resource-constrained Zimbabwean setting were able to express, heat-treat, and feed their infants for approximately four months. It should be stated that the feasibility study was aimed at infants six months old and not from birth as in this case. It is therefore encouraging to find that the suggestion of the implementation of the flash-heat infant feeding technique is acceptable to HIV-positive mothers and their infants from birth.

6.9.1.11 Profile of HIV-positive mothers most likely to adopt the flash-heat infant feeding technique

Given the finding in this study that HIV-positive mothers made inappropriate infant feeding decisions, the researcher described the profile of mothers who may continue to make inappropriate feeding choices and who may need to be encouraged to adopt an alternative feeding method. This profile could be used together with supportive guidelines the researcher developed for nurses in the public health sector to use for promoting/encouraging flash-heat as a supplementary infant feeding technique for HIV-positive mothers (see chapter 7). The guidelines are for HIV-positive mothers who fall outside the Affordability, Feasibility, Acceptability, Sustainability and Safety (AFASS) criteria and for whom feeding their infant on formula milk is not an option.

Doherty et al (2006:1) identified individual and environmental criteria (based on the WHO AFASS criteria) that could be used to guide appropriate infant feeding choices in functional settings. The criteria include; having access to piped water in the yard or house, electricity, gas or paraffin for cooking fuel, disclosure of HIV status by three weeks postpartum, having someone in the household employed, and access to a fridge for storage of prepared formula. The criteria by Doherty et al (2006:1) could be useful when combined with the profile of HIV-positive mothers described below.

Results learnt from the quantitative research method described the characteristics of the mothers most likely to adopt the new infant feeding technique. These HIV-positive mothers will primarily be between the ages 36-40 years, will have attained a Std 9 level

of education, and will be unmarried and live primarily with their relatives. Most of their partners will not have tested for HIV and together they will have three to four children. They will be unemployed and many will not have access to other financial resources such as a child support grant the Department of Social Welfare offers. Those who are employed will work primarily as domestic workers. A significant number of mothers will not have access to reliable utility services. Contraceptive use and compliance will be poor. Most mothers will not breastfeed their current infant and will opt to formula feed even if the Affordability, Feasibility, Acceptability, Sustainability and Safety of formula as a feeding option is not guaranteed. The mothers will find disclosing their HIV status to their boyfriends easier than their husbands. The mothers will be on ARV therapy but however will not understand the PMTCT programme they participate in.

6.9.1.12 Predictor variables on the use of the flash-heat technique

Glanz, Rimer and Lewis (1997:1) described theory as “a set of interrelated propositions including concepts that predict a phenomenon”. The behaviour the researcher aimed to predict is that of adopting the flash-heat infant feeding technique as a feeding method among HIV-positive mothers in order to increase their infants’ chances of HIV-free survival.

In model 1, the two variables found to predict flash-heat behaviour were ‘Express for four months’ and ‘Heat Expressed Breast milk’. These two variables explain two of the eight principles in Backer’s (2001) Theory of Individual and Group Change. ‘Express for four months’ indicates the verbal commitment the mothers made to manually expressing their breast milk at home for a period of four months and the latter variable indicates their ability to effectively flash-heat. The mothers are required to express a minimum of half a cup of breast milk by hand and inactivate the HI virus from the breast milk by heat treating it according to recommendations. Most of the mothers indicated that they are able to perform these requirements at home suggesting that they have a high sense of “self-efficacy” in using this feeding technique. This finding was contrary to the finding by Doherty et al (2006:1) who found that HIV-positive mothers often have low levels of self-efficacy in relation to infant feeding.

The distinction between internal and external attributions is an important one, in that how we attribute our personal successes and failures has been shown to be related not

only to our behaviour, but also to our self-esteem and our self-efficacy for different tasks (Ajzen & Fishbein 1980). Self-efficacy is one's confidence in the ability to take action and persist in that action. It is perhaps the single most important factor in promoting changes in behaviour (Bandura 1986).

The researcher is satisfied that the attitudes of HIV-positive mothers predicted future infant feeding behaviour as

- their attitudes included a specific behavioural intention which was to flash-heat
- both the attitude and the intention were very specific (Ajzen & Fishbein 1980)

The researcher is aware that the mothers' emotional reaction can be altered based on how they benefit or get rewarded for their behaviour (THCU 2007:1). It is therefore crucial that nurses evaluate the mothers' emotions/attitudes to their feeding choice every time they present to hospitals or clinics and encourage the benefits of using the technique in order to maintain the positive feeding behaviour.

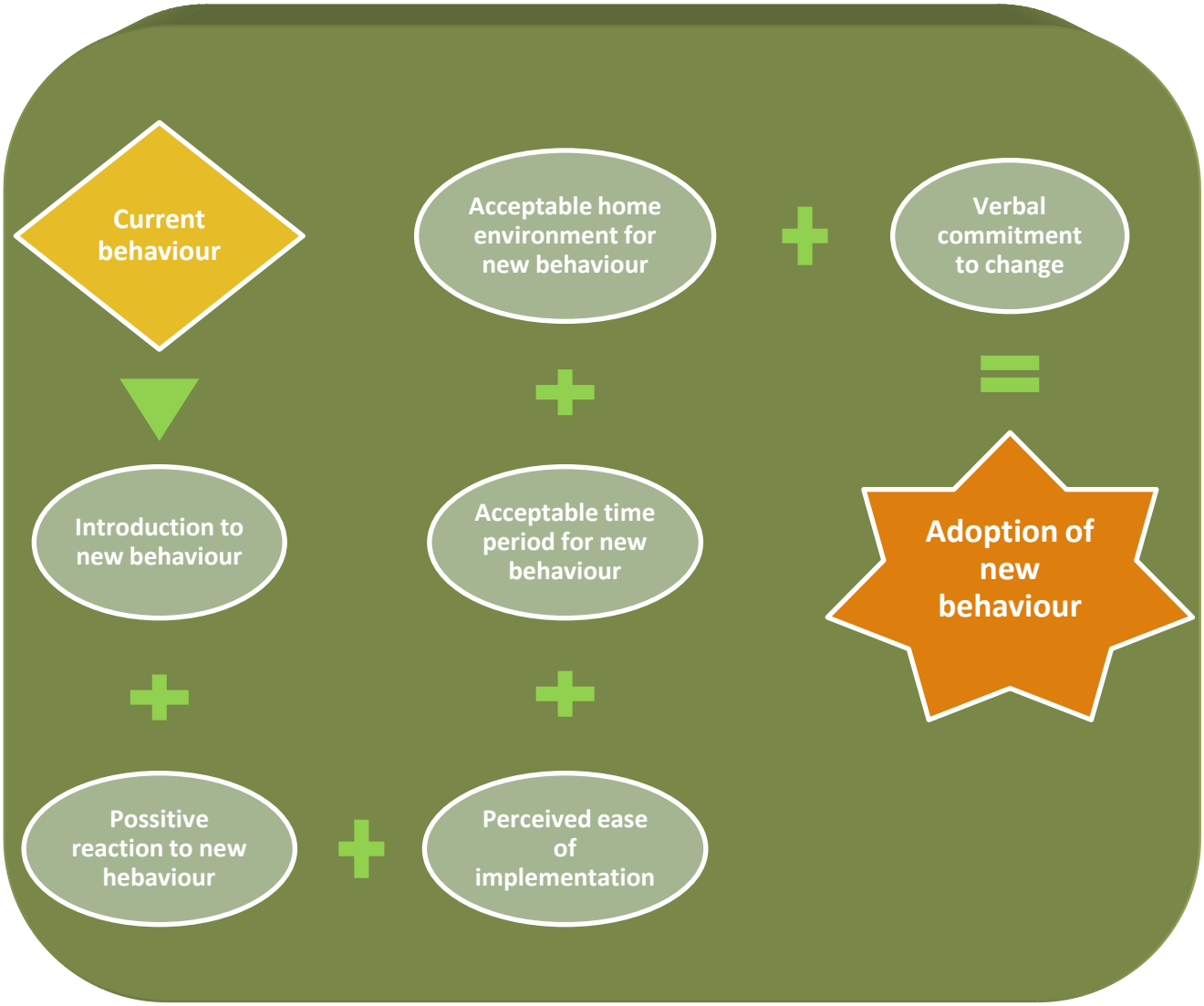

Figure 6.1 Modified flow diagram of the Theory of Individual and Group Change showing the process of behaviour change in HIV-positive mothers

(Backer 2001)

Figure 6.1 above depicts the process of behaviour change as indicated by the results of this study with HIV-positive mothers at Tembisa Hospital. The variables noted above are those found to be significant when running correlations prior to running the logistic regression.

6.10 CONCLUSION

Section A discussed the findings and conclusions observed from the in-depth interviews. The six themes, their categories and sub-categories were discussed in detail

in this chapter along with literature control. Section B discussed the findings from the quantitative data.

The researcher used the Theory of Individual and Group Change by Backer (2001) as a framework for the study. This theory was fundamental to the study as an attempt to understand individual behaviour in relation to HIV and infant feeding using the flash-heat technique. The theory assisted the researcher in understanding the mothers' home and familial environments which were either favourable or unfavourable to feeding their infants using this new technique. The results proved that two out of the eight Backer principles significantly predicted "flash-heat behaviour" with HIV-positive mothers.

It is the researcher's opinion that the greatest motivation for HIV-positive mothers at Tembisa Hospital to adopt the flash-heat method was their perceived benefit of the new feeding technique. It is therefore crucial that nurses use the "benefit-motivation" principle when educating HIV-positive mothers on alternative infant feeding techniques. The researcher maintains that this approach to infant feeding education will produce desired results as all the 70 mothers who participated in this study felt that they would do anything to protect their infants from HIV.

CHAPTER 7

PRACTICAL GUIDELINES FOR PROMOTION OF FLASH-HEAT IMPLEMENTATION IN HIV-POSITIVE MOTHERS IN PUBLIC HEATLH FACILITIES IN SOUTH AFRICA

PART A: BACKGROUND AND THEORETICAL FRAMEWORK

7.1 INTRODUCTION

The previous chapter discussed findings and conclusions drawn from the analysis of in-depth interviews with HIV-positive mothers on the flash-heat feeding technique. Six themes were identified and discussed in detail. In addition, Section B of the previous chapter detailed the discussion of the quantitative findings. Literature control was also done in order to validate the authenticity of the study findings.

This chapter begins with the background and theoretical framework underpinning this study. Subsequently, the justification for the development of the proposed guidelines and the development of the guidelines in order to promote supplementary infant feeding techniques for HIV-positive mothers will be elaborated on.

This study indicated that HIV-positive mothers who deliver at public sector hospitals are not given clear infant feeding guidelines on the options available to them. The default practice is that nurses provide health education on infant feeding based on incomplete and unavailable evidence-based guidance. Furthermore, ward routines such as not putting an infant to the breast within one hour and feeding infants on formula play a role in shaping mothers' feeding perceptions.

These proposed guidelines are for nurses in public health facilities who are involved in the postnatal care of HIV-positive mothers. The guidelines will serve as a road map to guide nurses in determining the appropriate course of action when faced with HIV-positive mothers who are not sure of the best feeding method for their infants and their social and economic situation.

7.2 DEFINIFITIONS

Commercial infant formula

A commercial product that meets the applicable Codex standard for infant formula, follow-up formula, and infant or follow-up formula for special dietary or medical purposes.

Complementary foods

Refers to any foodstuff, whether in solid or semi-solid form, given to an infant after the age of 6 months as part of the transitional process in which the infant learns to eat food appropriate for his/her developmental stage, while continuing to breastfeed or be fed with commercial formula.

Cup feeding

The act of feeding an infant or child using a cup, regardless of what the cup contains.

Exclusive breastfeeding or exclusive breast milk feeding

Feeding practice in which an infant receives only breast milk and no other liquids or solids, including water, but may receive drops or syrups consisting of vitamins, mineral supplements, or medicines that are necessary for the child. When expressed milk is given, the preferred term is breast milk feeding.

HIV-exposed infant

Infant born to an HIV-positive woman

HIV-positive

Refers to people who have taken an HIV test with a positive result and know their result.

Nutritional supplements

Food and/or nutrient supplements given in addition to food available at home.

