ASSOCIATIONS BETWEEN KNOWLEDGE OF BREASTFEEDING WITH CULTURAL FACTORS AND MATERNAL CHARACTERISTICS PF PREGNANT WOMEN ATTENDING THE ANTE-NATAL CLINIC AT MUCCP

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DECLARATION

I declare that the dissertation hereby submitted by me for the Magister degree at the University of the Free State is my own independent work and has not previously been submitted by me to another university/faculty. I further cede copyright of this research report in favour of the University of the Free State.

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SUMMARY

The main aim of this study was to determine the associations between knowledge of breastfeeding with cultural factors and maternal characteristics of pregnant women attending the ante-natal clinic at the Mangaung University Community Partnership Programme (MUCPP). A sample of 646 pregnant women with a gestational age of between 28 and 32 weeks and who attended the ante-natal clinic at MUCPP was randomly selected for the study.

The socio-demographic composition of the subjects was determined by means of a standardized questionnaire, which included identifiable details of each subject, the family composition, household and economics. Anthropometric measurements obtained from each respondent included weight and height. Knowledge about breastfeeding and breastfeeding practices as well as cultural factors that would influence the mother to breastfeed was obtained by means of standardized questionnaire.

The majority of the participants' home language was Sotho (55.73%), while Tswana was spoken by 23.99%. The majority of respondents were unmarried (63.16%). Although Grade 10 was the average level of education achieved by the respondents, and 75.54% of respondents were unemployed. In most households only 1 person contributed to the household's monthly income, with 44.58% of households receiving between R501 to R1000 per month, and only 1% of households earned more than R5000 per month. In 45.67% of households the parent was the head of the household, and 87.77% of respondents lived in a brick house.

Ninety percent of women had a BMI of 25kg/m^2 or more, indicating that they were overweight. Only 8.68% of respondents had a BMI in the normal range of 20--<25kg/m^2 and very few women (only 8) were underweight.

The majority of respondents (97.98%) were planning to breastfeed their child, while only 1.40% did not want to breastfeed (table 4.2). Of this 1.40%, a maximum of 33.33% mentioned that their reason for not planning to breastfeed was illness. Almost 46% of respondents had received breastfeeding education before the interview, and 54.74% of these received it from the local clinic sister.

The majority of pregnant women (83.90%) reported that breastfeeding could not prevent them from falling pregnant again. Most of the mothers (92.72%) believed that they could go back to work when they are breastfeeding. Most mothers did not think that breastfeeding should continue when the baby has diarrhea (53.80%), and most believed that they should stop breastfeeding if they fall pregnant again (58.29%). Most women believed that one could not reintroduce breastfeeding after ceasing it for a while (79.69%).

The majority of the mothers also believed that the size of their breasts determined the efficacy of their breastfeeding practices (67.03%). Most respondents (64.40%) believed that breastfeeding has advantages, and only 3.26% of respondents believed that breastfeeding has disadvantages. Most of the mothers (90.25%) did not believe they should continue to breastfeed when they have mastitis, but 81.89% reported that one should continue breastfeeding when engorgement is present. A large percentage (59.29%) believed that the mother will need special types of food to ensure that she breastfeeds successfully.

Almost all respondents (99.84%) knew that breast milk is the best food for a newborn baby. The average age, however, at which respondents planned to give their babies water in combination with breast milk was 4 months (n=370). Most (67.34%) of the respondents also reported that they would add extra food to the diet of the breastfed baby before the recommended age of 6 months. Almost three quarters (72.91%) of mothers reported that a mother should breastfeed her baby even if she is HIV infected, while 15.33% believed that the HIV infected mother should not breastfeed her baby. Of these, 25.56% said that the main reason a

Human Immunodeficiency Virus (HIV) positive mother should not breastfeed is that the baby will be infected with HIV.

When associations between variables were determined. Significantly more overweight women had received breastfeeding education (49.80%) compared to normal and underweight women. Overweight women were also more likely to know that breastfeeding has numerous advantages (67.61%) compared to women with a BMI <25kg/m^2 (53.64%).

Normal and underweight women were significantly more likely to think that breastfed babies need water (66.89%) compared to overweight women (54.66%). More overweight women (76.16%) thought that one should add additional food to the babies' diet before six months of age, compared to the 64.78% of normal and underweight women. Most normal weight and underweight women (96.36%) also believed that expressed breast milk should not be given to their babies, compared to 92% of overweight women.

Significantly more married mothers had received breastfeeding education before (59.53%), compared to single mothers (38.84%). Married mothers were also more likely to know that there were advantages to breastfeeding. However, more single mothers knew that the baby will need other food including breast milk after 6 months of age.

The results of the study confirm that women need accurate information, encouragement, and support to enable them to practice optimal breastfeeding. This includes timely initiation of breastfeeding; exclusive breastfeeding for six months; introduction of adequate, safe, and appropriate complementary foods from six months; and continued breastfeeding up to two years of beyond.

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LIST OF ABBREVIATIONS

WHO	Word Health Organization
UNICEF	
BFHI	Baby Friendly Hospital Initiative
MUCPP	Mangaung University Community Partnership Programme
EBF	Exclusive breastfeeding
PMTCT	Prevention of Mother-to-Child Transmission
HAART	highly active anti-retroviral therapy
NVP	nevirapine
ZDV	zidovudine
3TC	lamivudine
WABA	Alliance for Breastfeeding Action
IBFAN	International Baby Food Action Network
BMI	Body Mass Index
kg/m^2	kilogram/meter square
<	less than
>	greater than
≥	equal to or greater than
≤	equal to or less than

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CHAPTER 1

1.1 Introduction and motivation for the study

The importance of breastfeeding has been boldly stated in both WHO and UNICEF policies, where breastfeeding is considered to be one of the four priorities to reduce infant mortality and morbidity. These four priorities are represented by the acronym *GOBI,* where G stands for growth monitoring, O for oral rehydration, B for breastfeeding and I for immunization (Sobti et al., 2002). The WHO recommends exclusive breastfeeding for at least the first 6 months of an infant's life, and continued breastfeeding with adequate complementary food for up to two years of age or more. Yet many infants stop breastfeeding in the first few weeks or months and, as a result, are at increased risk of illness, malnutrition and death. Breastfeeding can however be re-established (Sobti et al., 2002).

Despite the positive association between breastfeeding and infant health, beliefs and/or misperceptions about breastfeeding that are not valid and can even be harmful to mother and baby, still exist (Nefreit, 2001). Such misperceptions may play a significant role in the decline in the overall health and well-being of the community. It is these beliefs and misperceptions that are to blame for the drastic decline in breastfeeding practices throughout the world (Arora et al., 2000). There are, however, practical measures being taken to reverse this decline, in the form of the *Baby Friendly Hospital Initiative (BFHI)* which is currently being implemented in hospitals and community health-care centers throughout South Africa.

It is well known that breastfeeding practices and beliefs vary according to ethnicity, level of education attained, socio-economic status and maternal age of the mother (Nefreit, 2001). Previous studies done by Mayoney and James (2000) also show that low rates of breastfeeding are observed among young and undereducated mothers in America. In South Africa, a recent study has shown that cultural factors

are the primary factor influencing the breastfeeding practices of women (Myburgh, 2003).

The art of breastfeeding is a blend of social, cultural, and biological behavior. In the global and historical spectrum of breastfeeding practices, many variations work well for the nursing pair. However, breastfeeding problems are often rooted in cultural beliefs and social practices that do not match the biologically based needs of the mother and child. When new breastfeeding information challenges the mother's cultural and social beliefs, she may mistrust it and have difficulty acting on it (Myburgh, 2003).

1.2 Problem statement

The pregnant mothers' knowledge about breastfeeding and the advantages of breastfeeding and breastfeeding practices, as well as her cultural beliefs may influence her choice to breastfeed or not to breastfeed. The associations between her maternal characteristics, knowledge about breastfeeding and cultural beliefs will also play a role in the mother's choice to breastfeed.

According to Nefreit (2001) and Lawrence and Lawrence (1999), malnutrition is most often related to the fact that exclusive breastfeeding is not maintained for the first six months. Approximately 56% of infants in these two studies received some form of supplementary food by the first month. As a result, almost 30% of the infants experienced a chronic food shortage and became stunted.

It is thus evident that sufficient knowledge about the advantages of breastfeeding (especially during the baby's first few months) a very important factor is when it comes to pre-natal care.

Sibeko et al. (2005) performed a study with the aim of documenting the breastfeeding practices, beliefs, and attitudes of periurban South African lactating

mothers with infants younger than 6 months. Results showed that none of the mothers in the study (n=115, mean age of 26+/- 6.3 years) reported exclusively breastfeeding their infants for this period, with a combination of breastfeeding together with other feeds being given in 78% of cases. According to these researchers complementary foods were fed to 32% of infants by their first month of life. Babies who have not been exclusively breastfed will be more likely to develop food allergies later in life, and will also be prone to diarrhea, vomiting, eczema, gastrointestinal infections and respiratory infections (Babapurmath et al., 1993). Immunoglobulins, specifically IgA, binds to foreign proteins, and prevents them from entering the bloodstream. IgA can only be produced by 6 to 9 months of age and thus babies who are not exclusively breastfed cannot receive these immunoglobulins through breastmilk.

The fact that the knowledge, cultural factors and characteristics of the mother about breastfeeding practices have not been sufficiently studied among urban, low-income communities in South-Africa, motivated this study. In order to develop relevant breastfeeding intervention programmes, it is essential to determine how culture and the beliefs of society have shaped mother's knowledge, attitudes and practices towards breastfeeding.

1.3 Aim and objectives

The main- and sub-objectives of the research study were as follows.

1.3.1 Aim

The main aim of the study was to determine knowledge about breastfeeding and its association with cultural factors and characteristics of the pregnant women attending the ante-natal clinic at ***M****angaung* ***U****niversity* ***C****ommunity* ***P****artnership* ***P****rogramme* (MUCPP).

1.3.2 Objectives

To achieve the aim, the following objectives were set:

- To describe the personal characteristics of the pregnant women included in the sample,
- To identify the anthropometric status of the pregnant women included in the sample,
- To identify the knowledge of the pregnant women about breastfeeding,
- To determine the associations between knowledge of breastfeeding and characteristics of the pregnant women, and
- To determine the associations between cultural factors and characteristics of the pregnant women.

1.4 Outline of the dissertation

Chapter 1 - Introduction and motivation for the study
Chapter 2 - Literature Review
Chapter 3 - Results
Chapter 4 - Discussion of results
Chapter 5 - Conclusions and Recommendations

CHAPTER 2

Breastfeeding: A Social, Cultural, and Biological Behavior

2.1 Introduction

In countries all over the world women adapt their feeding practices to their own circumstances and the environment they live in. Women adapt to their infant's needs, and infants adapt to their mothers' availability. In every culture, there are circumstances where a mother cannot breastfeed, and also, mothers who choose not to breastfeed for multiple reasons (Blum, 1999).

2.2 Breastfeeding: A Social Behavior

Although breastfeeding is a natural act, many mothers have found it to be anything but instinctive (Yusof et al., 1995; Heining & Farley, 2001). Breastfeeding is a social behavior: mothers learn – or fail to learn – how to breastfeed from those around them.

When women become mothers in societies in which breastfeeding is the norm, they have societal support and approval, as well as ample models and reliable advisors in their own families. However, the mothers, aunts, and sisters of women bearing children to societies where breastfeeding is not the norm will have little or no support (Almedon, 1991).

Harrison et al. (1993) as well as Heining and Farley (2001), have stated that when breastfeeding knowledge has been lost in individual families and entire societies, the techniques that are appropriate for formula feeding – such as scheduled, infrequent, time-limited, and measured feedings – are applied to breastfeeding. Although these techniques are compatible with the dominant cultural beliefs of

Western societies (Jarosz, 1993), they are not always compatible with breastfeeding.

2.3 Breastfeeding: A Cultural Behaviour

According to Davies-Adetaghs (1992) breastfeeding meets the criteria of a cultural construct. The diverse approaches to breastfeeding found between and within societies are largely based on cultural rather than individual differences. A mother is socialized to breastfeed or not to breastfeed (Yusof et al., 1995). Breastfeeding knowledge, when it exists, is passed down from mother to daughter in the form of consistent patterns of practices and concepts. Cosminsky et al., (1993) has also stated that childhood experiences regarding feeding and nutrition of infants are internalized through observation, modeling, and play (e.g., feeding dolls with bottles or breastfeeding them).

The need to change the approach to breastfeeding, or to avoid, or solve breastfeeding difficulties can result in confusion, as mothers struggle to reconcile new behaviors with old beliefs (e.g., nursing a baby on cue conflicts with the bottle-feeding-culture of scheduled feeding) (Yusof et al., 1995).

According to Dettwyler (1992) and Davies-Adetaghs (1997) breastfeeding patterns vary with geographic region, language, and era. Breastfeeding beliefs and behaviors can be organized around themes of cultural dimensions. Though biology imposes constraints on successful approaches to breastfeeding, breastfeeding attitudes and techniques vary between cultures.

2.3.1 Definition of Culture

Culture is a very complex concept. Davies-Adetaghs (1997) has stated that it is commonly thought of as ethnicity, race, or nationality. However, even among people of similar ethnicity, race or nationality, life experiences differ with gender, age, place of residence, social affiliations, language, education, religion, and socioeconomic status. Because of these variations, culture can be thought of as having multiple dimensions that reflect their “worldview”, which includes shared attitudes, beliefs, categorizations, expectations, norms, roles, self-definitions, and values.

The concept of “worldview” provides a framework for understanding culture and its impact on the thoughts, emotions, and behaviors of people. A person perceives the world and constructs their own experience of reality according to their worldview. In turn, a socioculture context is created, passing down beliefs and customs to children (Odebiyi, 1989).

According to Davies-Adetaghs (1997) culturally based components of worldview involve the following:

- Socialization
- intergenerational transmission of ideas
- internalization of values based on childhood experiences
- consistent patterns of practices and concepts
- patterns that are maintained even when maladaptive, and
- feelings of confusion or helplessness are changed.

These factors can be identified among people who share a geographic location, language, and historic period, are organized around a theme, and vary less within the culture than they do between cultures. Breastfeeding beliefs and behaviors are also affected by these factors (Heining & Farley, 2001).