7.3 BACKGROUND OF THE STUDY

In Sub-Saharan Africa, infants born by Spontaneous Vertex Delivery (SVD) or Caesarean Section (C/S) to HIV-positive mothers are at risk of low birth weight, prematurity, perinatal and neonatal death (Brocklehurst & French 1998:836). For every 100 babies born by SVD or C/S to HIV-positive mothers, 10-20 will become HIV-positive during the breastfeeding period (Tearfund 2009:2). Morbidity among infants is influenced by feeding choices that mothers make (Israel-Ballard et al 2008:444). Furthermore, few HIV-positive women are aware of the strategies that could prevent them from infecting their children (Coovadia et al 2007:1107), leaving many with the dilemma of whether to breastfeed or bottle-feed their infants.

Figure 7.1 below presents the outcome of 100 infants born to HIV-positive mothers without any intervention. It highlights that of every 100 infants born to HIV-positive mothers in South Africa, 25-50 will be HIV-positive. Five (5) to ten (10) infants will become HIV-positive during pregnancy, 10-20 during delivery and 10-20 during the breastfeeding period.

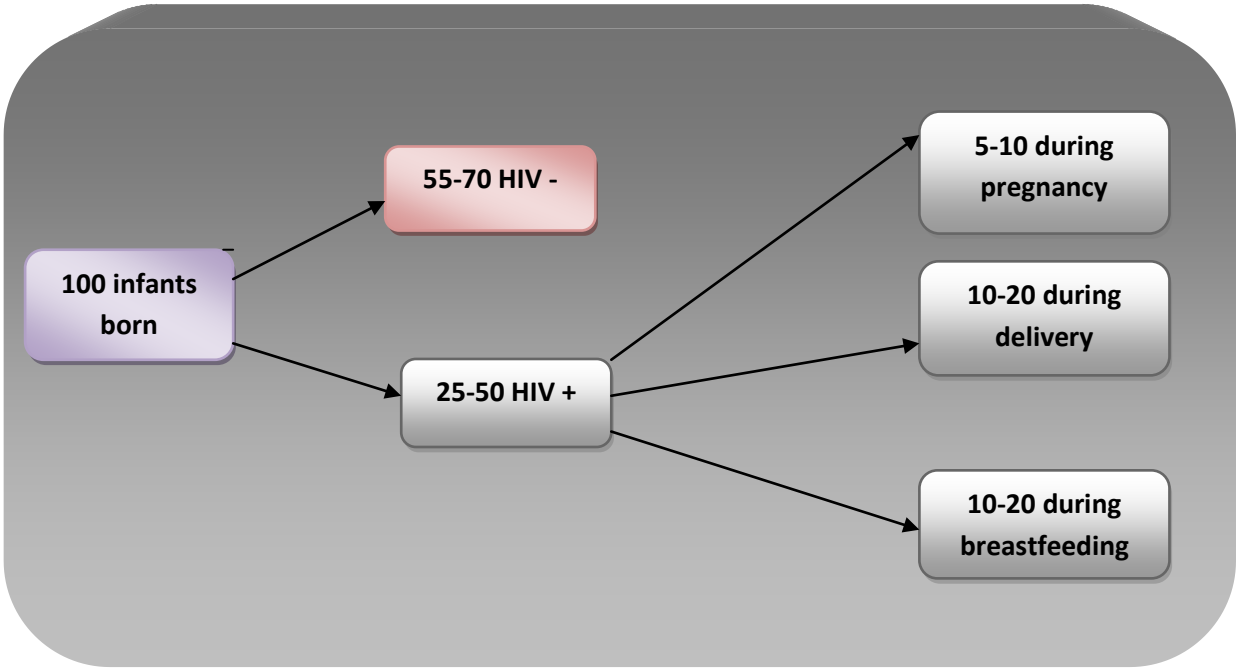

Figure 7.1 Outcome for 100 infants born to HIV-positive mothers without intervention

The introduction of complementary foods at an early age and the effect of this practice on the rate of vertical transmission of HIV is a major concern (Moodley et al 1999:681). Adequate feeding of nutritional supplements for infants from the age of six months is

required for optimum growth and development; however, research suggests that in most developing countries including South Africa, poor feeding is practiced (WHO 1998b:1). Exclusive breastfeeding (or exclusive breast milk feeding) is the safest option, *provided* that the baby is successfully weaned (Coovadia et al 2007:1107).

Mother-to-child transmission (MTCT) occurs when an HIV-positive woman passes the virus to her baby. This can occur during pregnancy, labour and delivery, or breastfeeding (Duerr, Hurst, Kourtis, Rutenberg & Jamieson 2005:261). Mother-to-child transmission of HIV is prevented with prevention programmes aimed at HIV-positive mothers, their HIV-exposed infants and their families.

Effective prevention of mother-to-child transmission (PMTCT) requires a four-fold approach.

- Preventing HIV infection among prospective parents – by making HIV testing and other prevention interventions available in antenatal and postpartum care services related to sexual health.
- Avoiding unwanted pregnancies among HIV-positive women – by providing appropriate counselling and support to women living with HIV to enable them to make informed decisions about their reproductive lives.
- Preventing the transmission of HIV from HIV-positive mothers to their infants during pregnancy, labour, delivery and breastfeeding.
- Integration of HIV care, treatment and support for women found to be positive, including their families (Duerr et al 2005:262).

One of the goals of the national PMTCT programme is to reduce postnatal HIV transmission through breastfeeding (National Department of Health (NDoH) 2001:1). The flash-heat infant feeding method provides such an opportunity.

7.4 FLASH-HEAT METHOD OF INFANT FEEDING

Recent studies have shown that heating expressed breast milk from HIV-positive mothers *can* be used as a method to prevent vertical transmission of HIV (Israel-Ballard et al 2005:175).

7.4.1 Steps for HIV-positive mothers to follow when using the flash-heat technique

Prior to implementing the flash-heat technique, mothers are to:

- Care for breasts and ensure that nipples are not cracked and bleeding. This is to avoid discomfort and pain on expressing.
- Clean their hands and breasts with soap and water.
- Massage their breasts to encourage milk flow.
- Express breast milk into a clean glass container.

The flash-heat (FH) technique entails manually expressing 75-150 ml (approximately half a cup) of breast milk into a peanut butter, jam, or honey jar. The breast milk is collected in a clean glass jar and placed in a pot containing about two glasses of water and is allowed to boil uncovered. The water and the jar of milk are heated together over high heat. When the water boils (temperature between 62 and 72.9°C) or the milk begins to make bubbles around the edges inside the glass jar, the milk is immediately removed from the water, set aside and allowed to cool (Israel-Ballard et al 2005:175). The milk may be fed to the infant when cool.

Flash-heat is a method similar to Pretoria Pasteurisation where milk is heated to high temperatures to rid it of harmful bacteria; however in the Pretoria method most of the nutritional qualities of milk are destroyed (UNICEF 2010:1). The significant difference is that flash-heat brings milk to heat over a short period of time. This is referred to as High-Temperature Short-Time (HTST) (Dhar et al 1996:569). This high temperature reached in a short time is thought to destroy the HI virus. The HTST method kills micro-organisms while retaining the nutritional value of the milk when compared to the High-Temperature Long-Time (HTLT) which Pretoria Pasteurisation follows (Chantry et al 2009:264). Cheap, readily available equipment at home in resource-poor communities

can be used in this technique (Israel-Ballard et al 2007a:318). Equipment required includes a primus stove or any other form of heating, paraffin or firewood, an aluminium pot, two cups of water, expressed breast milk, a glass peanut butter or jam jar, and a cup or spoon for feeding.

7.5 THEORY APPLICATION

The theory underpinning this study will not be discussed in detail here as it has been dealt with in chapters 2 and 6. Briefly, the study framework by Backer (2001:20), states that a person chooses to adopt a new behaviour in the following manner.

- First, the individual assesses whether the new behaviour is necessary by looking at what she/he is currently doing or not doing, and weighs the benefit of adopting this new behaviour against whether a particular health problem will be solved by the new behaviour or not. See first blue square in figure 7.2. This is reflected as 'strong intention to FH'. Once an individual has a strong intention to do something, the next step is to verbalise doing that something. In this case, it is adopting the flash-heat technique (see purple bubble).
- Second, the person will assess whether there are any constraints to changing to the new behaviour. See second blue square in figure 7.2. Once the individual has considered the absence of constraints to adopting the new behaviour, she/he will verbalise the absence of such (see purple bubble no. 2).
- Third, the newly-proposed behaviour should be easy to perform and the individual should have the required knowledge to understand the rationale for performing that behaviour as well as the practical ability to perform the behaviour. See third blue square in figure 7.2. Once the individual has assessed the complexity of the behaviour, she/he will verbalise that the new behaviour is easy to perform (see purple bubble no. 3).
- Fourth, the behaviour should not change the individual's 'sense of self' nor should it make her feel less of a person when engaging in that behaviour.
- Fifth, the new behaviour should present more advantages to their state of health (in this case) than not doing it. This is reflected in the fourth and fifth blue squares in figure 7.2 as the new behaviour considered to be better than the alternative or current behaviour. Once this is established, the individual will

verbalise the benefits seen from adapting to the new behaviour (see purple bubbles no. 4 and 5).

- Sixth, the individual should have an affinity to the newly-proposed intervention and the benefits of that intervention should be worthwhile in order for her to do it. See the sixth blue square in figure 7.2, reflected as positive emotions. The individual will verbalise her affinity to the new behaviour (see purple bubble no. 6).
- Seventh, this intervention should be performed under a number of different circumstances in the home such as overcrowding, disclosure or non-disclosure of HIV status, sharing of eating utensils and time constraints (amongst others). See the seventh blue square in figure 7.2.
- Lastly, the individual perceives pressure from a few significant others like parents, community members and nurses to perform the new behaviour. (See the eighth blue square in figure 7.2). Once that has been established, they will verbalise their ease of adoption of the behaviour upon the confirmation of the support of the significant other.

Figure 7.2 below is a schematic diagram of Backer's theory and highlights the eight principals in blue. These eight principals were used in this study to predict the adoption of the flash-heat technique with HIV-positive mothers. These principals were put to the participants in the form of questions. The participants' responses were those in purple. According to Backer's theory, all positive responses would result in the change of current feeding behaviour to the adoption of the flash-heat technique.

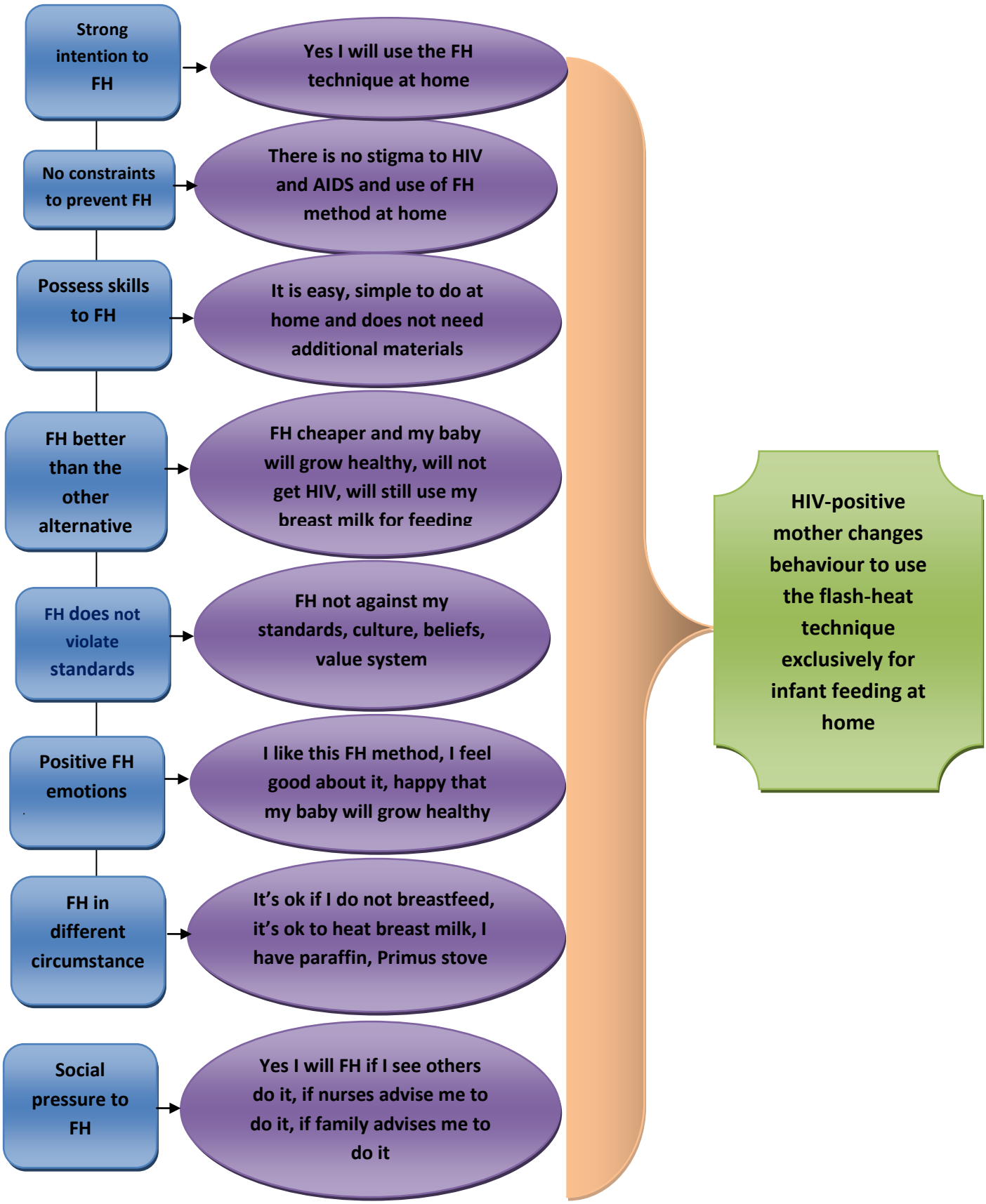

Figure 7.2 Diagram of the Theory of Individual and Group Change

(Backer 2001:20)