2.3.2 Cultural influences on breastfeeding

Culture and traditional beliefs may influence the following:

2.3.2.1 Initiation of breastfeeding

As mentioned before, initiation and continuation of breastfeeding is influenced by a complex interplay of culture, social support, and socioeconomic status (Woolridge, 1996). In most countries, where breastfeeding is widely practiced, a mother normally begins to breastfeed right after birth. Until recently, this was discouraged in Western hospitals by separating mothers from their newborns soon after birth for long periods. This practice had a very negative effect on successful breastfeeding as the infant's sucking reflex is strongest within the first 30 minutes after birth (Wilde et al., 1995). It is instinctively and biologically triggered and if interrupted during the critical 30 minute period, the whole process of breastfeeding and its associated attachment benefits can be disrupted (Nefreit, 2001).

For many cultural groups in Canada, breastfeeding is widely practiced in their countries of origin, but when they come to Canada, they often change from breastfeeding to bottle-feeding. The perception of immigrant and refugee women is largely that formula feeding is the dominant and preferred form of infant feeding in Canada (Burk et al., 1995). Even for those who want to continue breastfeeding, many find it difficult with the lack of family support, the lack of support for breastfeeding in the workplace, and the lack of acceptance of breastfeeding in public. There are, however, immigrant and refugee women who feel so strongly about the benefits of breastfeeding that they insist on it and find ways to incorporate it into their lives despite the lack of support in the workplace and in society as a whole.

2.3.2.2 Frequency of breastfeeding

Long intervals between timed feedings, a lack of night feeding, and supplementation of mother's milk with other species' milk or artificial milk, is a recent pattern practiced primarily in the West (La Leche League International, 1998). In many non-Western countries, mothers feed on cue (in short intervals all day and night), and do not supplement their milk with any other type of milk (Seema et al., 1997). This difference is based on different beliefs regarding a child's needs.

According to Seema et al. (1997), it is generally believed that children in the West need to learn to be independent almost from the time of birth. In non-Western countries it is generally believed that children are naturally dependent in their early years and that children need responsive relationships with family members.

2.3.2.3 Duration and termination of breastfeeding

Cross-cultural data shows that it is only in the West that infants are weaned before one year of age. For 99 percent of human history, breast milk was the primary food until two years of age(Blum, 1999). This difference between Western and non-Western countries is also based on the difference in belief regarding infants' need to learn independence versus their need for responsive relationships.

In all cultures, weaning involves the introduction of solid food, and the gradual or abrupt cessation of breastfeeding. The timing of weaning is influenced by cultural factors. Most non-Western cultures believe that children need to be breastfed until they are at least one year old. Weaning before this time is usually based on other factors, such as a cultural taboo against nursing during pregnancy (Blum, 1999). In the West, early weaning is encouraged because it is seen as a sign of infant development. It is often culturally unacceptable for a walking toddler to be

breastfed. Early weaning also enables a woman to return to work earlier in an environment where there is limited support for breastfeeding in the workplace.

2.3.2.4 Acceptability of breastfeeding in public

In North America and Western Europe, breastfeeding in public is not generally accepted. Even if women are determined to breastfeed, they are often uncomfortable to do so in public (Blum, 1999). However, in many other countries, it is very natural to breastfeed in public and women are very comfortable doing so. Some cultures may have a taboo against women breastfeeding in the company of men.

2.3.2.5 Family and community support for breastfeeding

Many cultures (Africa, South Asia, Latin America) have a 30-40 day postpartum rest period for new mothers, where family (immediate and extended) as well as community members step in to help the mother with other household tasks so that she can focus on feeding and caring for the new baby (Dettwyler, 1992). This practice can do much to contribute to successful breastfeeding.

In North America, and Europe, many people believe that children can be spoiled by being carried too much (Fok, 1996). In many countries outside of North America, mothers and other family members carry children in some form of sling for much of the day. This enables mothers to respond quickly to a child's cues that s/he needs to be fed.

In some countries women's clothing is often not very conducive to breastfeeding (Woolridge, 1996). This is the case in many Western countries. However, in many countries mothers are culturally dressed in very loose fitting clothes that are easily adjusted to allow breastfeeding to take place.

In many countries children sleep with their parents, in the same bed, or at least in the same room (La Leche League International, 1998). This enables mothers to breastfeed numerous times during the night, in response to her child's cues.

2.4 Breastfeeding: A Biological Behavior

Breastfeeding is a biological process that includes the physiological and psychological bonding of mother and child after birth (Fok, 1996).

2.4.1 Anatomy of the breast

The breast consists partly of gland tissue and partly of supporting tissue and fat (Wilde et al., 1995). The gland tissue produces the milk, which then moves along small tubes/ducts towards the nipple. Before they reach the nipple, the ducts become wider and form lactiferous sinuses in which milk collects. About 10-20 fine ducts lead from the lactiferous sinuses to the outside of breast, through the tip of the nipple. The nipple contains sensory nerves which are important for the reflexes which help with milk flow.

Around the nipple there is a circle of dark skin called the *areola*. On the areola there are small glands, the Montgomery Glands, which produce an oily fluid which keeps the skin of the nipple in good condition. Beneath the areola are the lactiferous sinuses.

2.4.2 Milk producing hormones and reflexes

Milk is produced as a result of the action of hormones and reflexes (Dalsy & Hartmann, 1995). During pregnancy, hormone changes prepare the gland tissue to produce milk. More gland tissue develops and the breasts become larger. Immediately after delivery, hormone changes result in milk production. When the

baby begins to suckle, 2 reflexes will ensure correct milk flow, and production. These include prolactin and oxytocin (Daisy & Hartmann, 1995).

2.4.2.1 Prolactin

The pituitary gland at the base of the brain produces a hormone called prolactin. Prolactin causes the cells in the breast to produce milk. Every time the baby suckles at the breast he/she stimulates the nerve endings at the nipple. These nerves carry messages to the anterior part of the pituitary gland, which produces prolactin. The prolactin is then carried through the blood to the breasts, and causes milk secretion. Prolactin is secreted after each suckle, and produces milk for the next feed (Lawrence and Lawrence, 1999).

2.4.2.2 Oxytocin

Milk is ejected by a small muscle cells around the breast glands which contract and increase the pressure on the milk inside the ducts (Lawrence & Lawrence, 1999, p. 922). The pressure then causes the milk to flow along the ducts to the lactiferous sinuses and out through nipple. The hormone oxytocin causes this muscle contraction.

According to Lawrence and Lawrence (1999) and Minchin (1998) oxytocin is also produced when the baby suckles and stimulates the sensory nerves in the nipple. Oxytocin is secreted by the posterior part of the pituitary gland and goes through the blood to the breasts. Oxytocin works while the baby is suckling and causes milk flow for the current feed.

2.4.3 Composition of breast milk

Breast milk does not always have exactly the same composition (Lawrence & Lawrence, 1999, p. 65). There are some important normal variations. Breast milk also varies slightly with the woman's diet, but it seldom has a significant impact.

2.4.3.1 Colostrum

For the first few days after delivery, the breasts secrete colostrum. This is yellow and thicker than mature milk and it is secreted in small amounts (Gunnlaugsson & Einarsdottir, 1993).

According to Hurst et al. (1997), colostrum contains more antibodies and more white blood cells than mature milk. It gives a baby its first "immunization" against bacteria and viruses. It is also rich in growth factors which stimulate a baby's immature intestine to develop. The growth factors prepare the baby's intestine to absorb and digest breastmilk, and prevents the absorption of undigested protein. Colostrum also acts as a laxative and aids in the passage of meconium (the first, very dark stool) which prevents the occurrence of *jaundice.*

In some cultures\communities it is the custom not to let the baby have colostrum (Frye, 1991). Health workers should discuss the importance of colostrum, and encourage mothers to give colostrum to their babies.

2.4.3.2 Mature milk

During the next 1-2 weeks, the milk increases in quantity and changes in appearance and composition (Lawrence & Lawrence, 1999, p. 66). Mature breast milk looks thinner and more watery than coloctrum, and is also whiter in colour. It contains all the necessary nutrients needed for optimal weight gain and growth.

The composition of breast milk also changes during each feed (Blum, 1999). *Foremilk* comes at the beginning of each feed. It looks grey and watery and is very rich in protein, lactose, vitamins, minerals and water. Hindmilk comes at the end of each feed and looks whiter than foremilk because it contains more fat. Hindmilk is therefore very rich in energy (Harrison et al., 1993).

A baby needs both foremilk and hindmilk for growth and development (Minchin, 1998, p. 214).

2.4.4 Maternal Nutrition and the Nutritional Composition of Human Milk

DePacheo and Hutti (1998) have stated that three aspects of maternal nutrition could have an impact on human milk composition: current dietary intake, nutrient stores, and alterations in nutrient utilization as influenced by the hormonal milieu characteristic of lactation. According to Good Mojab (1999) alterations in maternal nutrition that change the composition of human milk may have positive, neutral, or negative consequences to the nursing infant. Other factors that must also be considered include frequency of nursing, environmental conditions (e.g., the specificity of secreted antibodies in human milk after exposure to infectious agents), and length of gestation (Greene et al., 2003).

2.4.4.1 Protein

There is no convincing evidence that diet or body composition influences the total concentration of milk protein, even in communities of undernourished women (Greene et al., 2003); however, the interpretation of some studies is hampered by the use of total nitrogen as a proxy measure for the total amino acid content of milk (Gunnlaugsson & Einarsdottir, 1993) or by the short diet periods used in metabolic studies (Dettwyler, 1992).

In a study of three well-nourished women, Davies-Adetaghs (1997) demonstrated that an increased maternal intake of protein (20% compared with 8% of energy

from protein) increased total nitrogen, protein, and nonprotein nitrogen content of mature human milk and 24-hour milk protein output. There have been reports of low concentrations of protein and altered free and total amino acid nitrogen profiles in milk of women from countries with limited food supplies such as Nigeria (Davies-Adetaghs, 1997), Egypt (Harrison et al., 1993), and Liberia (Jarosz, 1993).

2.4.4.2 Lipids

Although there is no compelling evidence that changes in maternal fat intake influence the total quantity of milk fat, it has been shown repeatedly that the nature of the fat consumed by the mother will influence the fatty acid composition of milk (Lawrence & Lawrence, 1999).

Studies conducted in communities where maternal undernutrition is prevalent have shown evidence indicating that the percentage of maternal body fat may influence the concentration of fat in milk (Dalsy & Hartman, 1995). Milk fat concentrations in Mali (Dettwyler, 1992) and Zimbabwe (Cosminsky et al., 1993) were positively correlated with maternal skinfold thickness and decreased over the course of lactation. This positive relationship between milk fat concentration and body fat (as a percentage of ideal body weight) was likewise noted in women in late (6 to 12 months) lactation but not in early lactation (Harrison et al., 1993).

2.4.4.3 Carbohydrates

According to Gunnlaugsson and Einarsdottir (1993), lactose exerts 60 to 70% of the total osmotic pressure of milk. Compared with glucose, lactose provides nearly twice the energy value per molecule (per unit of osmotic pressure). The concentrations of lactose in human milk are remarkably similar among women, and there is no convincing evidence that they can be influenced by maternal dietary factors. However, Lawrence and Lawrence (1999) have noted that lactose

concentration in human milk decreased from 78 to 60 g/liter both 5 to 6 days before and 6 to 7 days after ovulation.

2.4.4.4 Vitamins

A major factor influencing the vitamin content of human milk is the mother's vitamin status (Dalsy & Hartmann, 1995). In general, when maternal intakes of a vitamin are chronically low, the levels of that vitamin in human milk are also low. As maternal intakes of the vitamin increase, levels in milk also increase, but many vitamins plateau and do not respond further to supplementation through diet or pharmaceutical preparations (Harrison et al., 1993). Although the milk concentrations of water-soluble vitamins are generally more responsive to maternal dietary intake than are concentrations of fat-soluble vitamins, there are important exceptions. These are discussed below for specific vitamins.

a) Vitamin A

The concentration of vitamin A decreases over the course of lactation and several reports indicate that the amount of vitamin A in human milk also decreases with maternal deficiency of the vitamin and increases with excessive intake (Riordan & Gill-Hopple, 2001).

b) Vitamin D

Several studies indicated that the vitamin D activity of human milk is directly related to the maternal vitamin D status (Riordan & Gill-Hopple, 2001).

c) Vitamin E

Concentrations of tocopherols are high in colostrum (8 mg/liter) and decline and stabilize to 2 to 3 mg/liter in mature human milk (Dalsy & Hartman, 1995).

d) Vitamin K

The vitamin K content of colostrum is approximately twice as high as that of mature human milk (Lawrence & Lawrence, 1999). When mothers with low vitamin K intakes are given 20-mg supplements of vitamin K, milk levels of the vitamin are increased by twofold for at least 48 hours. However, even when the mother's vitamin K intake from food has been high or she has routinely taken supplements containing vitamin K, the amount of this vitamin obtained by the breastfed neonate in the first few days after birth may be insufficient to meet the infant's needs (Minchin, 1998).

e) Vitamin C

When maternal vitamin C intake is relatively low, increases in intake are associated with an increased human milk content of the vitamin. Investigators Lawrence and Lawrence (1999) also reported that the level of vitamin C in milk is 8 to 10 times that in maternal plasma.

f) Thiamin

There are large variations in the thiamin content of human milk between individuals and over the course of lactation (Riordan & Gill-Hopple, 2001). Thiamin concentrations are low in colostrum (10 µg/liter) and increase 7-to 10-fold in mature milk. Milk from mothers with beriberi contains less thiamin than that of healthy women in the same country. Infants nursed by mothers with beriberi develop the disease by 3 or 4 weeks of age (Burk & Wieser, 1995). Blum (1999) has shown that the thiamin content of human milk can be sharply increased up to a certain limit, estimated to be 200 µg/liter.

g) Riboflavin and Niacin

Riboflavin content is high early in lactation and declines thereafter. Lower concentrations found in riboflavin-deficient populations can be increased by

supplementation (Dettwyler, 1992) The average niacin concentration in human milk increases from 0.75 mg/liter in colostrum to approximately 1 mg/liter in mature human milk. Niacin levels are largely dependent on maternal intake (Jarosz, 1993).

h) Vitamin B_6

The vitamin B_6 content is low in colostrum and varies between 50 and 250 µg/liter in mature milk. The vitamin B_6 content of milk is directly related to maternal intake of the vitamin. Cosminsky et al (1993) reported drastically reduced vitamin B_6 levels in milk from mothers with a long history (4 to 12 years) of oral contraceptive use before conception. Supplements of 20 mg/day were required to increase milk concentrations in those mothers and to reverse neurologic symptoms of deficiency in their infants (Almedom, 1991). However, the contraceptives taken by these women contained higher levels of estrogen than those that are presently used in contraceptive formulations. Current interrelationships among contraceptive use, vitamin B_6 intake, and vitamin B_6 concentrations in human milk are unknown.

i) Folate and Vitamin B_{12}

Folate and vitamin B_{12} in human milk are bound to whey proteins; therefore, maternal factors regulating protein secretion are more likely to affect milk levels of these vitamins over the short term than are fluctuations in maternal vitamin intake (Lawrence & Lawrence, 1999).

j) Biotin

The biotin content in human milk is exceedingly variable, however, the content of human milk increases with the progression of lactation and is directly related to maternal plasma biotin concentration (Burk & Wieser, 1995).