7.6 APPLICATION OF CONCEPTUAL FRAMEWORK TO THE DEVELOPMENT OF GUIDELINES

The development of guidelines was supported by Dickoff, James and Wiedenbach (1968:425) and Reed and Shearer's (2009:385) survey list for support of public sector nurses when educating HIV-positive mothers on infant feeding.

The survey list describes the following three characteristics: (1) goal content is clearly specified; (2) prescriptions are clearly-stated directives for the activities that are intended to bring about the goal; and (3) a survey list is aimed at significant aspects of an activity and resources that are crucial to the activity. The six survey list activities are agent, recipient, framework, procedure, dynamics and terminus. The six activities from the survey list are described below as they relate to this study (Dickoff et al 1968:425).

7.6 1 Agent

The agent is the individual who has the skill to perform an activity (Dickoff et al 1968:425). In this study, the activity is the infant-feeding education HIV-positive mothers in public sector health facilities receive. The agent is the registered nurse or midwife who has the requisite knowledge to perform the stated activity, allowing HIV-positive mothers to make an informed choice about infant feeding.

7.6 2 Recipient

According to Dickoff et al (1968:426) the recipient is the individual who receives an activity from the agent. The recipient in this case is the HIV-positive mother who is pregnant and attends public sector health facilities such as antenatal clinics or hospitals for delivery purposes.

7.6 3 Framework

The framework is the context in which the activity takes place (Dickoff et al 1968:429). The framework in this study is public sector antenatal clinics and public sector hospitals.

7.6 4 Terminus

The terminus is the outcome of the study. The terminus identifies what the activity has accomplished (Dickoff et al 1968:429). In this study this is the adoption of the flash-heat technique as an alternative method of infant feeding by HIV-positive mothers.

7.6 5 Procedure

The procedure entails the formulation of guidelines to provide nurses with a roadmap to assist them in determining the appropriate course of action when dealing with HIV-positive mothers who are not sure of the best feeding method for their infants (Dickoff et al 1968:430).

7.6 6 Dynamics

The dynamics of an activity are the power sources for that activity. Namely the driving forces behind the procedure (Dickoff et al 1968:431). The dynamics for the activity are the feelings of support and confidence HIV-positive mothers will have due to the infant feeding education received from the nurses.

Table 7.1 below depicts the aspects of activity in relation to the conceptual framework by Dickoff et al's (1968:425) survey list.

Table 7.1 Survey list

Activity aspects	Question	Response
Agent	Who performs the activity?	Registered nurse or midwife at public sector health facility
Recipient	Who is the recipient of the activity?	HIV-positive mothers who attend antenatal clinics while pregnant and hospitals for deliveries
Framework	What is the context where this activity takes place?	Public sector clinics and hospitals
Terminus	What is the goal or outcome of the activity?	The adoption of the flash-heat technique as an alternative method of infant feeding
Procedure	What are the relevant realities?	Formulation of guidelines to provide nurses with a roadmap to assist them in determining the appropriate course of action when dealing with HIV-positive mothers
Dynamics	What is the energy source for the activity?	Feeling of support and confidence HIV-positive mothers will have due to the infant feeding education received from the nurses

Adapted from Dickoff et al (1968:425)

7.7 RATIONALE FOR DEVELOPING GUIDELINES PROMOTING SUPPLEMENTARY INFANT FEEDING TECHNIQUES AMONG HIV-POSITIVE MOTHERS

Guidelines may provide answers to questions about organisational or policy interventions in the hope of improving health care or health policy (WHO 2008:1). Good guidelines are ones that lead to improved outcomes for patients. They need to be based on evidence and be implemented. Equally important is that they need to be assessed (WHO 2008:1) for applicability. They are developed to summarise and synthesise knowledge and innovations in health, to reduce variation in practice and to promote evidence-based clinical practice (WHO 2008:1).

It is envisaged that the proposed guidelines will provide nurses with principles that provide direction and support to HIV-positive mothers at public health facilities regarding

appropriate feeding behaviour. Currently there are no guidelines that promote alternative infant feeding techniques for HIV-positive mothers who may wish to feed their infants breast milk, without the added risk of exposing them to HIV.

According to Doherty et al (2006:1) HIV-positive mothers often have low levels of self-efficacy in relation to infant feeding. It is the researcher's opinion that such low levels of self-efficacy among HIV-positive mothers are caused by inadequate guidance and support in choosing an appropriate feeding method that is highly suitable for their infants.

7.8 PRACTICAL GUIDELINES FOR PROMOTING SUPPLEMENTARY INFANT FEEDING TECHNIQUES AMONG HIV-POSITIVE MOTHERS DEVELOPMENT PROCESS

Six themes emerged from the analysis of data on the likelihood of adoption of the flash-heat technique with HIV-positive mothers at Tembisa Hospital. These themes formed the basis for the development of the proposed guidelines.

The guidelines were developed in three stages.

- The first stage involved the identification of the six themes which emerged from the data analysis. These themes formed the basis of the areas needing support/improvement.
- The second stage involved consideration of the theoretical framework used as a foundation for this study. The framework provided the researcher with other scientific bases for the guidelines.
- The third and final stage involved developing the guidelines incorporating the study framework and study results.

Figure 7.3 below depicts the steps followed when developing the proposed guidelines.

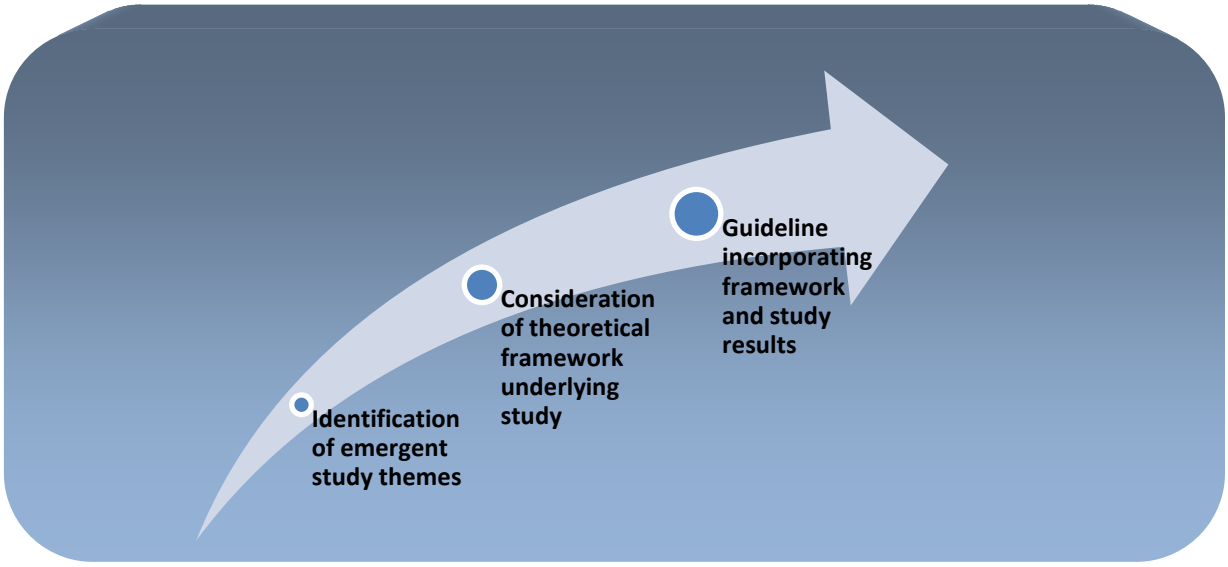

Figure 7.3 Schematic diagram of practical guideline development process

7.9 APPLICATION OF THE THEORETICAL FRAMEWORK TO THE DEVELOPMENT OF THE GUIDELINES

The Theory of Individual and Group Change by Backer (2001:18) was outlined in Chapters 2 and 6 as the theoretical framework for this study. Table 7.4 below depicts the application of the framework in developing the guidelines. It highlights the themes identified in the study, the study findings, and the elements of Backer's theory that relate to the findings and the respective guideline strategies.

Table 7.2 Application of the theoretical framework to guideline development

Identified theme	Study findings	Elements of Backer's theory	Activities/strategies
Mothers' feelings about the FH method	Positive feelings about touching breast milk while expressing	Positive attitude to behaviour	Set aside personal experience to be receptive to alternative methods of infant feeding.
	Positive about expressing breast milk into glass jar	Positive intention to perform behaviour	Educate HIV-positive mothers on possible cultural prohibitions to expressing and touching breast milk with hands. Engage in open communication about HIV-

Identified theme	Study findings	Elements of Backer's theory	Activities/strategies
			positive mothers' personal value system and beliefs prior to promoting the flash-heat method. Assist mothers in assessing the impact of their feeding option with regards to their lifestyles.
	Positive about heat treating breast milk Positive about FH, but prefer bottle feeding	Possess the skill to perform behaviour	Demonstrate the flash-heat technique to mothers antenatally and postnatally during the health education talks. Encourage mothers to also participate in the demonstration. Provide accurate and correct information on the volumes of milk yielded via expression. Demonstrate collecting the breast milk in a glass jar (which should be approximately three fingers' width) and placing jar in a pot with two cups of water and allowing it to boil uncovered. Encourage to remove the milk from the stove when the water begins to boil. Encourage feeding of the breast milk when cooled. Provide HIV-positive mothers with pamphlets with information on/demonstration of the flash-heat technique.

Identified theme	Study findings	Elements of Backer's theory	Activities/strategies
Views on the number of Flash-heat months and introduction of supplementary diet	FH and exclusive breast milk feeding for one month FH and exclusive breast milk feeding for four months FH and exclusive breast milk feeding for six months	Positive intention to perform behaviour	Use the AFASS criteria for infant education for HIV-positive mothers on the basis of their social, health and financial circumstances. Ensure that hospital routines are consistent with the ten steps to successful breastfeeding. Hold colleagues accountable for its successful implementation. Provide correct information on the period of exclusive breast milk feeding or of exclusive formula feeding. Provide the correct terms on exclusive breast milk feeding. Observe your responsibilities under the International Code of Marketing of Breast milk Substitutes and subsequent policies. Ensure that you familiarise yourself with the national PMTCT guidelines, and all other national and international infant feeding regulations. Encourage brief regular ward meetings to discuss difficulties with interpretation and education of national and international infant feeding guidelines. Encourage the update on knowledge of these guidelines when ward routines are slow.