The biotin content of human milk is hundreds of times greater than the content in maternal plasma, suggesting that biotin is actively transported from the plasma through the alveolar cell into the milk (Lawrence & Lawrence, 1999).

k) Pantothenic Acid

The pantothenic acid content of human milk is significantly correlated with maternal dietary intake (Burk & Wieser, 1995).

2.4.4.5 Major Minerals

The concentrations of calcium, phosphorus, and magnesium in maternal serum are tightly regulated. Thus, there is little reason to expect that maternal intake of these nutrients will strongly influence their levels in human milk (Lawrence & Lawrence, 1999). Two-thirds of the calcium is bound to casein; the rest forms a soluble citrate complex. Phosphorus and magnesium are also largely bound to casein (Kitzinger, 1995).

2.4.4.6 Trace Minerals

The concentrations of various trace elements– iron, copper, and zinc- in human milk may be influenced to widely varying degrees by maternal nutrition (Blum, 1999). The concentrations of iron, copper, and zinc in human milk are highest immediately following childbirth (Dalsy & Hartmann, 1995). The iron concentration in milk is not influenced by the mother's iron status (Cooper et al., 1995).

Over the first 4 months of lactation, the concentration of copper in human milk gradually declines and then remains stable up to month 12. In mature milk, copper concentrations are at the lower end of the range (Baydar et al., 1997). There is no relationship between maternal copper status and concentrations in human milk (Dalsy & Hartmann, 1995). Copper secretion into milk apparently is controlled, since milk copper concentrations are three to four times lower than serum concentrations (Lawrence & Lawrence, 1999).

Zinc concentrations in human milk decrease over the course of lactation. The concentration declines steeply during the first month and then declines gradually (Higginbottom, 2000).

2.4.4.7 Electrolytes

The concentrations of electrolytes (sodium, potassium, and chloride) in milk are determined by an electrical potential gradient in the secretory cell rather than by maternal nutritional status. The average concentrations of sodium, potassium, and chloride in mature human milk (7, 15, and 12 mEq/liter, respectively) account for approximately 2, 3 and 4% of total osmoles, respectively, and are lower than their respective levels in colostrum by approximately 66, 31, and 36%, respectively (Blum, 1999).

Although some investigators have reported that 5- to 40-fold increases in sodium and occasionally chloride levels in human milk are associated with emotional stress, mastitis, and diminished milk production in the mother (Kitzinger, 1995), a common cause of high electrolyte levels of the milk and associated dehydration and malnutrition of infants appears to be lack of suckling or inadequate suckling (Good-Mojab, 1999). Inadequate stimulation from suckling leads to involution of the mammary glands, which is characterized by reduction in lactose synthesis and elevated electrolyte concentrations in milk (Kitzinger, 1995). In the early stages, reinitiation of adequate suckling can reverse this process (Harrison et al., 1993).

2.5 Common Problems experienced during Breastfeeding and their Management

The most common problems experienced during breastfeeding will be discussed below.

2.5.1 Engorgement and Breast fullness

Breast engorgement is caused by congestion of the blood vessels in the breast (Good Mojab, 1999). The breasts are swollen, hard, and painful. The nipples cannot protrude to allow the baby to latch on correctly, and nursing is difficult.

According to Kitzinger (1995), engorgement is different from breast fullness. Breast fullness is the gradual accumulation of blood and milk in the breast a few days after birth and is a sign that the milk is coming in. Breast fullness doesn't impair efficient breastfeeding because the breast tissues can be easily compressed by the baby's mouth.

To relieve breast engorgement the mother should be encouraged to nurse frequently (8 times or more in 24 hours), and for at least 15 minutes at each feed (Burk et al., 1995). Breast-milk should also be expressed manually or with a pump. Alternatively taking warm showers and using cold compresses can help relieve the discomfort.

2.5.2 Sore nipples

Breastfeeding (nursing) can be a comfortable and relaxing experience, though, accorrding to Fok (1996), nipple soreness should be expected, especially during the first weeks of breastfeeding. Some breastfeeding mothers describe nipple soreness as a pinching, itching, or burning sensation.

Nipple soreness may be caused by:

- Improper position of baby
- Improper feeding techniques, and
- Improper nipple care (Harrison et al., 1993).

For many women, there is no identified cause. According to Frye (1991), a simple change in the baby's position while feeding may relieve nipple soreness. Some breastfeeding mothers report nipple soreness only during the initial adjustment period. Nipple soreness may also be caused by incomplete suction release at the end of the baby's feeding. The mother can help her baby learn to release (and reduce her discomfort) by gently inserting a finger into the side of the mouth to break the suction (DePacheo & Hutti, 1998).

Excessively dry or excessively moist skin can also cause nipple soreness (Frye, 1991). Moisture may be due to wearing bras made of synthetic fabrics which increase sweating and hinder evaporation. Using soaps or solutions that remove natural skin oils can cause excessively dry skin (Burk et al., 1995). Ointments containing lanolin may be helpful for the care of dry or cracking nipples. Expressed milk is also effective for soothing uncomfortable nipples (Nefreit, 2001).

Nipple soreness can also be caused by the baby chewing or biting on the nipples (Greene et al., 2003). When the baby begins teething, the gums will swell, itch, and hurt. Biting and chewing seems to help relieve this discomfort. To comfort the baby and reduce the desire to chew on or bite the breast, something cold and wet should be provided to chew on for a few minutes before breastfeeding (Fok, 1996).

2.5.3 Plugged Milk Ducts

A milk duct can become plugged if the baby does not feed well, if the mother skips feedings (common when the child is weaning), or if she wears a constricting bra (Jarosz, 1993). Symptoms of a plugged milk duct include tenderness, heat and redness in one area of the breast, or a palpable lump close to the skin.

Sometimes, a tiny white dot can be seen at the opening of the duct on the nipple. Massaging the area and gentle pressure can help to remove the plug (Almedom, 1991).

2.5.4 Mastitis

A breast infection (mastitis) causes flu-like symptoms such as aching muscles, fever, and a red, hot, tender area on one breast (Cosminsky et al., 1993).

Breast infections most commonly occur in mothers who are stressed and exhausted, have cracked nipples, plugged milk ducts or breast engorgement, have skipped feedings, or wear a tight bra (Dettwyler, 1992).

Treatment frequently includes the following:

- Antibiotics for the infection
- Moist, warm compresses to the infected area
- Wearing a comfortable bra between feedings and
- Rest (Harrison et al., 1993).

Breast milk is safe for the baby and continues to be the best source of nutrition for the baby even when there is a breast infection.

Frequent nursing from the affected breast will promote healing (Cosminsky et al., 1993). Although only one breast is usually infected, it is important to continue breastfeeding from both breasts to prevent the infection from worsening.

If nursing is too uncomfortable, pumping or manual expression is recommended (Almedon, 1991). The mother can also try to offer the unaffected breast first until let-down occurs, to prevent discomfort. A physician should be consulted for help in serious cases.

2.5.5 Inadequate milk supply

The baby's milk demand determines the mother's supply (Wirfalt, 2000). Frequent feedings, adequate rest, good nutrition, and adequate fluid intake can help maintain a good milk supply.

Checking the baby’s weight and growth frequently is the best way to make sure the baby is getting enough milk (Jarosz, 1993).

2.6 Breastfeeding and HIV

Breastfeeding provides optimal nutrition for infants, as well as protection from disease, particularly infections (Nefreit, 2001). However, mother-to-child transmission of the human immunodeficiency virus (HIV) can occur through

breastfeeding, if a mother is infected. This leads to difficult decisions regarding feeding choices, especially where HIV infection is common.

The *Global Strategy for Infant and Young Child Feeding* states that the optimal feeding pattern for overall child survival is exclusive breastfeeding for the first 6 months, and continued breastfeeding for up to 2 years and beyond, with complimentary feeding from age 6 completed months (WHO, 2000)

These recommendations, however, pose a difficult dilemma for HIV-positive mothers, due to the risk of HIV transmission through breastmilk. In 2001 the WHO and UNICEF gave the following infant feeding guidance for infected mothers:

- When replacement feeding is **a**cceptable, **f**easable, **a**ffordable, **s**ustainable and **s**afe (**AFASS**), avoidance of all breastfeeding by HIV infected mothers is recommended.
- Otherwise, exclusive breastfeeding is recommended during the first months of life.
- To minimize HIV transmission risk, breastfeeding should be discontinued as soon as feasible, taking into account local circumstances, the individual woman's situation and the risk of replacement feeding (including infections other than HIV and malnutrition).

2.6.1 Risk of transmission of HIV through breastfeeding

Information on the risk of transmitting HIV through breastfeeding has been reported by the Breastfeeding and HIV International Transmission Study (BHITS) Group (2004), in an individual patient data meta-analysis of 4085 predominantly breastfed children who participated in 9 trials. The overall risk of breastfeeding transmission was estimated as 0.74% per month of breastfeeding. This meta-analysis demonstrated that the risk of transmission was cumulative and roughly

constant throughout the breastfeeding period, suggesting a 4% risk for every 6 months of breastfeeding.

These studies, however, did not investigate the risk of breastfeeding transmission during exclusive breastfeeding (EBF). Exclusive breastfeeding is defined as feeding an infant only breast milk, in contrast to mixed breastfeeding, defined as the feeding of breast milk along with complementary foods, other milks, and/or infant formula. The first study to prospectively examine the influence of EBF on risk of HIV transmission was conducted in South Africa (Coutsoudis et al., 2001), and found that the cumulative probability of HIV infection was similar among never breastfed and EBF infants up to 6 months, but was significantly higher for infants who received mixed breastfeeding.

Several large, well designed, prospective cohort studies in South Africa, Zimbabwe, Cote D'Ivoire, and Zambia are currently in progress to examine more closely the effect of EBF on the risk of HIV transmission via breastfeeding. Preliminary results of the Zimbabwean (Piwoz & Tavengwa, 2004) and Cote d'Ivoire (Nefreit, 2001) studies presented at the International AIDS conference in Bangkok in July, 2004, have confirmed the finding that exclusive breastfeeding carries a much lower risk of HIV transmission than mixed breastfeeding. See table 2.1 for a summary of risk factors for HIV transmission during breastfeeding:

Table 2.1: Risk factors for breastfeeding transmission of HIV (Nefreit, 2001)

Strong Evidence	Limited Evidence
High plasma viral load	Non-exclusive breastfeeding in the first 6 months
Advanced disease/low CD4 count	High breast milk viral load
Breast pathology (mastitis, abscesses, cracke bleeding nipples)	Sub-clinical mastitis as evidenced by increased breast m sodium levels
Primary infection/new infection	Low maternal levels of vitamins B, C, and E
Prolonged duration of breastfeeding (more than months)	Infant oral candidiasis

2.6.2 Impact of breastfeeding on the HIV-infected mother

A study from Kenya reported that the 24-month maternal mortality among breast-feeding HIV-seropositive mothers was significantly increased relative to their formula-feeding counterparts (Nduati et al., 2001). However, a Tanzanian study (Sedgh et al., 2004), a Zambian study (Kuhn et al., 2004), and a meta-analysis involving 9 large studies (The Breastfeeding and HIV International Transmission Study Group, 2004), have shown clearly that breastfeeding does not pose any mortality or other health risk to the HIV-infected mother.

2.6.3 Morbidity and mortality risks of not breastfeeding

Simply encouraging HIV-positive women not to breastfeed in order to prevent postnatal transmission of HIV, carries its own risks. The objective of any strategy to prevent mother-to-child transmission of HIV must be to optimise overall survival (including that of children of women who are not infected with HIV). Central to this decision is determining the risk of morbidity and death in breastfeeding versus non-breastfeeding infants and what impact the recommendation and/or provision of formula milk or other replacement feeds to HIV-infected women will have on the feeding practices of uninfected mothers (Kuhn et al., 2004).

Breastmilk fulfils the healthy, full-term infant's total nutrient requirements for the first 6 months of life and remains a valuable source of nutrition up to 2 years and beyond. Well known benefits of breastfeeding include reducing the infant's risk of infection, especially diarrhea and pneumonia, and these have been reinforced by a recent meta-analysis (WHO Collaborative Study Team on the Role of Breastfeeding on the Prevention of Infant Mortality, 2000). Reduction of mortality from infections is unlikely to be as important a consideration in well-resourced communities where the risks of artificial feeding can be minimized. However, even in developed countries, breastfeeding may protect against bacterial and viral infections and later onset of health problems such as diabetes, cardiovascular disease, and cancer (Lawrence & Lawrence, 1999).

Because of the lack of well-designed prospective trials evaluating the long-term risks associated with breastfeeding and formula-feeding in settings of high HIV prevalence, several groups have designed mathematical models to assess the net mortality. In a recent modeling exercise Kuhn et al. (2004) estimate that when infant mortality rates are greater than about 40 per 1000 live births, providing formula milk to HIV-infected women would result in the excess number of deaths arising from formula use being the same or greater than the number of HIV infections that might be prevented.

Counseling and empowering women to make an informed choice on infant feeding is not simply a matter of informing them about the theoretical risks associated with different feeding options. Health workers need to assess an individual mother's circumstances to determine what is most feasible and safe for her. Time is required to explain the factors that increase the risk of breastfeeding transmission of HIV or of morbidity from replacement feeds, and to give suggestions to reduce these risks (Kuhn et al., 2004). Counselors need a deep understanding of the social issues and the household situation of the mother, as well as the ability to explain complex scientific concepts on risk in a way that is understood by women who do not ordinarily think in these terms. They need to express compassion and have the ability to emotionally support women in a decision that affects themselves, their children, and the rest of their family and community (WHO, 2000).

Because there is growing evidence that mixed breastfeeding carries considerable risk for HIV transmission, implementers of Prevention of Mother-to-Child Transmission (PMTCT) programs should be cautious about the distribution of free formula milk, as this practice seems to encourage mixed breastfeeding (Jackson et al., 2004 ; Coutsoudis et al., 2002). A safer approach would be to provide vouchers which could be exchanged either for formula milk for the infant or food for the mother (Nefreit, 2001).

For those mothers who choose to exclusively breastfeed, a second choice will need to be made at about 6 months of age. If the child is infected, or suspected to be infected, then the mother should continue to breastfeed. If the child is uninfected, the mother should be encouraged to stop breastfeeding in a short period of about 1-2 weeks, provided that the child will have access to adequate complementary food. Mothers should be provided with specific guidance and support when they cease breastfeeding to avoid harmful nutritional and psychological consequences to the infant and to maintain their breast health. If the infant will not have access to adequate complementary food, the best option is probably for the mother to express and heat-treat her breast milk (Jeffrey et al., 2001) and use the money that would have been spent on formula milk to purchase complementary food.

2.6.4 Strategies to reduce breastfeeding transmission and improve child survival

Until more data is available to clarify these issues, it is important to investigate what can be done to minimize breastfeeding transmission of HIV and optimize child survival. Health workers need improved counseling skills and more opportunities to assist women in making informed choices that they are committed to follow. For women who choose to breastfeed, experienced support should be available to ensure good exclusive breastfeeding practices that will minimize breast pathology, HIV viral load, and disruptions to the infant's gut environment, thereby reducing risk of HIV transmission. Breastfeeding should be discouraged for those women who have progressed to AIDS and have very low CD4 counts.

According to the WHO (2000), strategies to minimize risk of transmission include the following:

- Exclusive breastfeeding during the first 6 months.
- Shorter duration of breastfeeding – about 6 months.

- Good lactation management so that breastfeeding problems such as cracked nipples, engorgement, and mastitis are prevented.
- Where the mother does develop mastitis or abscesses, she must express milk from the affected side frequently and discard it and continue feeding from the unaffected side.
- Condoms must be used throughout the lactation period.
- If the infant has oral thrush, it must be treated promptly.

Pasteurization of expressed breast milk, using a method that is practical and feasible even at home, can be used to effectively kill all cell-free HIV (Jeffrey et al., 2001). This strategy is likely to be difficult to implement from birth but may be more relevant after 6 months or as a temporary measure to sustain breastfeeding when the mother is unwell or away from her child.

For those mothers who choose not to breastfeed, or who wean before 6 months postpartum, support should be available to demonstrate preparation and safe storage of commercial infant formula to minimize the risks of diarrheal morbidity and malnutrition (Kuhn et al., 2004)

Communities need to be encouraged to be supportive of mothers with HIV infection and accept the varied approaches to infant feeding that may occur.

2.6.5 Use of antiretroviral drugs to prevent HIV transmission during breastfeeding

As already mentioned, maternal HIV viral load has consistently been shown to be an important risk factor for breastfeeding transmission. It therefore seems likely that giving highly active anti-retroviral therapy (HAART) to the infant and/or mother during the lactation period could reduce transmission. Several studies are currently underway testing the use of HAART to the mother and single or dual antiretroviral drug regimens to the infant (Gaillard et al., 2004).

Many women may already be on HAART, raising the question of whether a woman on HAART can safely breastfeed. Unfortunately, enough information to answer this question is not yet available. Given that the viral load in women on HAART will be very low (at undetectable levels), there should be no, or minimal risk of breastfeeding transmission. Other considerations to bear in mind in this decision would be medication safety issues. Most antiretrovirals will be excreted into the breast milk, and the infant will be exposed to small quantities. For those drugs which have been widely used in infants such as nevirapine (NVP), zidovudine (ZDV) and lamivudine (3TC), there are unlikely to be safety concerns. A remaining concern will be that infants will be exposed to sub-therapeutic levels of antiretrovirals through breast milk. If some infants become HIV infected despite HAART, they may have developed resistance to these drugs. This could impact their future HIV treatment. There are several trials currently in progress investigating these issues (Gaillard et al., 2004).

2.6.6 Expression of breast milk

In situations where the mother is HIV positive, or cannot take her baby with her to breastfeed at work, she can express her breastmilk by hand, and leave it for a helper to feed to the baby while she is away (Burk et al., 1995). Expressing milk while the mother is at work, will also help to keep milk supply sufficient.

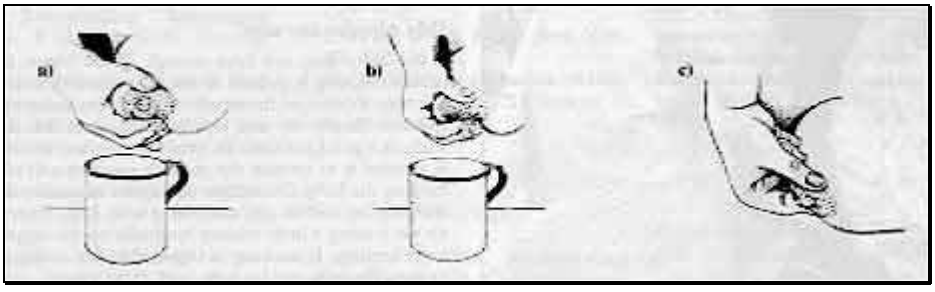


Figure 2: Expressing Breast milk

Figure 2 shows the method of hand expression (Higginbottom, 2000):

- Express milk into a clean cup or container. To make sure the cup is clean wash it with soap and water and leave it to dry in the sun; then pour boiling water into the cup. The sun and boiling water will kill most bacteria.
- Hands should be washed thoroughly with soap before expressing milk
- The mother should lean forward, while supporting her breast over the cup or bowl
- With her thumb above and first finger below the nipple, she should press in towards her body (a)
- The mother should then bring her thumb and finger together, squeezing behind the nipple (b)
- She should release and repeat this until milk starts to drip or flow from her breast.
- The mother should then press the areola (the darker area around the nipple) to the left and right of the nipple in the same way, to make sure that milk is expressed from all sectors of the breast (c)
- Expressed breast milk (EBM) should be given to the baby from a clean cup. Feeding bottles should not be used. They are more difficult to keep clean and may cause nipple confusion.
- EBM can be stored during the day (up to six hours if no refrigerator is available, and up to 24 hours if kept refrigerated), but it should be kept covered and as cool as possible. If the milk separates; it can be shaken up and is still good for use
- Using EBM is the best way to feed a baby who is too ill to suck, and expressing milk can relieve very full or leaking breasts

2.7 Complementary foods

According to Heinig (2001), weaning is the process by which an infant gradually becomes accustomed to an adult diet. During weaning, supplementary foods other than milk are introduced in order to meet the child's increased nutritional demands. However, breast milk remains an important part of the diet.

If not done correctly, weaning can be a hazardous period for many infants (Kitzinger, 1995). This is because the child may not receive food of adequate nutritional value and the food and drinks provided may be contaminated with pathogenic microbes, including those that can cause infectious diseases and diarrhea. The danger is that the child will become undernourished due to an inadequate diet and repeated episodes of diarrhea, or will succumb to dehydration caused by an acute episode of diarrhea. Unfortunately, these processes are inter-related: undernutrition increases the child's susceptibility to infection so that the child experiences more frequent and more severe episodes of diarrhea, and diarrhea accelerates the development of undernutrition.

According to Heinig (2001), some specific problems associated with weaning that can lead to undernutrition or diarrhea are:

- weaning too abruptly;
- giving too few meals per day;
- giving supplementary foods with a low content of protein and particularly energy;
- preparing and storing weaning foods in a way that permits bacterial contamination and growth; and
- giving milk or other drinks prepared with contaminated water or in a contaminated feeding bottle.

Weaning should begin when the child is between 6 and 8 months old (Greene et al., 2003). While continuing to breast-feed, the mother should give small amounts

of well-cooked soft or mashed food, such as cereals and vegetables, twice each day. As the child gets older, the variety of foods should be increased and meals should be given at least four times per day, in addition to breast-feeding. After 1 year of age, the child should eat all types of food; vegetables, cereals, and meat should continue to be well-cooked, and mashed or ground. Food should be given 4-6 times per day. If possible, breast-feeding should be continued.

According to Dettwyler (1992), cereals and starchy roots are the most widely used weaning foods, but these are relatively low in energy. They should be given as a thick porridge, using a spoon, and not as a dilute drink. The energy content should be increased by mixing one or two teaspoonfuls of vegetable oil into each serving. The objective, as mentioned by Almedon (1991), is to achieve an energy intake of about 26 Kj/kg/day. Between the age of 6 months and one year, pulses, fruit, green vegetables, eggs, meat, fish, and milk products should be added to the diet. In areas where vitamin A deficiency is a problem, the diet should include orange, yellow, or dark-green vegetables, yellow fruit, and, if possible, liver, full-cream dairy products, or fish (Heinig, 2001).

According to Hurst (1997), ideal food choices for babies between 6 and 8 months of age are:

- Iron fortified cereals, oats, rice, and other soft porridge, but no bran products;
- strained vegetables such as butternut, pumpkin and carrots (no butter, sugar or salt added);
- strained fruits such apples, bananas and peaches;
- and meat products such as strained chicken, fish, red meats and liver.

Strained products can gradually be reduced after the age of 8 months, where mashed or chopped family foods should be introduced to the baby's diet (Jarosz, 1993).

Mothers should be taught ways of preparing, giving, and storing weaning foods to minimize the risk of bacterial contamination (Blum, 1999). These include:

- Washing her hands before preparing weaning foods and before feeding the baby.
- Preparing the food in a clean place.
- Cooking or boiling the food well when preparing it.
- If possible, preparing the food immediately before it will be eaten.
- Covering food that is being kept. Keeping food in a cool place; refrigerating it if possible.
- If cooked food was prepared more than two hours before it is used, reheating it until it is thoroughly hot before giving it to the baby.
- Feeding the baby with a clean spoon, from a cup, or with a special feeding spoon. Feeding bottles should never be used.

Good complementary food should be rich in energy and adequate in good quality protein, vitamins and minerals, easy to prepare, have very few dietary bulk and easily digestible and should be free from artificial colours and flavours (Winberg & Porter, 1998).

2.8 Strategies for promotion of breastfeeding

Programmes to "recreate a breastfeeding culture" continue to be necessary. Since the passage of the *International Code of Marketing of Breast-Milk Substitutes* , both the World Health Organization (WHO) and UNICEF have continued to promote initiatives such as the *Innocenti Declaration* and the *Baby-Friendly Hospital Initiative*. These programs reinforce the importance of breastfeeding protection. International consumers groups - World Alliance for Breastfeeding Action (WABA) and the International Baby Food Action Network (IBFAN) and national organizations like *INFACT Canada* also play a vital role in popularizing and implementing these global standards.

Changing societal attitudes and governmental and institutional policies and practices are difficult to achieve. Firstly, the idea that bottle feeding is the norm should be addressed (Fisher & Inch, 1996). This requires governments and health ministries to be convinced that breastfeeding is the best and normal way to feed babies and include this in protective legislation that regulates the formula feeding industry (La Leche League International, 1998).

All over the world there is increasing knowledge and concern about early child development and significant interactions in the family (Neifert, 2001). There is widespread interest in improving the quality of child care and in integrating knowledge about the needs of the developing child into educational systems.

The goals on the theme of “Breastfeeding: Education for Life” is to (Sobti et al., 2002):

- Increase public awareness of the importance of protecting, promoting and supporting breastfeeding as the standard for infant development and growth;
- Encourage the incorporation of education on breastfeeding and appropriate infant feeding practices into all levels of formal and informal education;
- Improve relevant curriculum design with all types of educators and trainers from professional institutions, medical and other teaching schools, health organizations, public and private schools and hospitals and community education centers;
- Involve school children, from preschool onward, and teenagers in World-Breastfeeding-Week activities and provide tools for popular education appropriate for different age groups;
- Encourage the integration of breastfeeding experiences and practices into children’s developmental materials and toys.

According to Blum (1999), cultural, emotional and social forces shape people’s attitudes early in their lives. Families, friends and teachers influence beliefs about

what is or is not acceptable. For children to develop a positive attitude toward breastfeeding, educators must help them learn from an early age why it is a good choice for mothers and their infants and why everyone needs to help and support mothers and their babies (Kitzinger, 1995).

Formal and informal education gives children, youth and adults numerous opportunities to obtain correct information about breastfeeding (Good-Mojab, 1999). Breastfeeding information can be easily incorporated into subjects such as science, biology, family studies, nutrition, and home economics. Creative educators can also incorporate breastfeeding issues into Mathematics, Art, Social studies, History, Marketing, Business, Ecology and even Engineering. Since male and female attitudes affect societal norms, it is necessary to educate both genders equally about breastfeeding (Coutsoudis, et al., 2002).

Greene et al. (2003) state that the development of critical thinking skills and applying them to breastfeeding issues help children, youth and adults examine the advantages and disadvantages of various feeding practices. It also helps them form their own opinions and make informed choices. This author also mentions that learners will be better able to make informed decisions in their own lives when they have sufficient knowledge regarding the subject.

For breastfeeding to become a cultural norm once more, it is important to include basic facts about breastfeeding in the educational system. These can include:

- Breastfeeding is the normal way for babies to eat and mothers and babies have the right to breastfeed free of commercial influences (Fisher & Inch, 1996).
- Breastfeeding mothers and babies are to be welcomed anywhere (Thompson, 1996). They have the right to be in schools, religious buildings, restaurants, public transport, and work, visiting friends, visiting a hospital or shopping.
- Carrying a baby provides both security and stimulus to the baby's developing brain (Seema et al., 1997).

- Although mothers may need to work, babies need their mothers, especially during the first year of life.
- Fathers can provide all of the baby care that mothers can, with the exception of breastfeeding. Fathers can rock, talk with, change, bathe, play with, put to sleep, carry, etc.
- Breastfeeding helps prepare the infant's body for adult foods and changes to meet the needs of the growing infant and child.
- Sleeping with babies is a normal way of caring for them, not a bad habit that will encourage dependence (Seema et al., 1997).
- The images of babies bottle feeding and using pacifiers are images used to sell products, but they are not necessary for babies (La Leche League International,1998).