Identified theme	Study findings	Elements of Backer's theory	Activities/strategies
			Develop a short checklist with the steps required for each health educator to use when providing health education. Monitor the health education sessions provided by colleagues on a regular basis. Review checklists to reflect changes or modifications to national guidelines.
Comparison of feeding methods	FH cheaper than formula Breast milk in FH is reliable Breast milk is healthy	Advantages of performing the new flash-heat feeding technique outweighs not performing it	Assist HIV-positive mothers with a financial breakdown of the costs associated with formula feeding. Reinforce the use of cheaper materials such as a pot, a glass jar, two cups of water, Primus stove and paraffin for the implementation of the Flash-heat method. Link unemployment and poor access to water and electricity to adverse health outcomes for the infant. Reinforce to HIV-positive mothers that breast milk is readily available, has no costs and comes at the right temperature and quantity. Reinforce that breast milk has all the nutritional qualities an infant requires.
Perceptions of significant others on FH implementation	Nurses as having significant influence on infant feeding choice	Perceives social pressure from significant others	Acknowledge that mothers receive information from other sources during education/counselling sessions.

Identified theme	Study findings	Elements of Backer's theory	Activities/strategies
	Relatives as having significant influence on infant feeding choice		Invite significant others to come for education/counselling on PMTCT and infant feeding as well as Flash-heat method demonstrations. Demonstrate to all HIV-positive mothers their role in infant feeding decision-making. Actively engage significant other on their personal value and belief system prior to educating about the flash-heat method. Establish communication between significant other and health provider. Listen attentively to significant other's infant feeding concerns as well as their personal belief system.
Mothers' perceptions of home circumstances	Can FH at home without full disclosure of HIV status	Lack of environmental constraints for behaviour	Provide ongoing psychosocial support and encouragement to HIV-positive mothers and their significant other in creating an environment favourable to implementing the flash-heat method at home. Encourage HIV-positive mothers to find support at home with household chores and child care to enable comfortable implementation of the FH method. Encourage HIV-positive mothers to join local support groups on infant feeding and refer to such.

Identified theme	Study findings	Elements of Backer's theory	Activities/strategies
	Can FH even if home environment not suitable	Able to perform behaviour under a number of different circumstances	Provide HIV-positive mothers with opportunities to disclose their HIV status to someone they live with. Provide opportunities during counselling sessions for HIV-positive mothers and significant other to discuss the impact of the use of cooking equipment. Encourage and support families to express their emotions on the flash-heat method and the possible stigma it may cause. Refer to local support groups
	FH not against personal standards	FH consistent with self-image	Provide psychosocial support and encouragement for HIV-positive mothers who would adopt the flash-heat method for the health and wellbeing of their infants. Create opportunities for HIV-positive mothers to personally assess (in counselling sessions) whether the flash-heat method causes any changes in self-worth and self-esteem.
Current feeding option	Formula is current feeding option	Advantages of performing the new flash-heat feeding technique outweighs not performing it	Adhere to the Baby-Friendly Hospital Initiative (BFHI). Use only cups as feeding tools in hospitals. Hold colleagues accountable by monitoring the implementation of the BFHI. Educate mothers on the dangers of using bottles

Identified theme	Study findings	Elements of Backer's theory	Activities/strategies
			which are not thoroughly cleaned for infant feeding. Reinforce that the bottle is more difficult to clean thereby posing health risks such as diarrhoea. Encourage the use of a cup to feed the infant with at home as it is easy to clean and readily available.
	Prefer FH method		Encourage mothers to make time for feeding as cup feeding may be slower than bottle feeding.

7.10 GUIDELINES FOR PROMOTING SUPPLEMENTARY INFANT FEEDING TECHNIQUES AMONG HIV-POSITIVE MOTHERS

Findings of this study revealed that HIV-positive mothers at Tembisa Hospital preferred the flash-heat method of infant feeding because they thought that it was cheaper and healthier than using commercial formula for infant feeding. The mothers mentioned that the use of breast milk was comforting as it is natural and readily available, whereas the supply of infant formula to clinics and hospitals was erratic, which caused them anxiety. A few other concerns highlighted by HIV-positive mothers include the fact that they did not have the correct information relating to the period of exclusive feeding on breast milk and nurses were the most influential health care personnel in shaping the mothers' perceptions of feeding techniques but did not have the correct information themselves pertaining to various infant feeding techniques. The nurses were giving inconsistent messages to HIV–positive mothers such as to exclusively breastfeed for four months or for six months and that commercial infant formula would be available to some mothers postnatally and to others not. The mothers verbalised their intention to use the flash-heat technique at home and stated they did not feel that non-disclosure of their HIV status to their families could pose an obstacle to the successful implementation thereof. Rather, they would continue with the flash-heat method of infant feeding.

Based on the background provided, the researcher proposes the following guidelines to be followed by nurses who are at the forefront of maternal and child health initiatives such as those run in public hospitals. It is envisaged that the proposed guidelines would empower nurses with information and skills to promote the flash-heat method as the best infant feeding option for infants exposed to HIV.

The following are strategies for nurses to use to encourage the promotion of flash-heat as an alternative infant feeding option for HIV-positive women. The suggestions follow the themes identified from data analysis.

7.10.1 THEME 1: Mothers' feelings about the flash-heat method of infant feeding

The flash-heat technique comprises distinct steps that require that an individual reassess whether the technique is personally acceptable. The steps are: touching breast milk while expressing, expressing the breast milk into a glass jar and heating the breast milk. As earlier mentioned in this study, in other African countries breast milk is considered precious/sacred and will not be mishandled in any way. The findings of this study revealed that HIV-positive mothers had positive feelings about touching their breast milk while expressing into a glass jar and heat treating their breast milk on a stove. The study also revealed that some mothers questioned certain parts of the technique such as having insufficient milk for expression and experiencing pain on expression.

7.10.1.1 Positive attitude and positive intention for behaviour

(a) To ensure development and sustainability of the positive attitude HIV-positive mothers have towards the flash-heat method.

- Set aside personal experience to alternative methods of infant feeding and ensure that personal bias does not affect the quality of information provided.
- Educate HIV-positive mothers on possible cultural prohibitions to expressing and touching breast milk with hands.
- Engage in open communication about HIV-positive mothers' personal value system and beliefs prior to promoting the flash-heat method.

- Assist mothers in assessing the impact of their feeding option with regards to their lifestyles.

7.10.1.2 Educate on the skill necessary for flash-heat implementation

(a) To improve and strengthen the skill and knowledge HIV-positive mothers have in implementing the flash-heat method.

- Demonstrate the flash-heat technique to mothers antenatally and postnatally during the health education talks.
- Encourage mothers to also participate in the demonstration.
- Provide accurate and correct information on the volumes of milk yielded via expression and ensure HIV-positive mothers that milk volumes are sufficient for infant growth and development.
- Encourage mothers to collect (approximately three fingers' width when measured against the glass bottle) the breast milk in a glass jar and place that in a pot with two cups of water and allow it to boil uncovered.
- Encourage removal of the milk from the stove when the water begins to boil. When the water boils and has bubbles round the edges, the milk should be removed from the heat source and allowed to cool.
- Encourage feeding of the breast milk when cooled.
- Provide HIV-positive mothers with pamphlets with information on/demonstration of the flash-heat technique.

7.10.2 THEME 2: Views on the number of months mothers are comfortable using the flash-heat method and introduction of supplementary diet

Findings of this study showed that HIV-positive mothers had an overwhelming desire to protect their infants from vertical transmission of HIV and had strong intentions of exclusively feeding their infants breast milk using the flash-heat method because they understood the health benefits thereof. The concern highlighted is that some mothers did not know what the recommended exclusive feeding period was and as a result verbalised feeding their infants supplements at one month, six weeks, four months and six months. Other findings highlighted that the quality of health education provided by

the nurses was poor. There appeared to be gaps and inconsistencies in the information provided and at times, no information was provided at all.

7.10.2.1 Positive intention to behaviour

(a) To ensure that infant feeding information provided is consistent with national and international recommendations.

- Use the "acceptable, feasible, affordable, sustainable and safe" (AFASS) criteria for infant education for HIV-positive mothers on the basis of their social, health and financial circumstances.
- Ensure that hospital routines are consistent with the ten steps to successful breastfeeding (Annex F) and monitor its use. Keep colleagues accountable for its successful implementation.
- Provide correct information on the period of exclusive breast milk feeding or of exclusive formula feeding to be six months and the introduction of complementary foods to the infants' diet after six months.
- Provide the correct terms on exclusive breast milk feeding which should state that the infant takes only breast milk and no additional food, water, or other liquids such as tea and juice (with the exception of medicine and vitamins, if needed).
- Observe your responsibilities under the International Code of Marketing of Breast Milk Substitutes and subsequent policies such as the Infant and Young Child Feeding policy which will be promulgated soon.
- Ensure that you familiarise yourself with the national Prevention of Mother-To-Child Transmission (PMTCT) guidelines, and all other national and international infant feeding regulations.
- Encourage brief regular ward meetings to discuss difficulties with interpretation and education of national and international infant feeding guidelines.
- Encourage the update on knowledge of these guidelines when ward routines are slow.
- Develop a short checklist with the steps required for each health educator to use when providing health education talks to ensure that all relevant information is provided.

- Monitor the health education sessions provided by colleagues on a regular basis to assess compliance with stated guidelines.
- Review checklists to reflect changes or modifications to national guidelines. Checklists should be reviewed every time guidelines and other policies are amended to ensure the education provided is based on the latest information.

7.10.3 THEME 3: Comparison of feeding methods

In this study, findings suggest that HIV-positive mothers preferred the flash-heat method for use when feeding their infants. Reasons for their choice varied from the flash-heat method being good and better than formula, delight at using their own milk to feed their infants, and the breast milk supply being reliable and readily available. Cost was also highlighted as a reason for choice.

7.10.3.1 Advantages of performing the new flash-heat feeding technique outweighs not performing it

(a) To encourage the adoption of the flash-heat technique as their only (exclusive) infant feeding method.

- Every month for two years, assist HIV-positive mothers with a financial breakdown of the costs associated with formula feeding such as costs of formula, feeding bottles, sterilising equipment and cleaning materials.
- Reinforce the use of cheaper materials such as a pot, a glass jar, two cups of water, Primus stove and paraffin for the implementation of the flash-heat method.
- Link unemployment and poor access to water and electricity to adverse health outcomes for the infant.
- Reinforce to HIV-positive mothers that breast milk is readily available, has no costs and comes at the right temperature and quantity.
- Reinforce that breast milk has all the nutritional qualities an infant requires and no other infant food including formula contains all these qualities.

7.10.4 THEME 4: Perception of significant others regarding flash-heat infant feeding technique

The findings of this study suggest that some HIV-positive mothers make their own decisions on feeding their infants; however, others report that there are people who exercise their opinions and even insist that their method is more appropriate for the infant. These alternative people would insist on their feeding method in spite of the mothers' chosen option. The HIV-positive mothers identified nurses and relatives mostly as those who have significant influence in relation to the choice of feeding option for their infants.

7.10.4.1 Perceive social pressure from significant others

(a) To encourage adoption of the flash-heat technique by significant others.

- Acknowledge that mothers receive information from other sources during education/counselling sessions.
- Invite significant others to come for education/counselling on PMTCT and infant feeding as well as to flash-heat method demonstrations.
- Demonstrate to all HIV-positive mothers their role in infant feeding decision-making.
- Actively engage significant other on their personal value and belief system prior to educating about the flash-heat method.
- Establish communication between significant other and health provider.
- Listen attentively to significant other's infant feeding concerns as well as their personal belief system.

7.10.5 THEME 5: Mothers' perceptions of home circumstances

Non-disclosure of HIV status has the potential of causing anxiety and stress in the individual and home environment (THCU 2007:1). Significant others are not likely to understand why HIV-positive mothers chose a feeding option over another and will insist on enforcing their influence on the feeding method. In this study, the findings showed that most mothers felt that they did not have to disclose their HIV status as they could find inventive ways of dealing with questions and suspicions for practicing the new

infant feeding method, other than breastfeeding. Mothers report that they would use the flash-heat method in their homes without full disclosure because of their fear of being stigmatised as being HIV-positive.

7.10.5.1 Lack of environmental constraints for flash-heat behaviour

(a) To facilitate the creation of a favourable home environment for flash-heat implementation.

- Provide ongoing psychosocial support and encouragement to HIV-positive mothers and their significant others in creating an environment at home that is favourable for flash-heat implementation.
- Encourage HIV-positive mothers to find support at home with household chores and child care to enable comfortable implementation of the flash-heat method.
- Encourage HIV-positive mothers to join local support groups on infant feeding and refer to such. If none, encourage them to develop a support group in their area.

7.10.5.2 Ability to perform behaviour under a number of different circumstances

(a) To encourage a favourable home environment for the use of the flash-heat method free from stigma to HIV.

- Provide HIV-positive mothers with opportunities to disclose their HIV status to someone they live with so that they can get the necessary support to implement the flash-heat method.
- Provide opportunities during counselling sessions for HIV-positive mothers and their significant others to discuss the impact of the use of cooking equipment such as pots and cups (for the use of flash-heat) on family beliefs and preferences.
- Encourage and support families to express their emotions on the flash-heat method and the possible stigma that it may cause.
- Refer to local support groups.

7.10.5.3 Promotion of behaviour consistent with self-image

(a) To encourage and acknowledge the protective role HIV-positive mothers play over their HIV-exposed infants.

- Provide psychosocial support and encouragement for HIV-positive mothers who would adopt the flash-heat method for the health and wellbeing of their infants.
- Create opportunities for HIV-positive mothers to personally assess (in counselling sessions) whether the flash-heat method causes any changes in self-worth and self-esteem.

7.10.6 THEME 6: Current feeding option

The findings of this study proved that HIV-positive mothers who preferred to use the flash-heat infant feeding method, would do so using a regular infant feeding bottle. Bottle feeding is the most commonly used method of supplementation in more affluent regions of the world (Ghosh 1992:69), but is of concern in developing countries such as South Africa. Access to water in the home was limited for most of the mothers and could cause infant morbidity due to disease arising from improper cleaning of feeding bottles and teats. Most of the mothers were also unemployed and single, possibly influencing their ability to acquire bottles, teats and cleaning materials for feeding purposes. The spoon which was encouraged as a feeding tool was not preferred because of the increased length of time the mothers thought it would take to feed the expressed breast milk to their infants.

7.10.6.1 Advantages of performing the new flash-heat feeding technique outweighs not performing it

(a) To support implementation of the flash-heat technique using a cup.

- Adhere to the Baby-Friendly Hospital Initiative (BFHI) and do not keep and promote any feeding bottles in the maternity and postnatal wards.
- Use only cups as feeding tools in hospitals.
- Hold colleagues accountable by monitoring the implementation of the BFHI.

- Educate mothers on the dangers of using bottles which are not thoroughly cleaned for infant feeding. Reinforce that the bottle is more difficult to clean thereby posing health risks such as diarrhoea.
- Encourage the use of a cup to feed the infant with at home as it is easy to clean and readily available.
- Encourage mothers to make time for feeding as cup feeding may be slower than bottle feeding.

7.11 CONCLUSION

This chapter began with the background as well as the theoretical framework underpinning this study. This was followed by the justification for the development of the proposed guidelines in order to promote supplementary infant feeding techniques for HIV-positive mothers.

The six themes identified from the in-depth interviews were as follows:

- Mothers' feelings about the flash-heat method of infant feeding
- Mothers' views on the reasonable period for using the flash-heat technique and introduction of supplementary diet
- Reports from mothers concerning different feeding methods
- Mothers' perceptions of significant others on flash-heat implementation
- Mothers' descriptions of home circumstances and the feasibility to flash-heat and lastly
- Mothers' choice of preferred feeding options

The findings from this study indicated that the participants were positive about the flash-heat infant feeding method. They reported that they could comfortably express and heat treat their breast milk at home and feed their infants for varying months ranging from 1 to 4 to 6. Nurses provided antenatal mothers with inconsistent and incorrect education on infant at Tembisa Hospital and this resulted in confusion on which feeding method is best for their infants. The participants indicated that they consider nurses and relatives as having significant influence over their feeding choice for their infants. It is therefore critical that nurses be supported with relevant education literature on infant feeding. Practical guidelines were developed for the promotion of the flash-heat

implementation in HIV-positive mothers in public health facilities to assist nurses when educating HIV-positive mothers on infant feeding. The guidelines focus on encouraging HIV-positive mothers to adopt flash-heat as their only infant feeding method for a minimum period of four months. Furthermore, they discourage the use of infant feeding bottles and teats in public hospitals and encourage the use of a feeding cup. In addition the guidelines encourage nurses to adhere to the International Code of Marketing of Breast Milk Substitutes, the Baby-Friendly Hospital Initiative and subsequent policies such as the Infant and Young Child Feeding policy which will be promulgated soon.

Various figures and tables were developed to provide the reader with a visual appreciation of the theoretical factors that affect HIV-positive mothers' intentions to adopt the flash-heat technique for infant feeding.

CHAPTER 8

CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS

8.1 INTRODUCTION

The previous chapter presented practical guidelines for nurses on the promotion of the Flash-heat infant feeding technique for HIV-positive mothers. This chapter draws the conclusions based on the findings of the study. Limitations of the study are presented as well as the recommendations for improving the quality of counselling on infant feeding for HIV-positive mothers.

8.2 STUDY OBJECTIVES

The following objectives were assessed based on the study findings.

8.2.1 To explore and describe the factors influencing HIV-positive mothers on their choice of feeding technique

The results were presented as the six main themes in chapter 4 from the qualitative study results. The themes indicated that HIV-positive mothers felt that they first had to identify and deal with their feelings of the newly-proposed infant feeding method before they could verbalise intent to use or adopt the technique. In addition, they had to decide on the adoption of healthier feeding behaviours such as exclusive breast milk feeding prior to changing to this new method. Significant others such as relatives and nurses played an important role in the infant feeding choice HIV-positive mothers make, as well as the physical and emotional home environments they lived in. HIV-positive mothers weighed the benefits of available feeding options and settled on a method that provided them with the comfort that HIV would not affect their infants.

8.2.2 To identify the profile of HIV-positive women who can be targeted for promotion of a supplementary infant feeding technique termed flash-heat

Chapter 6 identified the characteristics of HIV-positive mothers who could be targeted for promotion of the flash-heat infant feeding method. The following criteria were identified, amongst others:

- They were between the ages 35-40 years.
- Had three to four children each.
- They were mostly unmarried.
- They were mostly unemployed.
- Many lived with their boyfriends.
- Contraceptive use and compliance was poor.
- Most mothers did not breastfeed their current infant for fear of infecting that infant with HIV, opting to formula feed instead.
- Disclosing their HIV status to their boyfriends and husbands was a challenge. They more readily disclosed to a relative.
- Most of their partners had not tested for HIV.

8.2.3 To formulate practical guidelines based on the research findings and literature support for promoting supplementary infant feeding techniques

Chapter 7 presented the guidelines for promoting supplementary infant feeding techniques among HIV-positive mothers. Guidelines were developed based on the findings of this study. The Theory of Individual and Group Change by Backer (2001:18) and study results were used to develop the guidelines. The eight principals in Backer's theory were used as questions to elicit responses on the new flash-heat infant feeding technique from the study participants. The responses were highlighted as themes identified in the study. Individual guideline strategies were based on the principals of Backer's theory.

8.3 PREDICTIVE VARIABLES IN QUANTITATIVE STUDY

Results of the quantitative study indicated that five variables were statistically significant and important in predicting flash-heat behaviour with HIV-positive mothers at Tembisa Hospital, however the first two variables had explanatory power. These variables were:

- *Can you express for 4 months.*
- *Can you easily heat treat the milk.*
- *Do you believe that you can flash-heat under a number of different circumstances at home?*
- *Does the mother have a positive reaction to flash-heat*?
- *Do you believe flash-heat can prevent transmission of HIV*?

In both the quantitative and qualitative studies, HIV-positive mothers had positive feelings about the newly proposed infant feeding method. Participant B20 said: *"I use my own milk? Then I will do this method. Nowadays things are tough, so we are not able to feed our babies well. But with this method...ha...I am happy".* Their primary concern after being diagnosed HIV-positive was to protect their infants from vertical transmission. They viewed the flash-heat infant feeding technique as being able to protect their infants from HIV infection. Participants indicated that they felt the technique was simple and that they could easily master the heat treatment of breast milk according to the desired technique. Finally, they believed that the flash-heat infant feeding method was healthy and affordable to implement in their homes.

8.4 LIMITATIONS OF THE STUDY

This research focused on topics such as HIV status, choice of infant feeding method, and on the influence of significant others on deciding on an infant feeding method. Limitations are characteristic of this study simply because of the intricate nature of research. This was evident in the qualitative study when a limited number of mothers would not respond to the reasons for their feeding choices. They remained quiet upon further questioning. It was understood that they were uncomfortable in engaging further on that issue and they were discouraged from discussing any topic they were not comfortable with.

8.5 RECOMMENDATIONS

8.5.1 Recommendations for creating a favourable environment for HIV-positive mothers at public hospitals to adopt the flash-heat technique

The following recommendations are proposed to facilitate the adoption of the flash-heat infant feeding technique among HIV-positive mothers at public hospitals.

- The findings of this study indicated that HIV-positive mothers in a public health facility would adopt flash-heat as alternative infant feeding method. Thus practical guidelines to promote this feeding method were proposed. The proposed draft guidelines which promote the use of the flash-heat infant feeding method for HIV-positive mothers in public sector facilities will be communicated to relevant authorities such as the National Department of Health (NDoH). These guidelines support the new policy shift to exclusive breastfeeding as a child survival strategy in South Africa.

- Once the draft guidelines have been presented to the NDoH, buy-in from the NDoH and other stakeholders such as community-based and faith-based organisations would need to be obtained to enable adoption. This can be done by investing time in building relationships of trust and meaningful participation in the national shift towards greater infant survival in South Africa.

- After obtaining buy-in from all the relevant stakeholders, the guidelines would need to be pre-tested with nurses at one health facility to assess their applicability. This can be done by conducting a qualitative study on the views of nurses who have significant influence over infant feeding choice with HIV-positive mothers. The views of the nurses will be incorporated into the guidelines.

- The study indicated that public sector nurses do not educate HIV-positive mothers on all the infant feeding options available, but on biased/personal views. Training of the public sector nurses would be recommended (through workshops) on the effective use of the proposed guidelines. The training would include skills to enhance their capacity to communicate the new guidelines in a non-biased, clear and correct manner.

- The promotion of the implementation of the guidelines at one health facility will be done after buy-in from all stakeholders has been obtained and the nurses are adequately trained on the effective use thereof. Relevant media can be used to promote the implementation of the guidelines. The media could help to de-stigmatise the guidelines and enable acceptability by the nurses, HIV-positive mothers, their families and the wider community.

- After the guidelines have been implemented in one health facility, they would need to be revised within three months. This review would take into account the views of the NDoH, public sector nurses, HIV-positive mothers and other stakeholders in order to meet their expectations of a safe alternative infant feeding method.

8.5.2 Recommendations for further studies

- After the implementation of the guidelines has been reviewed at one health facility, a follow-up longitudinal study can be done in more provinces. This longitudinal study could assess the minimum requirements and skills nurses require at government health facilities to counsel/educate and promote expression and heat treatment of breast milk with HIV-positive mothers.

8.6 CONCLUSION

The researcher became aware of the problem of vertical transmission of HIV after working with many Non-Governmental Organisations providing services to orphaned and vulnerable children living with HIV in South Africa. Relevant health literature suggests that vertical transmission of HIV be prevented with antiretroviral provision to the mother at 14 weeks gestation, when in labour and postnatally to the infant. Failing this, other techniques should be targeted very early on postnatally. Alternative infant feeding techniques utilising breast milk were looked at due to the researcher's passion for the promotion of breastfeeding. The researcher studied a newly-proposed feeding technique supported by the WHO termed flash-heat (FH) and what was not known was (1) Whether urban-based mothers would agree to use this feeding technique as the technique was researched initially in rural areas; (2) What the characteristics of the mothers were who would be more likely to adopt this feeding technique and (3) whether

there were any guidelines to support nurses in promoting flash-heat as a supplementary feeding technique for HIV-exposed infants.