CHAPTER 3

EXPERIMENTAL PROCEDURE

3.1 Introduction

The following framework (Figure 1.1) was compiled for the purpose of this study, to describe the experimental procedures for identifying the associations between knowledge, cultural factors and characteristics of the mother regarding breastfeeding practices.

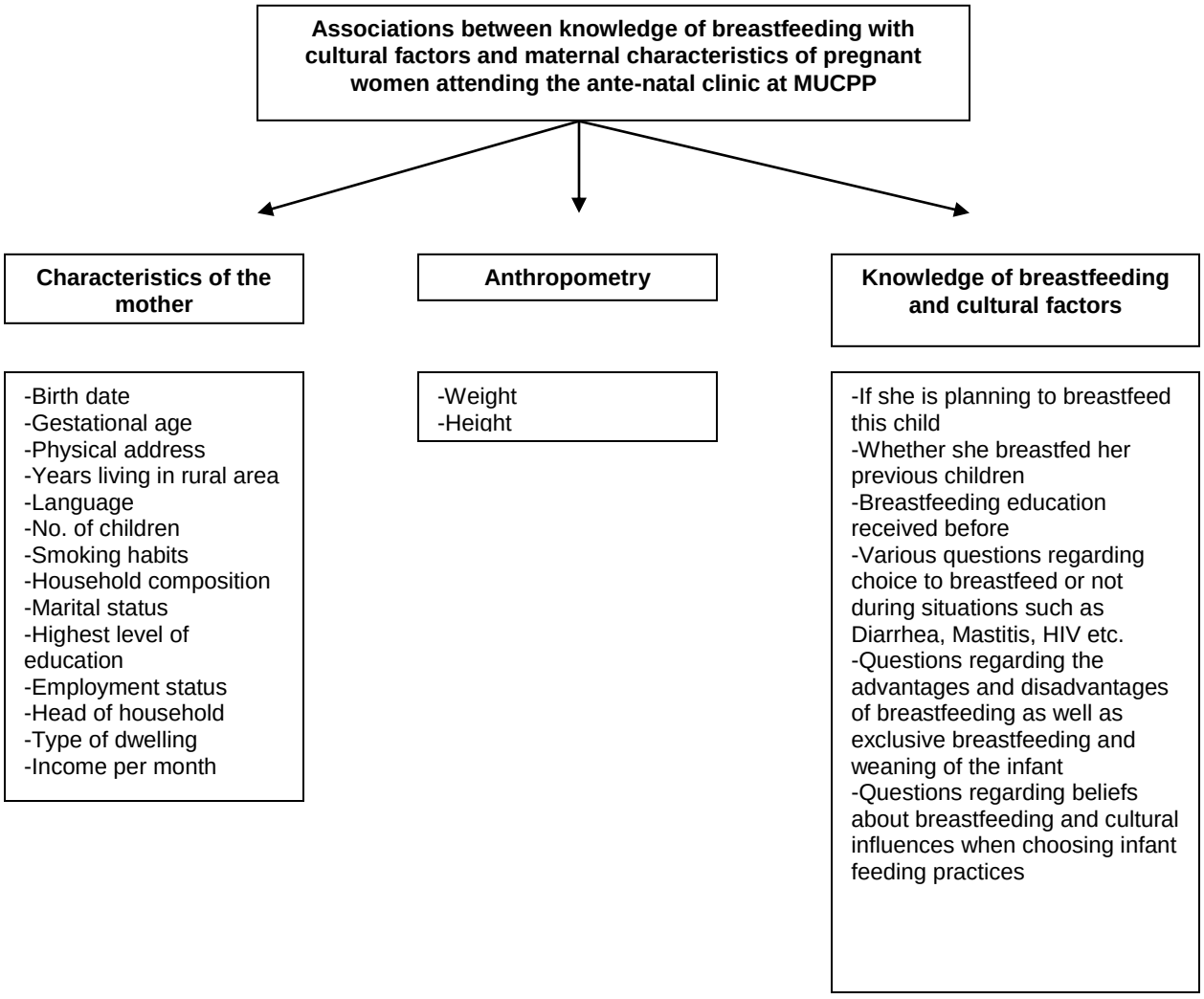


Figure 3.1: Experimental procedure for identifying the associations between knowledge, cultural factors and characteristics of the mother regarding breastfeeding practices

3.2 Materials and Methods

3.2.1 Study design

The study design comprised a cross-sectional descriptive study.

3.2.2 Population and Sampling

An average of 45 women attend the ante-natal clinic at MUCPP daily. Of these 45 women, the first 10 patients attending the daily ante-natal clinic were included in the study. The study was performed from Mondays to Thursdays for a period of 12 weeks. A total of 640 participants have been randomly selected and evaluated.

3.2.2.1 Inclusion criteria

Women who complied with all of the following were allowed to participate:

- Pregnant women with a gestational age of between 28 and 32 weeks (according to the last date of their menstruation)
- Attending the ante-natal clinic at MUCPP
- Able to understand/speak Afrikaans, English, Sotho and/or Xhosa
- Gave written informed consent.

3.2.3 Operational definitions

For the purpose of this study, operational terms are defined as follows:

3.2.3.1 Knowledge about breastfeeding

Knowledge about breastfeeding refers to knowledge regarding:

- The advantages of breastfeeding

- Breastfeeding and mastitis, engorgement, and sore nipples
- The mother's knowledge regarding breastfeeding and her breasts and/or figure
- Weaning practices
- Breastfeeding and returning to work
- Infant nutrition
- Nutrition of the breastfeeding woman

3.2.3.2 Characteristics of the mother

For the purpose of this study, characteristics of the mother include the following:

- Age of respondent
- Gestational age
- Language
- Number of children (born and alive)
- Smoking status
- Household composition
- Marital status
- Level of education
- Employment status
- Head of the household
- Type of dwelling
- Income per month, and how many people contribute to the income
- BMI (kg/m^2)
- Known health status of the mother (e.g. HIV)

3.2.3.3 Cultural factors that can affect breastfeeding practices

Cultural factors that can influence breastfeeding practices refer to:

- Whether the culture of the pregnant women (beliefs/influences of the mother/or family) will determine the choice to breastfeed or not.
- Whether cultural factors influence the exclusion of certain foods during breastfeeding, and what these foods are.
- Whether cultural beliefs about breastfeeding/breast milk influence the views/beliefs of the mother regarding breastfeeding/breast milk (e.g. breast milk can be spoilt, a mother should/should not give expressed breast milk to her baby)

3.2.3.4 Anthropometric status

For the purpose of this study, anthropometric status refers to Body Mass Index (BMI) of mothers. BMI is defined as weight in kg divided by height in m^2. According to international recommendations, underweight is defined as a BMI of less than 18.5 kg/m^2; normal weight is 18.5 to 24.9 kg/m^2; overweight is defined as BMI of 25.0- 29.9 kg/$m^{2,}$ and obesity is defined as BMI of more than ≥ 30 kg/m^2 (Kong & Lee, 2004).

3.2.4 Techniques

The following techniques were used for the study:

3.2.4.1 Knowledge of breastfeeding and characteristics of the mother

The knowledge of breastfeeding, socio-demographic circumstances and other characteristics of the mother were determined by means of a standardized questionnaire (Appendix A). The questionnaire was completed in a personal interview with each mother.

3.2.4.2 Anthropometry

Anthropometric information (weight and height) collected during the study was also noted in Appendix A. Anthropometric status of the subjects was determined by means of the following:

Weight was measured using a SECA digital electronic scale to the nearest 100 grams (Lee & Nieman, 1996, p. 229). Weight was measured by the researcher using the standardised techniques recommended by Lee and Nieman, 1996, p. 229). Participants were asked to empty their bladders beforehand, and wore an examination gown provided by the clinic.

Height was measured with the participants standing barefoot on the platform of a stadiometer to the nearest 0.5 cm (Lee & Nieman, 1996, p. 225-226). Subjects also wore an examination gown with the head in the Frankfort plane (Pressman & Adams, 1990, p. 46).

3.3 Reliability and Validity

Reliability and validity of the questionnaire, as well as the weight and height measurements will be discussed:

3.3.1 Questionnaire

Validity of the questionnaire was assured by the following:

- All issues addressed by the questionnaire are directly related to the main aim and objectives of the study.
- To ensure that the questions are a valid measure of knowledge of breastfeeding, the answers to those questions have been compared to the

guidelines of the South African Breastfeeding Code of Ethics and relevant literature (Myburgh, 2003).

Reliability was ensured by interviewing 10 % (64) of participants for a second time. This took place after one month – when the women returned for their follow-up visit at the clinic. Where answers to questions differed with more than 20%, the question was considered unreliable and the results eliminated from the study.

None of the questions were considered unreliable according to the second interview.

3.3.2 Anthropometric measurements

In order to ensure validity and reliability of the results, weight and height was measured by a qualified anthropometrist, according to standard procedures, as recommended by Lee & Nieman (2003, p. 65).

Scales were moved to the zero point before each measurement, the weight recorded by the scale was compared with a known weight. The scale must give the same reading when measuring the standard weight. The scale was calibrated after every 20th patient measured by the researcher

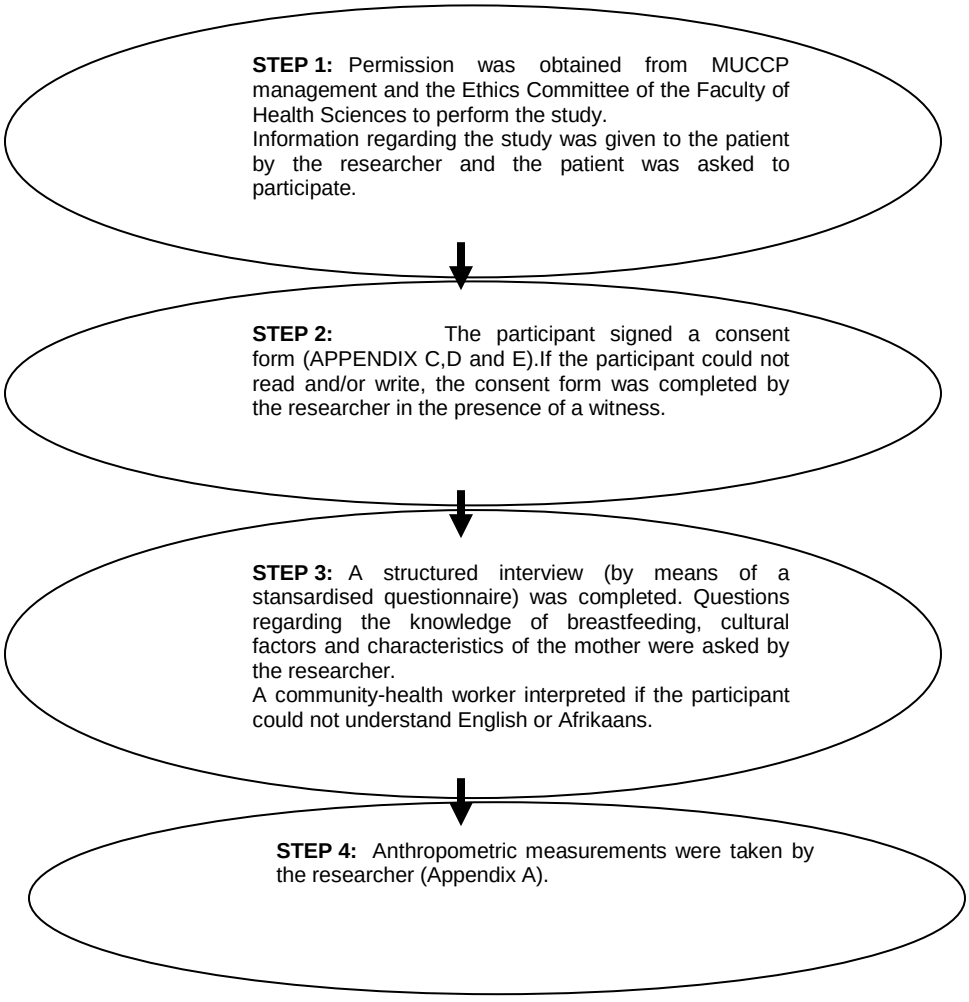
3.4 Statistical Analysis

Descriptive statistics, namely frequencies and percentages for categorized variables and means and standards deviations or medians and percentiles were calculated. The association between the knowledge of breastfeeding and characteristics of the mother, as well as the associations between knowledge of breastfeeding and cultural factors were calculated by the chi-square or Fisher's exact test. The analysis was performed by the Department of Biostatistics of the Faculty of Health Sciences of the UFS.

The answer to a question was considered unreliable if 20% of the respondents give different answers on the two occasions (initial interview and reliability interview).

3.5 Study Procedure

The research study was undertaken using the following process:



3.6 Pilot Study

A pilot study was undertaken on 10 mothers that attended the clinic and fell within the inclusion criteria, and were able and willing to participate. The same techniques as for the main study were followed, in order to see if the women understood the questions used in the questionnaire. Changes to the questionnaires were made accordingly.

Measurements of anthropometric measurements were also standardized: Results obtained for anthropometric measurements by the researcher and an expert in anthropometry were compared to ensure that reliable measurements were obtained.

The pilot study was conducted at MUCPP, and these respondents were excluded from the final study.

3.7 Ethical issues

Approval of the research was given by the Ethics Committee of the Faculty of Health Sciences at the University of the Free State. Approval to conduct the study was also obtained from the Management of MUCPP (Appendix C).

Informed consent (Appendix D) was obtained from participants in the language of their choice (Sotho, English, Afrikaans) during which procedures were explained to them in detail. Confidentiality of the information was maintained by ensuring that no names were made known or written in questionnaires, codes were used in data analysis and results. Participation was voluntary and respondents were given freedom to withdraw from the study at any time

Summary

A sample of 646 pregnant women with a gestational age of between 28 and 32 weeks and who attended the ante-natal clinic at MUCPP was randomly selected for the study.

The socio-demographic composition of the subjects was determined by means of a standardized questionnaire, which included identifiable details of each subject, the family composition, household and economics.

Anthropometry (weight and height) was obtained from each respondent.

Knowledge about breastfeeding and breastfeeding practices as well as cultural factors that would influence the mother to breastfeed was obtained by means of standardized questionnaire.

CHAPTER 4
RESULTS

4.1 Introduction

The results in this study are presented under the following headings: socio-demographic status, anthropometry, knowledge about breastfeeding, cultural factors, and associations between variables.

4.2 Socio-demographic background

Although not depicted in table form, the socio-demographic background of the sample is briefly described in the following section.

The mean age of the women who participated in this study was 26.7 years. The maximum years the women lived in an urban area were 39 years, with a minimum of 1 year. A majority of 55.73% of the participants' home language was Sotho, while only 0.31% spoke English at home. Tswana was spoken by 23.99%, while 0.93% spoke Afrikaans at home. The majority of respondents were unmarried (63.16%).

The maximum number of children that had previously been born to a respondent was 6 children. Of those children born, a maximum of 5 were still alive on the day the questionnaire was completed.

As many as 15 people lived together in some households, with an average room density of 4.5 people. Of these 4.5 people, an average of 2 were children under the age of 18 years and 2 were adults ($\geq$ 18 years).

Grade 10 was the average level of education achieved by the respondents, and 75.54% of respondents were unemployed. In most households only one person contributed to the household's monthly income, with 44.6% of households

receiving between R501 to R1000 per month, and only 1% of households earned more than R5000 per month. In 45.7% of households the parent was the head of the household, and 87.8% of respondents lived in a brick house.

4.3 Anthropometric status

The BMI of respondents is indicated in table 4.1. Ninety percent of women had a BMI of 25kg/m^2 or more, indicating overweight (Kong & Lee, 2004). Only 8.68% of respondents had a BMI in the normal range of 20-26kg/m^2 and very few women (only 8) were underweight.

TABLE 4.1: Body mass index

BODY MASS INDEX CATEGORIES						
	< 20 kg/m^2 UNDERWEIGHT		**20-24.9 kg/m^2 NORMAL WEIGHT**		**≥ 25 kg/m^2 OVERWEIGHT**	
N = 640	**N**	**%**	**N**	**%**	**N**	**%**
	8	0.15	45	6.97	592	91.78

4.4 Knowledge of breastfeeding

Knowledge of breastfeeding and breastfeeding practices are summarized in table 4.2 A.

TABLE 4.2 (A): Knowledge of breastfeeding

QUESTIONS RELATED TO KNOWLEDGE OF BREASTFEEDING			
N	**YES (%)**	**NO (%)**	**NOT SURE (%)**
	Do you plan to breastfeed this child?		
640	97.98	1.40	4
	Have you ever received breastfeeding education before this interview?		
640	45.75	54.26	-

TABLE 4.2 (A): Knowledge of breastfeeding (continued)

N	YES (%)	NO (%)	NOT SURE (%)
	Should you continue breastfeeding if the baby has diarrhea?		
640	33.49	53.80	12.71
	Should you stop breastfeeding if you find out you are pregnant again?		
640	58.29	36.28	5.43
	Can you start breastfeeding again after you stopped for a few weeks or months?		
640	7.44	79.69	12.87
	Does breastfeeding help you attain your pre-pregnancy weight more quickly?		
640	59.44	15.33	25.23
	Does your breast size determine how well you will be able to breastfeed?		
640	67.03	25.70	7.28
	Is breastfeeding a method of contraception that will definitely prevent you from becoming pregnant?		
640	9.13	83.90	6.97
	Can you breastfeed even if you have to go back to work?		
640	92.72	3.72	3.56
	Do you think there are any advantages to breastfeed?		
640	64.40	25.85	9.75
	Do you think there are any disadvantages to breastfeed?		
640	3.26	82.48	14.26
	Should you continue to breastfeed if you have mastitis?		
640	3.25	90.25	6.50
	Should you continue to breastfeed if you have engorgement?		
640	81.89	12.54	5.57
	Should you breastfeed if you have sore nipples?		
640	6.50	80.80	12.69
	Do you as a mother need special types of food to breastfeed successfully?		
640	59.29	32.04	8.67
	If a mother is breastfeeding her baby, do you think that the baby should be given water as well as breast milk?		
640	57.43	39.32	3.25
	If the mother is breastfeeding her baby, do you think that baby should be given any other foods as wel the breast milk?		
640	67.34	31.27	1.39
	Should a mother who is HIV-infected breastfeed her baby?		
640	72.91	15.33	11.76

The majority of respondents (97.98%) were planning to breastfeed their child, while only 1.40% did not want to breastfeed (table 4.2). Of this 1.40%, a maximum of 33.33% mentioned that their reason for not planning to breastfeed was illness. Almost 46% of respondents had received breastfeeding education before the interview, and 54.74% of these received it from the local clinic nurse.

An alarming 91.78% of the mothers had a BMI of > 25 kg/m^2, which was considered as being overweight (Kong & Lee, 2004). Only 9.13% of mothers thought that breastfeeding was a method of contraception, while 83.90% of the mothers did not think that breastfeeding will prevent her from falling pregnant again. The rest of the mothers (6.97%) were not sure. Most of the mothers (92.72%) believed that they could go back to work when they are breastfeeding, while only 3.72% of them did not think they could go back to work again.

Most mothers did not think that breastfeeding should continue when the baby has diarrhea (53.80%), while only 33.49% of the mothers thought that they should continue feeding. This is alarming, due to the fact that even the mothers who have received breastfeeding education before did not believe that one should continue to breastfeed during times of diarrhea.

Another concern is the fact that most of the mothers believed that they should stop breastfeeding if they are pregnant again (58.29%), and will then not be able to start to breastfeed again (79.69%). The majority of the mothers also believed that the size of their breasts determined the efficacy of their breastfeeding practices (67.03%).

Most (64.40%) respondents believed that breastfeeding has advantages. Of these, 64.40% mentioned the following advantages:

- Breastfeeding helps the baby to grow properly;
- Breastfeeding gives the baby strong bones;
- Breastfeeding keeps the baby healthy.

Some other advantages that were mentioned included:

- Breast milk is the ideal food for the baby;
- Breast milk is affordable;
- Breast milk keeps the baby strong;
- It keeps the baby happy;
- Breast milk is free;
- It gives the baby energy;
- It gives the baby's body shape;
- Breast milk helps the mother and baby to bond;
- It protects the baby against illnesses;
- Breast milk also acts as a "booster" for the baby
- It is less effort than preparing a bottle;
- It promotes the baby's development;
- And gives the baby strong teeth.

Only 3.26% of respondents believed that breastfeeding has disadvantages. The following are examples of these:

- Breastfeeding worsens HIV infection; causes the mother to become ill; gives sore breasts or prevents the mother from sleeping with a man; and
- Gives pimples on the breast and causes the mother to not feel well.

Most of the mothers (90.25%) did not believe they should continue to breastfeed when they have mastitis, while most of them (81.89), also believed that they should continue to breastfeed when engorgement is present. Breastfeeding when the

mother suffers from sore nipples should also not continue, according the respondents. An alarming 80.80% of the mothers believed the statement. Most of the mothers (59.29%) also believed that the mother will need special types of food to ensure that she breastfeeds successfully.

Almost all of the mothers said that one should stop breastfeeding when the breasts are engorged, and that even though breast milk is the best food choice for the baby, water is still necessary in the baby's diet.

The question was asked whether a baby needs water as well as breast milk, and 57.43% (n=646) of respondents answered "yes" to this question. The average age at which the mothers would give their babies water in combination with breast milk was 4 months (n=370). Most (67.34%) of the respondents also reported that they would add extra food to the diet of the breastfed baby before 6 months.

Out of 645 respondents, 644 (99.84%) respondents believed that breast milk is the best food for a newborn baby, and only 1 (0.16%) respondent believed that formula milk was better than breast milk.

Almost three quarters (72.91%) of respondents believed that a mother should breastfeed her baby even if she is HIV infected, while 15.33% believed that the HIV infected mother should not breastfeed her baby. Of these 25.56% mentioned that the main reason a HIV positive mother should not breastfeed is that the baby will be infected with the HIV virus.

TABLE 4.2 (B): Mother's views on milk substitutes given to the HIV positive mother's baby

Most common milk substitutes given to the HIV positive mother's baby (N=88)	
Milk substitute	**%**
Nan	37.59
Pelargon	9.09
Nan or Pelargon	1.14
Any formula milk	14.77
Nan or Nespray	13.64
Nan or Pelargon, or Lactogen	18.18
Pelargon or Nespray	1.14
Nespray	1.14
Nan or Lactogen	2.27
Pelargon or Lactogen	1.14

As seen in table 4.2 B, Nan was the most common milk substitute given to the HIV positive mother's baby. Also mentioned as substitutes for the baby were, Nespray, Pelargon and Lactogen.

4.5 Cultural Factors that influence the mother's choice to breastfeed

Of the 646 respondents questioned, 87.1% reported that their cultural beliefs will influence their choice to breastfeed or not. The mother of the respondent was reported to be the most likely person to influence the respondent when it comes to infant feeding choices. Exactly 78.9% said that their family will decide whether or not they should breastfeed.

Only 15.02% (97 respondents) of respondents felt that there are certain foods a mother should not eat when she is breastfeeding, with onion, cabbage and alcohol mentioned as the main foods to be avoided. The main reasons given for avoiding these foods during breastfeeding were:

- They cause the baby to become ill;
- Have a negative effect on the baby;

- Will spoil the milk.

Only 81 respondents (12.56%) wrongly thought that breast milk could spoil, and 98.68% said that sleeping around with men is the main cause for milk to spoil.

Out of the 645 respondents questioned, only 30 (4.56%) said that expressed breast milk could not be given to a baby. Of these, 38.10% felt that expressed breast milk will cause the baby to become ill.

Table 4.3: Cultural factors that influence choice to breastfeed

QUESTIONS RELATED TO CULTURAL FACTORS		
	YES (%)	**NO (%)**
N	**Will your culture determine whether you will breastfeed, or choose not to breastfeed?**	
640	87.15	12.85
	Are there foods that a mother may not eat when she is breastfeeding?	
640	15.02	84.98
	Do you believe that breast milk can spoil?	
640	12.56	87.44
	Can a mother give expressed breast milk for her baby?	
640	95.35	4.65

4.6 Associations between variables

The following associations between variables were determined:

Knowledge of breastfeeding and the following:

- Age
- BMI
- Marital status
- Level of education

Cultural factors and the following:

- Age
- BMI
- Marital status
- Level of education

4.6.1 Associations between knowledge of breastfeeding and age of the respondent

Associations between the mother's knowledge of breastfeeding and age (< 18years; ≥ 18 years) are presented in Tables 4.4 (categorical data) and 4.5 (continuous data).

Table 4.4: Associations between knowledge of breastfeeding and age of the mother: Categorical data

Questions related to knowledge of breastfeeding	Age (%)	
	< 18 y N = 44	**≥ 18 y N = 596**
Plans to breastfeed this child	100.00	97.83
Has received breastfeeding education	40.91	46.09
Will continue to breastfeed when baby has diarrhea	25.00	34.11
Will stop breastfeeding if pregnant again	70.45	57.40
Can start breastfeeding again if stopped	11.36	7.15
Knows that breastfeeding can help attain pre-pregnancy weight	47.73	60.30
Thinks that breast size determines how well one is able to breastfeed	59.09	67.61
Thinks that breastfeeding is a method of contraception that will definitely prevent one from becoming pregnant	11.36	8.97
Knows that one can breastfeed if returning to work again	95.45	92.52
Thinks that breastfeeding has advantages	63.64	64.45
Thinks that breastfeeding has disadvantages	2.27	3.33
Knows that one should continue to breastfeed with mastitis	4.55	3.16
Knows that one should continue to breastfeed with engorgement	75.00	82.39
Knows that one should continue to breastfeed with sore nipples	4.55	6.64
Thinks that one needs special food to breastfeed successfully	61.36	59.14
Thinks that the baby needs water as well as breast milk	40.91	58.64
Thinks that one needs to add other food to the babies diet before six months	59.09	67.94

Table 4.4: Associations between knowledge of breastfeeding and age of the mother Categorical data (continued)

Questions related to knowledge of breastfeeding	Age (%)	
	< 18 y N = 44	≥ 18 y N = 596
Knows that breast milk is the best milk for a newborn baby	100	99.83
Knows that an HIV-infected mother can breastfeed	77.27	72.59

No significant differences in categorical questions related to knowledge of breastfeeding were found between younger and older women in this study (table 4.4).

Table 4.5: Associations between knowledge of breastfeeding age of the mother: Continuous data

Questions related to knowledge of breastfeeding	Age					
	< 18 y N = 99			≥ 18 y N = 596		
	25%	MED	75%	25%	MED	75%
At what age should the baby receive water (months)?	2	5.5	6	2	4	6
At what age should the baby receive other foods (months)?	5	6	6	4	6	6
How long should the mother breastfeed exclusively (months)?	6	6	6	5	6	6
How long can the mother breastfeed in combination with complimentary foods (months)?	6	6	12	4	6	12

No significant differences in knowledge questions related to continuous data were found between younger and older women in this study (table 4.5).

4.6.2 Associations between knowledge of breastfeeding and BMI

Table 4.6 and 4.7 indicate the associations between the mother's BMI and her knowledge about breastfeeding for categorical data and continuous data respectively.