The findings of this study indicated that HIV-positive mothers continue to practice poor feeding behaviours such as mixed feeding, possibly caused by poor counselling on infant feeding nurses provide in public sector facilities. The poor counselling results in confusion on which feeding option is best for their infants. The national PMTCT programme provides free infant formula for HIV-positive mothers as a strategy to reduce transmission; however the unreliable supply and provision of this formula milk causes anxiety for mothers who do not want to put their infants at risk of HIV infection if breastfed. An alternative infant feeding technique such as the flash-heat method (endorsed by the WHO) was discussed. This technique encourages heat treating expressed breast milk to a rolling boil to inactivate HIV found in the breast milk, and feeding to the infant once cooled.

Both the qualitative and quantitative studies were useful in identifying the number of HIV-positive mothers who would adopt the flash-heat technique, the characteristics of mothers whom the technique could be promoted to, the factors that influence/affect the choice of infant feeding for these mothers, as well as their feelings associated with the technique. Feedback from the participants interviewed indicated that they were relieved at the introduction of this flash-heat technique because they felt that they could protect their infants from HIV by using this method.

The significance of the study is that it gave HIV-positive mothers a voice to air their concerns, feelings and hopes around the exposure of their infants to the disease. They verbalised their concerns about infecting their infants with HIV and opted to feed their infants formula milk even when they were unsure of the sustainability of the provision of the infant formula, both at hospital and at home. Of further significance is the fact that there are people such as nurses and relatives whom HIV-positive mothers regard as important in their lives and the views of these people are included in one way or another in the feeding choice for their infants.

The researcher is hopeful that findings from this study are useful for public health professionals who are equally passionate about working to improve the health of mothers and infants in developing countries such as South Africa. It is encouraged that

the findings be used to add to the body of knowledge of other PMTCT strategies using alternative infant feeding methods. The guidelines could be used as change agents particularly when promoting breast milk feeding for HIV-exposed infants.

ANNEXURE A

PARTICIPANT CONSENT FORM IN ISIZULA

ANNEXURE B

SAMPLE INTERVIEW

ANNEXURE C

APPROVAL FROM TEMBISA HOSPITAL TO CONDUCT RESEARCH

ANNEXURE D

ETHICS APPROVAL FROM UNISA

ANNEXURE E

RESEARCH QUESTIONNAIRE

ANNEXURE F

10 STEPS TO SUCCESSFUL BREATFEEDING

ANNEXURE A. PARTICIPANT CONSENT FORM IN ISIZULU

IMVUMO YOKUBA INXENYE YOCWANINGO

IGAMA LESIFUNDO

IZINDLELA EZONGEZIWE ZOKUNCELISA ABANTWANA NGENDLELA EBAVIKELA UKUTHI BANGATHELELWA OMAMA IGCEWANE LESANDULELA NGULAZI

Uyacelwa ukuba ube ingxenye yezifundo locwaningo eyenziwa ngu Nksz Armelia Chaponda okumyango wezempilo kwinyuvesi yase Ningizimu Africa eyaziwa nge UNISA. Imiphumela yalolucwaningo lizoba yingxenye yezifundo zakhe zobudokotela kuwona lomnyango wezempilo eUnisa.

Uma unemibuzo noma kukhona okukukhathazayo, xhumana naye uNksz Amelia Chaponda kule nombolo 0766532972.

UMSUSA WALOLUCWANINGO

Lolucwaningo lufuna ukuthola ukuthi ikhona yini indlela egcono nejabulisayo yokuthi omama abanegciwane lesandulela ngculazi bakwazi ukukhama ubisi emabeleni abo, balufudumeze bese belincelisa izingane zabo ngokhezo, zize zibe nezinyanga ezine (4 months) ngaphandle kwenzinkinga.

KUZOKWENZIWA KANJE

Uma uvuma ukungenela loluncwaningo, sizocela ukuthi wenze ngalendlela elandelayo:

Sizofuna ukuthi uhlale nabanye omame egumbini lapho kuzoboniswa khona indlela okuzokwenziwa ngayo loluncwaningo:

1. **Ukukhanywa kobisi emabeleni ngesandla**- Lokhu ukukhama ibele ngesandla, ubisi lufakwe ebhodleleni elifayo (i-glasi) elinjengele Peanut Butter.

2. **Ukufudunyezwa kobisi ukuze kubulawe igciwane lesandulela ngculazi** – lena indlela yokufudumeza ubisi olusebhodleni, ngokufaka ibhodlela ebodweni elinamanzi. Isikali samanzi ebhodweni sibe ngamankomishi amabili. Ubilise lawamanzi esitofini imizuzwana engemingaki. Uma esebilaamanzi, susa ibhodwe esitofini ulinde kuphole iglass enobhisi.

3. **Indlela yokubekwa kobisi nokufunza ingane ngokhezo**- Ubisi olufudumele ungaligcina kulona lelibhodlela olisebenzisile ukulifudumeza. Vala ibhodlela ngendwangu ehlanzekile noma isivalo salo ibhodlela. Ubisi lungahlala ngaphandle kwesiqandisi isikhathi esingama hora awu 4-8. Lolubisi ungalupha ingane ngokhezo esihlanzekile.

Isikhathi esithathwa ulolucwaningo
Kuzothatha imizuzu emihlanu (5 min) ukufundisa ukukhama ubisi nokufunza ingane. Lokhu kuzolandelwa isikhathi semibuzo nezimphendulo esizothatha imizuzu emibili (2 minutes). Abanye omama abakhethiwe bazophendulo eminye imibuzo ebhaliwe okuzothatha imizuzu ewu 30 (30 minutes) futhi abanye eyabo imibuzo izothatha imizuzu ewu 40 (40 minutes). Lokhu kuphendula kwemibuzo kuzoqotshwa kwi "tape recorder".

Iphepha lemibuzo
Iphepha elinemibuzo lizonikezwa abanye omama abakhethiwe ukuthi baphendule lemibuzo.

Okulandela ukuba kwakho kulolu gcwaningo
Uzoba yingxenye yalolucwaningo kanye vo. Akekho ozophinde akuthinte ngalolucwaningo kanye nesimo sakho. Kodwa uma wena unemibuzo noma kukhona okukukhathazayo ngalolucwaningo nemibuzo yakhona, uvumelekile ukuthintha uNksz. Armelia Chaponda kule nombolo 0766532972.

Imiphumela yocwaningo
Imiphumela yalolucwaningo kuzokuba eyase UNISA. Uma ufuna ukwazi ngemiphumela yaloluncwaningo, ungathinta umnyango wezempilo kuyona lenyuvesi.

UKUNGAPHATHEKI KAHLE KWAKHO EKUBENI INGXENYE YOCWANINGO

Uma kukhona okwenza ukuthi ungakhululeki noma ungaphatheki kahle ekubeni ingxenye yalolucwaningo, kuyilungelo lakho ukungasaqhubeki nocwaningo. . Asikho isijeziso ngalokho.

INZUZO YOMPHAKATHI NGALOLUCWANINGO

Imiphumela yalolucwaningo luzosiza abacwaningi ukuthi babhekisise izindlela zokuvikela izingane ezizelwe zingatheleleki ngegciwane lesandulela ngculazi ngokubheka izindlela ezingcono zokuncelisa. Kanti uma imiphumela ingemihle nakhona lapho abacwaningi bazokwazi ukululeka omama abanengciwane ngezindlela eziphephile zokuncelisa izingane zabo ngaphandle kokudlulisela ingciwane. Kanti futhi imiphumela yonke izokwenza ukuthi kwande ulwazi emphakathini ngalendlela yokuncelisa okuzodala ukuthi kuncishiswe izinga labantwana abathelelwa omama sebezelwe kwande.

UKUGCINA IMFIHLO YEMININGWANE YABANTU ABAYINGXENYE YALOLUCWANINGO

Kuzokwenziwa konke okusemandleni ukugcina imininingwane yabantu ababeyingxenye yalolucwaningo kuyimfihlo.

Amagama azobhalwa kuleliphepha lemvumo kuphela. Kwezinye izindawo kuzofakwa izinombolo kuphela hayi amagama. Iphepha lemvumo alizusetshenziswa kulolucwaningo.

Akukho okunye okuphathelena nawe okuzonikezwa abanye ozakwethu.

Izimpendulo eziqoshiwe zizohlaziywa kuphela bese imiphumela ifakwe njengengxenye yemiphumela yalocwaningo.

UKUBA INGXENYE NOMA UKUPHUMA KULOLUCWANINGO

Ungazikhethela ukuba ingxenye yalolucwaningo. Uma uzikhethela ukuba ingxenye bese ushinthsa imqondo usungasaphumeleli, kuyilungelo lakho ukuhoxa. Asikho isijeziso esizobakhona kuwena mayelana nalokho. Uvumelekile ukuthi imininigwane yakho ikhishwe kulonke ucwaningo futhi uma kukhona imibuzo ongakhululekile ukuyiphendula, kesaseyilungelo lakho ukungayiphenduli kepha uqhubeke ngokuphendula eminye imibuzo. Umcwaningi angakhetha ukukukhipha kulolucwaningo uma kukhona akubonayo okudinga ukuthi enzenjalo.

AMALUNGELO ABOBONKE ABAYINXEYE YOCWANINGO

Ungahoxisa imvumo yakho yokuba ingxenye yocwaningo nganoma isiphi sikhathi ngaphendle kwesijeziso. Ukuba kwakho ingxenye yalolucwaningo akusho ukuthi unikela ngamalungelo akho ngokomthetho. Isigungu sase UNISA esibekela imithetho yokuphathana kwabantu (UNISA Ethics Board) luluphenyile lolucwaningo ngemigangatho yabo laphasiswa ngokungahlukumezi imithetho yokuphathana kwabantu (ethics). Uma unemibuzo ngamalungelo akho aphathelene nalolucwaningo, ungathinta uNksz. Armelia Chaponda kulezi zinombolo 076 653 2972.

INDLELA YOKUBONGA UKUBAKWAKO INGXENYE YALOLU CWANINGO

Uzophiwa okuncane okokubonga isikhathi sakho ekubeni ingxenye yalolucwaningo.

IMVUMO YOMUNTU OYINGXENYE YOCWANINGO/UMELI WAKHE

Ngizizwile izifundiso nomkhangiso ngokukhama ubisi emabeleni, ukulufudumeza ubisi, nokufunza ingane lolubisi ngesipuni njengendlela yokuvikela ukuthelela abantwana igcewane lesandulela ngculazi. Yonke imibuzo yami iphenduliwe kahle ngendlela engigculisayo. Ngiyavuma ukuba ingxenye yalolucwaningo.

_____

Igama lomuntu oyingxenye yocwaningo (libale libonakale)

_____	_____
Sayina	Usuku

_____

Igama lofakazayo (libale libonakale)

_____	_____
Sayina ufakazi	Usuku

ANNEXURE B. SAMPLE INTERVIEW

(1) Joey, B4, 09 June

Legend- M, Moderator, P- Participant, FH- Flash-heat

M-Good morning, I have already demonstrated the FH technique to you, now I will ask you questions about it with the tape recorder on. I would like to know if you understood the technique.

P- Yes I understand it.

M- Is there any part of the technique that you want me to repeat?

P- No, I understand it completely.

M- Okay, for me to ascertain that you understand it I will ask that you repeat what you understood.

P-Okay, What I understood is that breastfeeding for someone who is HIV positive is good, but if you use this method of flash, flash-heating it is better. This method is one of heat treating breast milk. You take breast milk and pour it into a (black cat) peanut butter or mayonnaise jar. Then you pre-heat water in a pot on a fire, then you put the jar with the breast milk into the water. When you heat the breast milk like this, it will kill all the germs, then you can feed the milk to your baby. That's what I understood.

M- Remember you boil the water in a pot, you do not pre-heat.

P- Okay

M- What are your feelings about using this method for feeding your baby? How do you feel about it?

P- I feel it is right to feed your baby using this method. I feel okay in that formula milk is very expensive and sometimes you go to the clinic and the nurse tells you that the formula is finished. That is a problem and the nurse tells you to come back in a few weeks. By that time, your baby is only feeding on formula. Isn't it that you should only feed your baby formula if you do so, or breast milk if you are breastfeeding? Breastfeeding is good because you are with the baby and the baby can feed any time. You do not have to leave your house to buy formula. All you have to do is eat vegetables and remain healthy so that you can feed your baby with no problems.