Table 4.6: Associations between knowledge of breastfeeding and BMI: Categorical data

Questions related to knowledge about breastfeeding	BMI (%)		
	< 25 kg/m^2 N = 51	≥ 25 kg/m^2 N = 589	CI for % differences
Plans to breastfeed this child	98.00	97.97	
Has received breastfeeding education	32.00*	49.80*	[-26.0% ; -8.8%]
Will continue to breastfeed when baby has diarrhea	34.67	33.20	
Will stop breastfeeding if pregnant again	55.33	59.31	
Can start breastfeeding again if stopped	8.67	7.09	
Knows that breastfeeding can help attain pre-pregnancy weight	58.94	59.72	
Thinks that breast size determines how well one is able to breastfeed	65.29*	70.24*	[-22.8% ; -5.2%]
Thinks that breastfeeding is a method of contraception that will definitely prevent one from becoming pregnant	10.60	8.70	
Knows that one can breastfeed if returning to work again	87.42*	94.33*	[-13.4% ; -1.9%]
Thinks that breastfeeding has advantages	53.64*	67.61*	[-22.9% ; -5.1%]
Thinks that breastfeeding has disadvantages	2.65	3.45	
Knows that one should continue to breastfeed with mastitis	1.99	3.64	
Knows that one should continue to breastfeed with engorgement	77.48	83.20	
Knows that one should continue to breastfeed with sore nipples	6.62	6.48	
Thinks that one needs special food to breastfeed successfully	53.64	60.93	
Thinks that one needs to add other food to the babies diet before six	76.16*	64.78*	[-1% ; 0]
Thinks that the baby needs water as well as breast milk	66.89*	54.66*	[3.3% ; 20.5%]

Table 4.6: Associations between knowledge of breastfeeding and BMI: Categorical data (continued)

Questions related to knowledge about breastfeeding	BMI (%)		
	< 25 kg/m^2 N = 51	≥ 25 kg/m^2 N = 589	CI for % differences
Knows that breast milk is the best milk for a newborn baby	100	99.80	
Knows that an HIV-infected mother can breastfeed	72.19	73.28	

- **Significant difference**

Significantly more overweight women (BMI ≥25kg/m^2) had received breastfeeding education (49.80%) compared to normal and underweight women with a BMI <25kg/m^2 (95% Confidence Interval (CI) for the median difference -26.0% ; -8.8%). Significantly more overweight women believed that breast size determines how well one is able to breastfeed (70.24%), compared to normal and underweight women (65.29%) (95% CI for median difference: -22.8% ; -5.2%). When asked if one can breastfeed if returning to work, significantly more overweight women knew that one could (94.33%) compared to normal and underweight women (53.64%), 95% CI -13.4% ; -1.9%. Overweight women were also more likely to know that breastfeeding has numerous advantages (67.61%) compared to women with a BMI <25kg/m^2 (53.64%) with a 95% CI for the median difference of -22.9% ; -5.1%. Normal and underweight women were significantly more likely to think that breastfed babies need water (66.89%) compared to overweight women (54.66%) with a 95% CI for the median difference of 3.3% ; 20.5%, and more overweight women (76.16%) thought that one should add additional food to the baby's diet before six months of age, compared to the 64.78% of normal and underweight women, with a 95% CI for the median difference of -1% ; 0%.

Table 4.7: Associations between knowledge of breastfeeding and BMI: Continuous data

Questions related to knowledge of breastfeeding	BMI					
	< 25 kg/m² N = 51			≥ 25 kg/m² N = 589		
	25%	MED	75%	25%	MED	75%
At what age should the baby receive water (months)?	2	3	6	3	5	6
At what age should the baby receive other foods (months)?	4	5	6	4	6	6
How long should the mother breastfeed exclusively (months)?	4	6	6	5	6	6
How long can the mother breastfeed in combination with complimentary foods (months)?	3	5	12	4	6	12

No significant differences in knowledge of breastfeeding (continuous data) were found between underweight and normal weight women with a BMI <25kg/m^2 compared to overweight women with a BMI ≥25kg/m^2.

4.6.3 Associations between the mother's knowledge of breastfeeding and marital status

Table 4.8 and table 4.9 show the association between knowledge of breastfeeding and marital status

Table 4.8: Association between knowledge of breastfeeding and marital status: Categorical data

Questions related to knowledge of breastfeeding	Marital status (%)		CI for % difference
	Single N = 404	Married N = 236	
Plans to breastfeed this child	99.53	94.86	
Has received breastfeeding education	38.84*	59.53*	[-28.5% ; -12.5%]
Will continue to breastfeed when baby has diarrhea	34.88	30.70	
Will stop breastfeeding if pregnant again	58.60*	57.67	

Table 4.8: Association between knowledge of breastfeeding and marital status: Categorical data (continued)

Questions related to knowledge of breastfeeding	Single N = 404	Married N = 236	CI for % difference
Can start breastfeeding again if stopped	8.14	6.05	
Knows that breastfeeding can help attain pre-pregnancy weight	58.00	62.33	
Thinks that breast size determines how well one is able to breastfeed	65.20	70.70	
Thinks that breastfeeding is a method of contraception that will definitely prevent one from becoming pregnant	11.14*	5.12*	[1.4% ; 10.0%]
Knows that one can breastfeed if returning to work again	92.81	92.56	
Thinks that breastfeeding has advantages	58.47*	76.28%*	[-24.8% ; -10.2%]
Thinks that breastfeeding has disadvantages	3.49	2.79	
Knows that one should continue to breastfeed with mastitis	2.55	4.65	
Knows that one should continue to breastfeed with engorgement	82.13	81.40	
Knows that one should continue to breastfeed with sore nipples	6.96	5.58	
Thinks that one needs special food to breastfeed successfully	55.92*	66.05*	[-17.8% ; -2.1%]
Thinks that the baby needs water as well as breast milk	59.16	53.95	
Thinks that one needs to add other food to the babies diet before six months	71.0*	60.0*	[3.3% ; 18.8%]
Knows that breast milk is the best milk for a newborn baby	100*	99.53*	[-0.5% ; 2.6%]
Knows that an HIV-infected mother can breastfeed	74.71*	69.30*	[-1.8% ; 12.9%]

Significantly more married mothers have received breastfeeding education before (59.53%), compared to single mothers (38.84%). More single mothers (11.14%) thought that breastfeeding was a method of contraception than there married counterparts (5.12%). Significantly more married mothers (76.28%) knew that there were advantages when breastfeeding a baby, compared to 58.47% of single mothers. More married mothers (66.05%) thought that they will need special types of food to breastfeed effectively, compared to 55.92% single mothers. The 95% CI for median differences were -17.8% ; -2.1%. However, more single mothers (71%) compare to 60% of married mothers, thought that the baby will need other food

including breast milk after 6 months of age, with a 95% CI for median differences of 3.3% ; 18.8%. Most of the mothers- 100% single and 99.53% married- knew that breast milk is the best food choice for their baby, with a 95% CI for median differences of -0.5% ; 2.6%. Single mothers (74.71%) predominantly believed that an HIV-positive mother can breastfeed, while 69.30% of married mothers also believed the same.

Table 4.9: Associations between knowledge of breastfeeding and marital status: Continuous data

Questions related to knowledge of breastfeeding	Single N = 404			Married N = 236		
	25%	MED	75%	25%	MED	75%
At what age should the baby receive water (months)?	3	4	6	2	4	6
At what age should the baby receive other foods (months)?	4	6	6	4	6	6
How long should the mother breastfeed exclusively (months)?	4	6	6	6	6	6
How long can the mother breastfeed in combination with complementary foods (months)?	4	6	12	6	7	18

No significant differences in the continuous data on knowledge of breastfeeding were found between single and married women (table 4.9).

4.6.4 Associations between the mother's knowledge of breastfeeding and level of education

Table 4.10 and 4.11 shows the association between level of education of the mother and her knowledge about breastfeeding for categorical and continuous data respectively.

Table 4.10: Association between knowledge of breastfeeding and level of education: Categorical data

Questions related to knowledge of breastfeeding	Level of education (%)			
	1 (< grade 7) N = 97	2 (grade 8-10) N = 248	3 (grade 11-12) N = 295	CI for % differences
Plans to breastfeed this child	97.94	97.98	98.29	
Has received breastfeeding education	43.30	43.55	47.95	
Will continue to breastfeed when baby has diarrhea	34.02	34.68	32.19	
Will stop breastfeeding if pregnant again	48.45*	60.08	60.27*	1-3 [-22.9% ; -0.5%]
Can start breastfeeding again if stopped	6.19	7.66	7.53	
Knows that breastfeeding can help attain pre-pregnancy weight	65.98*	66.94*	51.19*	1-3 [3.4% ; 25.2%] 2-3 [7.4% ; 23.7%]
Thinks that breast size determines how well one is able to breastfeed	65.98	73.39*	63.14*	2-3 [2.4% ; 17.9%]
Thinks that breastfeeding is a method of contraception that will definitely prevent one from becoming pregnant	7.22	11.69	7.85	
Knows that one can breastfeed if returning to work again	88.66	92.74	94.54	
Thinks that breastfeeding has advantages	56.70*	61.69	68.26*	1-3 [-22.9% ; -0.6%]
Thinks that breastfeeding has disadvantages	20.6	2.83	3.41	
Knows that one should continue to breastfeed with mastitis	4.12	4.03	2.39	
Knows that one should continue to breastfeed with engorgement	79.38	85.48	79.86	
Knows that one should continue to breastfeed with sore nipples	11.34*	7.66	3.75*	1-3 [1.9% ; 15.6%]
Thinks that one needs special food to breastfeed successfully	58.76	60.48	58.70	
Thinks that the baby needs water as well as breast milk	67.01*	64.92*	47.44*	1-3 [8.2% ; 29.8%] 2-3 [9.1% ; 25.5%]
Thinks that one needs to add other food to the babies diet before six months	71.13	75.13	58.70	
Knows that breast milk is the best milk for a newborn baby	100	100	99.66	
Knows that an HIV-infected mother can breastfeed	77.32	73.32	72.01	

Significantly more mothers from group 3 (education: grade 11-12) (60.27%), will stop breastfeeding if they were to fall pregnant again, compared to 48.45% of mothers from group 1 (education: < Grade 7), with 95% CI for median differences of -22.9 ; -0.5. Surprisingly, only 51.19% mothers from group 3 believed that breastfeeding will help them attain their pre-pregnant weight, while 65.98% of mothers from group 1, and 66.94% of mothers from group 2 the above mentioned believed. More mothers from group 2 (73.39%) thought that their breast size will determine how well they will be able to breastfeed, compared to 63.14% of mothers from group 3, and 65.98% of mothers from group 1, with a 95% CI for median differences between groups 2 and 3 of 2.4% ; 17.9%. Significantly more mothers from group 3 (68.26%) knew there were advantages when breastfeeding their babies, compared with 56.70% of mothers from group 1, with a 95% CI for median differences of -22.9 ; -0.6 for between groups 1 and 3. More mothers from group 1 (11.34%) knew that they should continue to breastfeed when they have sore nipples, compared to only 3.75% of mothers from group 3, with a 95% CI for median differences between groups 1 and 3 of 1.9% ; 15.6%. Only 47.44% of mothers from group 3 thought that their baby will need water as well breast milk, while 67.01% of mothers from group 1, and 64.92% of mothers from group 3 thought the same.

Table 4.11: Association between knowledge of breastfeeding and level of education: Continuous data

Questions related to knowledge of breastfeeding	1 <grade 7 N = 97			2 grade 8-10 N = 248			3 grade 11-12 N = 295		
	25%	MED	75%	25%	MED	75%	25%	MED	75%
At what age should the baby receive water (months)?	3	4	6	3	6	6	2	4	6
At what age should the baby receive other foods (months)?	4	4	6	4	6	6	4	6	6
How long should the mother breastfeed exclusively (months)?	4	6	6	5	6	6	6	6	6
How long can the mother breastfeed in combination with complimentary foods (months)?	3	6	12	4	6	12	5	6	12

No significant differences in the continuous data on knowledge of breastfeeding were found between women with different levels of education (table 4.11).

4.6.5 Associations between age of the mother and Cultural factors

Associations between the mother's age, and whether cultural factors (beliefs, influences of family members) will influence mothers to breastfeed or not are indicated in tables 4.12 and 4.13.

Table 4.12: Associations between culture and age of the mother

Questions related to culture	Age (%)	
	< 18 y N = 44	**≥ 18 y N = 596**
Culture will influence choice to breastfeed	97.73	86.38
Persons that will influence the mothers choice to breastfeed:		
No one	0.00	0.38
Mother	46.51	60.38
Husband	0.00	2.12
Grandmother	53.49	36.92
Other	0.00	0.19
There are certain foods that may not be eaten when a mother is breastfeeding	11.36	15.28
Are there foods that may not be consumed while breastfeeding?:		
Onion	60.00	68.54
Cabbage	20.00	17.98
Alcohol	0.00	2.25
Fish	20.00	3.37
Meat	0.00	3.37
Sour foods	0.00	2.25
Peanuts	0.00	1.12
Breast milk can spoil	11.36	12.65
Expressed breast milk should not be given to a baby	93.18	95.51

No significant differences in knowledge of breastfeeding were found between women that were younger than 18 years and women that were 18 years and older (table 4.12).

4.6.6 Associations between the mother's BMI and Cultural factors that might influence her choice to breastfeed

The association between the mother's BMI, and cultural factors (beliefs, influences of family members) will influence mothers to breastfeed or not is shown in table 4.13.

Table 4.13: Associations between culture and BMI of the mother

Questions related to culture	BMI (%)		
	< 25 kg/m² N = 51	≥ 25 kg/m² N = 589	CI for % differences
Culture will influence choice to breastfeed	86.09	87.45	
Persons that will influence the mothers choice to breastfeed:			
No one	0.00	0.46	
Mother	62.31	58.56	
Husband	2.31	1.85	
Grandmother	34.62	39.12	
Other	0.77	0.00	
There are certain foods that may not be eaten when a mother is breastfeeding	9.93*	16.60*	[-11.9% ; -0.1%]
Are there foods that may not be consumed while breastfeeding?:			
Onion	57.14	70.00	
Cabbage	14.29	18.75	
Alcohol	7.14	1.25	
Fish	7.14	3.75	
Meat	7.14	2.50	
Sour foods	0.00	2.50	
Peanuts	0.00	1.25	
Breast milk can spoil	10.67	13.16	
Expressed breast milk should not be given to a baby	92.00*	96.36*	[-10.0% ; -0.4%]

Significantly more normal weight and under weight women (16.60%) thought there were food items not be consumed when breastfeeding compared to only 9.93 % overweight women, with 95% CI for median differences -11.9% ; -0.1%. Most normal-, and underweight women (96.36%) also believed that expressed breast milk should not be given to their babies, compared to 92% of overweight women, with a 95% CI for median differences of -10% ; -0.4%.

4.6.7 Associations between marital status and cultural factors

The association between the mother's marital status and cultural factors is shown in table 4.14.

Table 4.14: Associations between culture and marital status

Questions related to culture	Marital status (%)	
	Single N = 404	**Married** N = 236
Culture will influence choice to breastfeed	87.94	85.58
Persons that will influence the mothers choice to breastfeed:		
No one	0.26	0.54
Mother	62.53	52.72
Husband	1.58	2.72
Grandmother	35.36	44.02
Other	0.26	0.00
There are certain foods that may not be eaten when a mother is breastfeeding	15.55	13.95
Are there foods that may not be consumed while breastfeeding?:		
Onion	70.77	62.07
Cabbage	18.46	17.24
Alcohol	1.54	3.45
Fish	4.62	3.45
Meat	1.54	6.90
Sour foods	1.54	3.45
Peanuts	1.00	3.45
Breast milk can spoil	13.95	9.77
Expressed breast milk should not be given to a baby	94.65	96.74

No significant differences in the influence of cultural factors on breastfeeding were found between women that were single and married (table 4.14).