M- So, how do you feel about touching your milk while expressing? Some part of the milk might spill onto your hands or other parts of your body. Will this cause you to stop expressing or will you continue?

P- That depends on an individual. Some mothers may struggle to express and it may cause them to stop, but for me as long as you try to be clean and your nipples are not cracked and do not have sores and there is no blood, then you can express your breast milk. But if you see that there are sores in your breast or blood, then you must not feed your baby at all. I also do not have a problem with touching my milk. It is my milk.

M- I mean to touch your breast milk while expressing. Will touching your milk stress you at all?

P- No, I will not be stressed because it is not blood, but breast milk.

M-Okay, and how do you feel about expressing your breast milk into a glass bottle?

P- I feel okay about that. I don't have a problem expressing into a glass bottle.

M- Okay what about heating your breast milk in the boiled water?

P-I feel okay about heating my breast milk in the pot. It is the same as making a feed using formula, say S26. You also have to boil water to make the feed. It is the same method because you also boil water and wait for it to cool. Then after cooling you pour into a baby bottle to feed the baby with. With this FH method it is the same as you express your breast milk into something then you put that into a pot containing water to boil so that all the germs are killed, then you feed your baby once it has cooled.

M- So do you see yourself heat treating and cooling your breast milk?

P- I really do not have any problems with doing that.

M- Even if you heat treat your breast milk?

P- Heating breast milk is important because you kill all the germs that can get into the milk when you are expressing. The breast milk is very important and it is better than feeding your baby formula milk. The formula milk does not have everything that a baby needs to grow and breast milk does.

M- I understand that breast milk has everything a baby needs, but I am interested in understanding what you think the importance of heating your breast milk is.

P- That heating it kills the germs.

M- So, do you feel that you can spoon feed your baby this heat treated milk at home and away from home, like I explained to you in the demonstration?

P- I prefer to feed my baby with a baby bottle. A spoon is not bad also, as long as it is clean. I will sterilize the bottles and clean them from all the dirt. I will also use salt with the chemicals to sterilize the bottles so that my baby grows and is healthy.

M- What do you feel you will require to help you do this technique better at home?

P- What do you mean?

M- I mean what do you think will help you do this better at home? More information about this method or what?

P- Hm, I am satisfied with what you explained about the technique and do not need anything further because this is something we were exposed to you know. Our parents and grandparents used to breastfeed only before and as a result there were no diseases such as the ones we see today. These bottles we carry the formula in are what cause diseases. Babies were healthy back then. If they breastfed, they only fed on the milk and nothing else. Now, babies feed on germs as well.

M- What I would like to know specifically is more about the method. Is there anything that you would like to know more about it that will help you do it better at home?

P- I understand, I don’t think I need anything else.

M- How do you feel about dong the technique properly?

P- I can do it properly. It is not difficult. I will be able to do it at home. No problem.

M- Okay now I would like to know from you how many months would be comfortable expressing breast milk, heating, cooling and spoon feeding your baby?

P-I can feed my baby using the FH method for 6 months or even 1 year or 2.

M-Do you mean that you can feed for more than the 4 months that I talked about?

P-Hm.....Yes ....Yes, because it is healthy and my baby will not get sick. Isn’t it the nurses say that breastfeeding is best, but the problem is if you are positive (HIV positive) you think that maybe whatever is in your blood will pass into your breast milk and affect your baby. Like me, I was very scared. I did not want to take that risk.

M- Okay, so at what age do you think that your child needs supplements in his diet?

P- What are supplements?

M-Supplements are foods such as porridge, cereals.

P- Oh...6 months.

M- What about tea?

P- Also 6 months.

M- Why do you say 6 months?

P-I think as adults you know, we believe that there are many things that we need to give babies when they are born. We believe that their umbilical cords will not heal if we do not give them something to drink. We believe that their fontanels will not close if we do not put something on the head. But if you stick to breast milk only and you do not give your baby anything else to eat or drink, you will never run up and down to the clinic. After 6 months is when you can start feeding other foods.

M- So tell me, how do you prefer to carry the heat treated milk with you when you leave the house?

P- Eish...I think I will carry the milk in a baby bottle inside those things that they make to keep baby bottles warm. You know those things that look like flasks, but they are made from paper.

M-Okay, I see what you mean. Those big round plastic flasks to put the baby bottle inside?

P- Yes.

M-How do you feel personally about doing FH at home? Will you be embarrassed by it or not?

P- I will feel great about doing this technique. It's fine. I am fine with it. It is the best isn't it and no, this method will not embarrass me because I do what I think is right for me and my baby.

M-What would you do if people talk about culture and say that according to culture FH is wrong?

P-I will do what I think is right.

M- What or who would you say influences your infant feeding decisions.

P- What do you mean?

M- I mean who at home or at clinic said that you should feed your baby this way or that?

P- Oh...at the clinic...the nurses. When you attend the clinic you get information especially when you are pregnant...information on the pregnancy and any other health matters. You see if you are positive (HIV positive) you will need to get more information about your health because there can be sometimes when you have certain illnesses that you do not know of. If you have all the information, then you will be okay. Like me, when I got pregnant, I thought that I needed to go to the clinic to get information you see. So now I am covered...I was scared to breastfeed you know. I was not comfortable to breastfeed with my status (HIV positive). I did not prefer to breastfeed at all. All I want is for my baby to grow well.

M- So if you believe that the method is good for your baby, will you do it under any circumstance at home?

P- Yes what is important to me is that I take care of my baby properly and if it means doing something that people are not happy with...yes..I can do it. It does not matter what people say, because people will always talk.

M- So would you do this method even if other people talked?

P-Yes, I can do it.

M-Even if people at home do not support you with this method?

P-Yes, I can do it.

M- What are your feelings about this method and feeding other milk- formula?

P- It is cheaper. Formula is very expensive. You know if you go to the clinic sometimes, the nurses send you back saying there is no formula. Then you suffer/struggle because at the clinic they say not to give your baby water, no tea, no what-what, strictly milk for 6 months. So what do you do? I know that now that you are teaching us about this method, people will do it. Even if they hide it and say that they are not doing it, because things are tough. They may do it at home and go and tell people outside that they are breastfeeding or say something else.

M- Remind me, do you think FH is against your standards as a mother living in Tembisa?

P- No, no as I said before I do what is important to me and my baby. I wanted to get tested, then I found that I was positive (HIV) then I went for CD4 count. Then I found that my CD4 count was not very low. So I decided that I will not risk my baby getting HIV. So I went to the clinic to get information about HIV and about pregnancy. You see, I think it is better to know than not to know things especially about this disease. These people who walk around and talk about other people with HIV are not better off because they do not know about their status, whereas I know. I have information about HIV and I will live right. Those people who do not know cannot live right because they are clueless.

M- So what is your opinion about what other people say of those with HIV?

P-I really do not care about what other people say. What matters to me is what I do now that I am positive (HIV). If you think about it...a mother goes through a lot of pain to give birth to a baby, then it is only right that she does what she thinks is important for that baby. You need to take your HIV medication and live a healthy life. If you do not do that, you will die and leave your baby.

M- If you hear people talk about more about this technique and its benefits, will you want to do it for your baby more or what?

P- Yes, also If I see them doing it.

M- Regardless of what other people say?

P- I don’t care what other people say.

M- Right, in your opinion, does this method prevent HIV from affecting your baby?

P- Yes, you see people say that you cannot feed children water straight from the taps, that you need to boil the water first. This is the same. The milk is boiled to kill all the germs in it. It is the same with eating vegetables. They say that you should par-boil them to kill the germs, then it is safe to eat. The same with this method. Boiling kills HIV.

M- So tell me what feeding method did you chose for your baby?

P-I chose to formula feed.

M- I see.... So now that you have learnt about FH method will you change your mind about formula?

P-The problem is that I have already started feeding my baby formula. The nurse said that if you start feeding formula, I should continue and not change. Can you help me tell the sister that I want to breastfeed instead? When she (nurse) asked me if I wanted to formula feed, I was scared of giving HIV to my baby so I said yes. But now that I think about it, I will rather use this method. I don't think I will afford the formula. If I heard about Flash-heating yesterday, I would have chosen the method to feed my baby.

M- What else can you tell me about your baby and this FH method?

P- I am not employed and I have not saved money for this baby. This method will also save time because you will not have to travel to the clinic up and down for formula, just to be told it is finished. Whereas if you are breastfeeding, everything will do smoothly because you do not have to travel.

M-I see.. I know what you mean...

M-In all honesty do you feel that this method (milk only for 4 months) is enough for your baby to grow and to develop?

P- Yes it will be enough because we all grew up feeding on breast milk only and we did not many diseases.

M- Am I correct if I say that you are quite positive about using this FH technique?

P- Yes I like this method and would have used it if I learnt about it early.

M- Okay, is there anything about FH that you would like discuss, anything we did not already talk about?

P-No, this topic is very good and important. You see they say that you can go to the clinic if you have TB and it will be cured but you cannot go to the clinic and be cured of HIV. There is not cure. The only thing you can do is prevent it and this FH method helps us prevent our babies from getting HIV. This is very good research.

ANNEXURE C. APPROVAL FROM TEMBISA HOSPITAL TO CONDUCT RESEARCH

health and social development

DEPARTMENT OF HEALTH AND SOCIAL DEVELOPMENT
UMNYANGO WEZEMPILO NO KUTHUTHUKISWA KOMPHAKATHI
DEPARTEMENT VAN GESONDHEID EN MAATSKAPLIKE ONTWIKKELING

TEMBISA HOSPITAL

PRIVATE BAG X7
OLIFANTSFONTEIN
1665
TEL.: (011) 923-2318/FAX.: (011) 926-2719
E/Mail: Sandile.Mfenyana@gauteng.gov.za
DATE: 2011/01/31

To: Mrs Armelin Chaponda

From: Dr S.B. Mfenyana - Chief Executive Officer

Date: 2011/01/31

Subject: PERMISSION TO CONDUCT RESEARCH AT TEMBISA HOSPITAL

This is to confirm that your request to conduct research project at Tembisa Hospital has been granted.

Regards

Dr S.B. Mfenyana
CHIEF EXECUTIVE OFFICER

ANNEXURE D. ETHICS APPROVAL FROM UNISA

UNISA university of south africa

UNIVERSITY OF SOUTH AFRICA
Health Studies Research & Ethics Committee
(HSREC)
College of Human Sciences

CLEARANCE CERTIFICATE

Date of meeting: **17 May 2010** Project No: **47191058**

Project Title: Supplementary infant feeding methods as a strategy to prevent mother to child transmission of HIV

Researcher**: AS Chaponda**

Supervisor/Promoter**: Prof LI Zungu**

Joint Supervisor/Joint Promoter**:**

Department: **Health Studies**

Degree: **D Litt et Phil**

DECISION OF COMMITTEE

Approved [√] **Conditionally Approved** [ ]

Date: 17 May 2010

Prof ON Makhubela-Nkondo
RESEARCH COORDINATOR: DEPARTMENT OF HEALTH STUDIES

Prof MC Bezuidenhout
ACADEMIC CHAIRPERSON: DEPARTMENT OF HEALTH STUDIES

PLEASE QUOTE THE PROJECT NUMBER IN ALL ENQUIRES

University of South Africa
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ANNEXURE E. RESEARCH QUESTIONNAIRE

This questionnaire is aimed at finding out whether HIV positive mothers are happy and comfortable expressing breast milk in their homes or elsewhere to prevent their baby's from getting HIV. We would like to know if they are comfortable heating the milk for a short period of time over a prima or normal stove in a glass bottle and pot, cooling it outside a fridge and feeding their baby's with a spoon. The baby should **only** be fed on the heated breast milk for **4 months.**

This questionnaire is anonymous and no one will make contact with you after you complete this. However, if there is anything about the questionnaire that you want to discuss personally, please leave your contact details and one of the researches will get back to you. Thank you.

Participant Number: _____

Date: _____ Compiled by: _____

Part A: DEMOGRAPHICS

1. Address: ***Do not give full address***	**2. Age:** ☐ 18-20 ☐ More than 20 ☐ Less than 25 ☐ More than 25 ☐ Less than 30 ☐ More than 30 ☐ Less than 35 ☐ More than 35 ☐ Less than 40 ☐ 41-45
3. Marital status:	☐ Single ☐ Married ☐ Separated ☐ Divorced ☐ Husband died
4. Highest std passed:	☐ lower than std 6 ☐ 6 ☐ 8 ☐ 10 ☐ College ☐ higher
5. Race:	☐ Black ☐ White ☐ Indian ☐ Coloured ☐ Other
6. Ethnic group:	☐ Ndebele ☐ Pedi ☐ Sesotho ☐ Tsonga ☐ Venda ☐ Tswana ☐ English ☐ Zulu ☐ Afrikaans ☐ Xhosa ☐ Indian ☐ Other
7. Do you work?	☐ Yes ***if yes answer no. 9*** ☐ No
8. Do you live?	Alone: ☐ Yes Other: ☐ Yes With relatives: ☐ Yes With husband: ☐ Yes With boyfriend: ☐ Yes
9. What kind of work do you do?	☐ Work in office ☐ Domestic worker ☐ Work on a farm ☐ Self employed ☐ Other
10. Do you receive a grant?	☐ **Yes** ***if yes answer no.11*** ☐ **No**
11. What type of grant do you receive?	☐ Disability ☐ Foster care ☐ Child support ☐ Government pension ☐ Other
12. Do you have running water in your house?	☐ Yes ☐ No
13. Do you have electricity in your house	☐ Yes ☐ No ***if no answer no. 14***
14. What do you use for heating?	☐ coal stove ☐ prima stove ☐ outside fire ☐ Other
15. How many live children do you have including this one	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ More than 4

Part B: YOUR NEW BABY

16. Is your baby:	☐ a boy	☐ a girl		**17. Born by:** ☐ Cesarean (emergency)	☐ Normal ☐ Normal with tear
18. How much does your baby weigh?	☐ less than 2.5 Kgs	☐ 3 kgs	☐ more than 3 kgs	☐ Not sure	
19. Was this baby planned	☐ Yes	☐ No			
20. How many days are you in hospital?	☐ 1	☐ 2	☐ 3	☐ 4	**21. How many months were you pregnant?** ☐ 7-8 ☐ 8-9 ☐ not sure
22. Is your baby generally healthy?	☐ Yes	☐ No			
23. Do you wish to breastfeed this baby?	☐ Yes ☐ No *if no answer no.24*				
24. Why do you not want to breastfeed? ANSWER ALL THAT APPLY	☐ Worried about Painful breasts ☐ My family does not want me to breastfeed ☐ Work ☐ Not enough milk ☐ Twins ☐ HIV positive ☐ Worried I will infect my baby ☐ Wanted to try formula feeding ☐ It looks difficult ☐ Got formula from clinic (*if answered, please continue and answer no.25 & 26 also)*				
25. Who offered you the formula?	☐ **Nurse** ☐ **Doctor** ☐ **Counselor** ☐ **Other**				
26. Why was formula given to you? ANSWER ALL THAT APPLY	☐ Baby too small ☐ Baby could not suck well on the breast ☐ HIV positive ☐ Worried I will infect my baby ☐ I asked for it ☐ Baby has mouth deformity ☐ Baby has feeding difficulty ☐ I do not have enough milk ☐ Baby has mouth sores ☐ Baby has oral thrush ☐ Baby has fever ☐ Baby has jaundice (is yellow)				
Revert to question no. 15- For those with more than one baby , continue to answer the following question also					
27. Did you breastfeed your other baby (s)?	☐ Yes	☐ No	***if no answer no.28 also***		
28. What or who made you not to breastfeed: ANSWER ALL THAT APPLY	☐ My family ☐ My boyfriend ☐ My husband ☐ My mother in law ☐ Painful breasts ☐ Work ☐ Not enough milk ☐ HIV positive ☐ Got formula from clinic ☐ Was not sure what to do ☐ Wanted to try formula feeding ☐ Did not like to breastfeed ☐ Twins				

Part C: YOUR GENERAL HEALTH

29. Do you smoke?	☐ Yes *if yes answer questions below* ☐ No ☐ less than 1 packet a day ☐ more than 1 packet a day	**30. Do you drink alcohol regularly?**	☐ Yes *if yes answer questions below* ☐ No ☐ **Less than 3 cans/bottles a week** ☐ **more than 5 cans/bottles a week**
31. Are you coughing for more than 2 weeks:	☐ Yes ☐ No	**32. Are you losing weight?**	☐ Yes ☐ No
33. Do you have night sweats?	☐ Yes ☐ No	**34. Do you know your HIV status?**	☐ Yes *if yes answer no. 35* ☐ No

35. Are you HIV positive: ☐ **Yes** *if positive answer no.36 also* ☐ **No**

36. Have you disclosed your status to anyone yet?
☐ **Yes** *If yes answer no.37 also* ☐ **No**

37. Did you disclose to:	☐ Your husband ☐ Your boyfriend ☐ A friend ☐ Family member ☐ Someone at church ☐ A counselor ☐ Other
38. Has partner tested for HIV?	☐ Yes ☐ No ☐ Not sure
38. Would you still breastfeed even if you are HIV positive?	☐ Yes ☐ No ☐ Not sure
39. Would you try anything to prevent your baby from getting infected with HIV?	☐ Yes ☐ No ☐ Not sure

40. Are you on any medication right now?	☐ Yes *if yes answer no.41 also* ☐ No	**41. Is the medication for?** High blood pressure ☐ Diabetes ☐ HIV ☐ Other ☐ **ANSWER ALL THAT APPLY**	
42. Do you have a medical condition that may prevent you from breastfeeding?	☐ Yes ☐ No	**43. Are you generally healthy?**	☐ Yes ☐ No

44. Were you using contraception before you got pregnant? ☐ Yes ☐ No

Part D: THE PRESENTATION

45. Did you understand the presentation?	☐ Yes ☐ No	**46. Do you think that you can express breast milk with your hand into a glass bottle at home?**	☐ Yes ☐ No *if no answer no.47 also*
47. Why do you think that you can NOT express at home? **ANSWER ALL THAT APPLY**	☐ It looks painful ☐ It will take too much time ☐ People might ask what is wrong with me ☐ I don't think that I can do it ☐ I don't want to dirty the milk ☐ My family will not like that ☐ I worry that I might touch the milk ☐ I will not feel comfortable doing that ☐ I will have to throw the milk away if I touch it ☐ I don't see anyone expressing milk ☐ It looks difficult ☐ There is no benefit in expressing milk		
48. Do you think that you can heat breast milk at home?	☐ Yes ☐ No *if no answer no.49 also*		
49. I will not heat breast milk because: **ANSWER ALL THAT APPLY**	☐ I worry what people will say ☐ No one has ever done that ☐ I don't want to dirty the milk ☐ I do not want to 'kill' the milk ☐ I will not feel good about that ☐ I do not want to feed my baby heated milk ☐ I do not see the benefit of heating the milk ☐ I will not feel comfortable doing that ☐ My baby will not grow ☐ I might not do it properly ☐ I don't think that I can do it ☐ It is not necessary to heat the milk to kill HIV ☐ It looks difficult		
50. Do you think that you can carry the heated milk with you in a glass bottle when you leave your house?	☐ Yes ☐ No *if no answer no. 51 also*		
51. Why do you NOT think that you can carry the heated milk with you in a glass bottle when you leave your house? **ANSWER ALL THAT APPLY**	☐ The bottle might break ☐ The milk might get sour ☐ I worry that I might touch the milk ☐ I will have to throw the milk away if I touch it ☐ I will not feel comfortable doing that ☐ It would not look good if I carry the milk in a glass bottle ☐ I worry what the people in my community will say about this ☐ I might spill some of the milk ☐ I don't think that I can do it ☐ I don't see anyone do that ☐ It looks difficult		
52. Do you think that you can feed your baby the breast milk with a spoon away from home?	☐ Yes ☐ No *if no answer no. 53 also*		
53. Why do you NOT think that you can feed your baby with a spoon away from home? **ANSWER ALL THAT APPLY**	☐ It will take too much time ☐ I might spill the milk ☐ It will not look right ☐ My family will not like that ☐ I will have to throw the milk away if I touch it ☐ I worry what the people will say about this ☐ I don't see anyone do that ☐ I will not feel comfortable doing that ☐ My baby will not grow ☐ It looks difficult ☐ I don't think that I can do it		
54. Do you think that you can express breast milk for 4 months?	☐ Yes ☐ No *if no answer no. 56 also*	**55. Do you think that you can easily heat the milk like in the presentation?**	☐ Yes ☐ No
56. I cannot express breast milk for 4 months because: **ANSWER ALL THAT APPLY**	☐ My nipples will hurt ☐ Will take too much time ☐ Is too much work ☐ I worry what people will say ☐ My baby will not get enough milk ☐ I don't think that I can do it ☐ I will not feel comfortable doing that ☐ My baby will not grow well ☐ I will not be able to feed my baby away from home ☐ Expressing milk for 4 months is too long ☐ It looks difficult ☐ I don't see anyone doing that so I am afraid		

57. Do you think that you can comfortably cool the milk after heating?	☐ Yes ☐ No *if no answer no. 58 also*
58. I am not happy with cooling the milk after heating because: **ANSWER ALL THAT APPLY**	☐ I worry that the milk will get dirty while cooling ☐ It will get sour ☐ I might spill the milk ☐ I worry what people will say when they see me cooling the milk ☐ I don't think that I can do it ☐ My family will not like that ☐ I will not be able to feed my baby away from home ☐ It will get mixed up with other milk in the house ☐ I am not comfortable doing that ☐ I do not have a fridge ☐ Boiling the milk is not necessary ☐ I don't see anyone doing that ☐ It looks difficult
59. Do you think that you can comfortably feed your baby the cooled milk with a spoon at home?	☐ Yes ☐ No *if no answer no. 61 also*
60. Do you think that you can feed your baby the treated milk with a spoon FOR 4 MONTHS?	☐ Yes ☐ No
61. I am not comfortable feeding my baby with a spoon at home because: **ANSWER ALL THAT APPLY**	☐ It will take a long time to feed ☐ I am afraid that I will spill the milk ☐ I don't think that I can do it ☐ I don't see anyone doing that ☐ My baby will not get enough milk ☐ I worry about what people will say when they see me feeding my baby with a spoon ☐ It looks difficult ☐ My baby will not grow ☐ My baby might not like the taste of the milk ☐ I will not be able to feed my baby away from home ☐ I am afraid that I will not feel comfortable doing that ☐ It is not important to feed my baby with a spoon
62. Do you think that you can comfortably feed your baby the heated milk ONLY for 4 months?	☐ Yes ☐ No *if no answer no. 63 also*
63. I am not happy feeding my baby breast milk ONLY for 4 months because: **ANSWER ALL THAT APPLY**	☐ My baby will need more than breast milk to grow during the 4 months ☐ My family will not like that ☐ I will not feel comfortable feeding my baby only breast milk for 4 months ☐ I will have to feed my baby something other than milk ☐ I don't think I can do that for 4 months ☐ I will feel bad for my baby if I do that ☐ I don't see anyone doing that ☐ It looks difficult ☐ It will not be sufficient for my baby to grow

64. What do you LIKE about this feeding method?_____

65. What do you NOT LIKE about this feeding method?

68. PMTCT OF HIV? ☐ **Yes** ☐ **No** ☐ **Not sure**

69. Prefer to use baby bottle pls state why ?_____

70. Believe can do FH under diff circumstances? _____

71. Believe have all the skills to FH? _____

72. Will anyone prevent you from FH at home? _____

ANNEXURE F. 10 STEPS TO SUCCESSFUL BREASTFEEDING

Every facility providing maternity services and care for newborn infants should:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.

2. Train all health care staff in skills necessary to implement this policy.

3. Inform all pregnant women about the benefits and management of breastfeeding.

4. Help mothers initiate breastfeeding within half an hour of birth.

5. Show mothers how-to breastfeed, and how-to maintain lactation even if they should be separated from their infants.

6. Give new-born infants no other food or drink other than breastmilk, unless medically indicated.

7. Practice “rooming-in” to allow mothers and infants to remain together 24 hours a day.

8. Encourage breastfeeding on demand.

9. Give no artificial teats or pacifiers (dummies or soothers) to breastfeeding infants.

10. Foster the establishment of breastfeeding support groups and refer mothers to them upon discharge from the hospital or clinic (WHO 2009:1).

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