4.6.8 Associations between the mother's level of education and cultural factors

The association between the mother's level of education and cultural factors is illustrated in table 4.15.

Table 4.15: Associations between culture and level of education of the mother

Questions related to culture	Level of education (%)		
	<Grade 7 N = 97	Grade 8-10 N = 248	Grade 11-12 N = 295
Culture will influence choice to breastfeed	90.72	88.71	86.35
Persons that will influence the mothers choice to breastfeed:			
No one	1.14	0.45	0.00
Mother	67.05	59.09	56.92
Husband	1.14	2.27	1.98
Grandmother	29.55	38.18	41.11
Other	1.14	0.00	0.00
There are certain foods that may not be eaten when a mother is breastfeeding	17.53	11.69	16.72
Are there foods that may not be consumed while breastfeeding?:			
Onion	62.50	68.97	72.34
Cabbage	18.75	24.14	14.89
Alcohol	6.25	0.00	2.13
Fish	12.50	3.45	2.13
Meat	0.00	0.00	4.26
Sour foods	0.00	0.00	4.26
Peanuts	0.00	3.45	0.00
Breast milk can spoil	16.49	14.11	9.93
Expressed breast milk should not be given to a baby	94.85	94.35	96.23

No significant differences in the effect of culture on breastfeeding practices were found between women with different levels of education (table 4.15)

CHAPTER 5
DISCUSSION OF RESULTS

5.1 Introduction

In this chapter, possible reasons for findings will be given, and where possible, results will be compared to other similar studies.

5.2 Socio-demographic background

During this study, diverse subject characteristics were found in terms of maternal age, marital status, education, employment, and breastfeeding culture and beliefs.

The 646 mothers-to-be questioned in the Mangaung study had a mean age of 25.5 years and a mean gestational age of 25 weeks. In the study done by Sibeko et al., (2005) to document the breastfeeding practices, beliefs, and attitudes of periurban South African lactating mothers with infants younger than 6 months, mothers had a mean age of 26 years which was very similar to the mean age of mothers included in this study.

Most of the respondents in the Mangaung study (n=408) (63.16%) were single, just as most of the respondents (57.87%) in the Bland et al., (2002) study done on South African women living in a rural area of high HIV prevalence, were also single. The Bland et al., (2002) study aimed to assess exclusive breastfeeding rates and the impediments to exclusive breastfeeding.

The highest level of education obtained by the mothers in Mangaung was Grade ten; which was much higher than the level of education of mothers in a study undertaken in Makurdi, Nigeria, where the average level of education was primary school (Igbedioh et al., 1995). Most mothers in both these studies were unemployed.

Most (87.77%; N=567) of the respondents in Mangaung as well as in Makurdi, Nigeria (Igbedioh, 1994), lived in brick houses, while only a small number lived in either tin, traditional mud, or wood houses.

5.3 BMI

The ideal target for the mother's weight gain during pregnancy remains largely undetermined, especially as the prevalence of obesity increases. At the same time, the variable of weight gain during pregnancy can have significant effects on maternal and fetal outcomes (Dalsy & Hartmann, 1995). While weight and obesity have long concerned women due to looks and lifestyle issues, it is becoming increasingly evident that obesity has a significant impact on health. Obesity in women can cause serious pregnancy-related complications, but it is a risk factor that can be modified to improve birth outcomes (Dalsy & Hartmann, 1995).

Research has shown that obesity increases the risk of adverse outcomes for both mother and baby (Banapurmath et al., 1996). The dramatically increasing rate of obesity and the increasing rate of preterm births (PTB) have led to the investigations of an association of maternal obesity with PTB (Nath et al., 1997). Findings in the above mentioned study suggest that, while obesity may not be an independent risk factor for PTB, obesity does increase rates of medical complications (such as hypertension and diabetes) that have been shown to contribute to PTB. However, according to Denison et al. (2008), a higher maternal BMI in the first trimester may also be associated with longer gestation and an increased risk of postdates pregnancy. Higher maternal BMI during the first trimester was also associated with decreased likelihood of spontaneous onset of labour at term and increased likelihood of complications.

Obesity and being overweight are associated with a variety of adverse health outcomes, such as: cardiovascular disease, some types of cancer, diabetes,

stroke, respiratory problems and arthritis (Banapurmath et al., 1996). Underweight women with a low pre-pregnancy weight as well as maternal weight are also at increased risk for adverse pregnancy outcomes, including PTB and low birthweight (LBW) (Lipsky et al., 1994) (Sebire et al., 2001). For these reasons, all individuals should be encouraged to maintain or work towards a healthy body mass index during pregnancy.

The prevalence of overweight mothers in the studied group in Mangaung was an outstanding anthropometric feature, with 90% of mothers having a BMI of 25 kg/m^2 or more. Only 8.68% of the mothers had a normal BMI of between 20 kg/m^2 and 25 kg/m^2, and 8 of the mothers had a BMI of less than 20 kg/m^2 and were classified as underweight. This is of great concern, due to the fact that obese pregnant women are of greater risk is to deliver prematurely (<32 weeks) (Banapurmath et al., 1996). An obese pregnant woman also has an increased risk of early or late fetal death, if it is her first pregnancy. The chance of a still born baby at 28 weeks is also increased, and the rate of pre-eclampsia will increase with an increase of the mother's BMI (Sebire et al., 2001).

In a retrospective cohort study done in Sweden by Denison et al. (2008) on 186 087 mothers, an average first trimester pregnancy BMI of 22.9 kg/m^2 was noted. The median BMI measured during the first trimester was higher in those mothers delivering after their due dates compared with those delivering at term. According to a retrospective analysis of data from a validated maternity database system, which includes all but one of the maternity units in the North West Thames Region, a total of 287,213 completed singleton pregnancies were studied including 176,923 (61.6%) normal weight (BMI 20--24.9), 79 014 (27.5%) moderately obese (BMI 25--29.9) and 31,276 (10.9%) very obese (BMI> or =30) women (Sebire et al., 2001). In the previously mentioned study, moderately obese and very obese mothers were more likely to develop gestational Diabetes Mellitus; proteinuric pre-eclampsia; induction of labour; delivery by emergency

caesarian section; postpartum haemorrhage; genital tract infection; urinary tract infection; wound infection; birthweight above the 90th centile; and intrauterine death.

5.4 Knowledge about breastfeeding

The majority of mothers from this study (97.98%) were planning to breastfeed their child, while only 1.40% did not want to breastfeed (table 4.2). This is in contrast to the results reported in a study done by Sibeko et al. (2005) on a group of periurban mothers in South Africa. None of the mothers from Sibeko's study were planning to exclusively breastfeed their child, while 78% of the respondents mentioned that they might breastfeed, but would definitely include complementary foods in the baby's diet. Breastfeeding was also the choice feed in a study done by Kruger & Gericke (2003) in the Moretele district in South Africa, as well as in rural Mexico (Lipsky et al., 1994) and Hong Kong, China (Koo et al., 1986), while bottle feeding was only considered when breastfeeding was not possible.

In comparison with the study done by Koo et al., (1986), the incidence of breastfeeding did not relate to increasing levels of education. Most of the respondents in the current study were planning to breastfeed their baby. Delayed initiation of breastfeeding was also evident in a study done by Banapurmath et al. on mothers in villages of central Karnataka where 35% of mothers claimed that they were not planning to breastfeed their baby (Banapurmath et al.,1996).

Of the 1.40% respondents in this study that did not want to breastfeed, a maximum of 33.33% mentioned that their reason for not planning to breastfeed was some kind of illness, compared to 90% of respondents in the Sibeko study (2005) saying that their reason for not wanting to exclusively breastfeed was an inadequate milk supply. The major reasons why mothers in central Karnataka in India did not plan to breastfeed was because they believed they did not have enough milk (58.1%),

they thought they might fall pregnant again (35.8%), and ill health of the mother (20.7%) (Banapurmath et al., 1996).

The mean age at which mothers reported that they would give liquids/water to their baby was 4 months, compared to 2 months (range 0-5 months) in a study done by Lipsky et al, (1994). Mothers in the previously mentioned study would consider giving their babies solid foods at the age of 4 months, while respondents in this study only thought of giving solids by the age of 4-6 months. According to Lipsky et al, (1994), fresh powdered milk was the usual supplement for breastmilk, and only 5 babies in the Lipsky study received commercial infant formula. “Nan”, however was the preferred breastmilk supplement for babies in Mangaung, followed closely by “Lactogen” and “Pelargon”, while Nan was also the leading brand name formula in Nigeria (Igbedioh et al., 1995). Other breastmilk substitutes that were also considered in that study were “Cerelac” and “SMA” (Igbedioh et al., 1995).

5.5 Cultural factors

The effects of culture can be helpful, neutral, and even harmful to the success of breastfeeding.

Of the 646 respondents questioned in this study, 87.15% reported that their cultural beliefs will influence their choice to breastfeed or not. The mother of the respondent was reported to be the most likely person to influence the respondent when it comes to infant feeding choices. Approximately 78.87% said that their family will decide whether or not they should breastfeed. In Nigeria, most of the Idoma women questioned mentioned that it is the hospital and fathers that are most influential in making infant feeding choices (Igbedioh et al., 1995). This is in contrast to results found in a study done by Bland et al. (2002) in KwaZulu Natal, South Africa. In the above mentioned study, feeding choices were mainly self-determined (43%) (N=445), but health staff (22%) and grandmothers (16%) were cited as sources of advice. However, the women in the study done by Lipsky et al.,

(1996) generally based their decisions regarding feeding practices on their custom and advice given by their doctor.

Only 15% (97 respondents) of respondents from the study done in Mangaung felt that there are certain foods a mother should not eat when she is breastfeeding, with onion, cabbage and alcohol mentioned as the main foods to be avoided. The main reasons given for avoiding these foods during breastfeeding were that they cause the baby to become ill; have a negative effect on the baby; and will spoil the milk.

Only 81 of the Mangaung respondents (12.56%) wrongly thought that breast milk could spoil, and 98.68% of these respondents said that sleeping around with men is the main cause for milk to spoil. One of the major reasons for mothers from the villages of central Karnataka to introduce bottle feeding was the fear that their milk might not be enough for their babies (58.1%) (Banapurmath et al., 1996). Other reasons for not introducing breast milk in the villages of central Karnataka were the ill health of the mothers (20.7%), and subsequent pregnancies (35.8%). More reasons why mothers in rural Mexico (Lipsky et al., 1994) were reluctant to introduce breast milk to their babies were illness of the mother; insufficient milk supply; and an ill child.

Mexican mothers also denied their babies colostrum when they were advised by their doctors against it or when the mother was ill or had a breast problem. Breastfeeding was also withheld for 4-5 hours if the child was vomiting or had diarrhea, or had been in the sun for too long (Lipsky et al., 1994). Insufficient milk supply was the main reason given for supplementation by 52.3% of New Delhi mothers, while 28% cited breast rejection by the baby as the reason for not breastfeeding their child (Sachdev & Mehrotra, 1995).

Out of the 645 Mangaung respondents questioned, only 30 (4.56%) said that expressed breast milk could not be given to a baby. Of these, 38.10% felt that

expressed breast milk will cause the baby to become ill. It is evident that in countries and regions where breastfeeding promotion and support programs have been well installed, rates of exclusive breastfeeding and other optimal breastfeeding practices appear to be improving more dramatically. Nevertheless, in many developing countries certain cultural beliefs continue to interfere with optimal breastfeeding, especially feeding colostrum and breastfeeding (Martines et al., 1989). In every culture, specific beliefs that will influence optimal breastfeeding need to be identified through formative research and addressed through effective, well-designed behaviour change communication to promote and support optimal breastfeeding practices (Wandersman et al., 1996).

5.6 Associations between variables

While no significant differences in the continuous data on knowledge of breastfeeding were found between Mangaung women with different levels of education, educated mothers from Nigeria (Igbedioh, 1994) and India (Nath & Goswami, 1997) were more likely to stop breastfeeding at an earlier stage than non-educated women. Reasons for this included the fact that educated mothers are more likely to be involved in economic activities away from home, thus causing them to stop breastfeeding and switch to bottle feeding (Nath & Goswami, 1997). This was also evident in a study done in Jordan (Khassawneh et al., 2006) where less-educated women were more likely to breastfeed for longer than women with higher education levels. In contrast, education has been shown to have a positive effect on breastfeeding in Western communities and developed countries (Di Napoli et al., 2006; Lanting et al., 2005). By self-report, factors that would encourage bottle feeding mothers to breastfeed include more information in prenatal classes, more information from TV, magazines, and books; and family support (Arora et al., 2000)

In a study by Fawzia (1997), the mean duration of breast-feeding in Kuwait was significantly longer among illiterate mothers and those with primary-school education (6.2 and 6.3 months respectively), compared to mothers who were university graduates (3.7 months). The results also showed that 31.0% of mothers from the latter group breast-fed their infants for less than one month, while 35.0% of illiterate mothers continued breast-feeding until the infant was 9 months or older.

According to Fawzia (1997), the mean age at which mothers in Kuwait would start complementary feeding was also significantly modified by the educational level of the mother. It was 5.4 months among children of illiterate mothers, against 4.8 months when the mother was a university graduate. In addition, 7.0% of the mothers from the latter group started complementary feeding when the infant was younger than 3 months. On the other hand, 32.0% of illiterate mothers and 39.5% of mothers with primary-school education delayed the introduction of complementary feeding until the age of 6 months or more.

According to Yang et al. (2004), in a study done on 1113 women in Alberta, Canada, determents of breastfeeding initiation were marital status, education, maternal smoking behavior, and annual family income. In this study, white women and women who were older than 35 years of age were more likely to continue breastfeeding for longer periods, whereas those who smoked during pregnancy were less likely to breastfeed their infants for extended periods. The primary reasons given for weaning were breast problems at less than 1 week, insufficient milk production during weeks 1 to 12, and infants who weaned themselves after 3 months.

Interestingly, in a review done by Scott and Binns (1999) of literature identifying factors associated with the initiation and duration of breastfeeding among Western women, there was a strong association with demographic factors such as parity, method of delivery and infant health, and less consistent association with factors such as marital and socio-economic status. Scott and Binns (1999) also reported a negative association between maternal smoking habits and breastfeeding duration.

In the above mentioned study, fathers also play an important role in breastfeeding decision and the intended duration thereof.

Kulakac et al. (2007) investigated the changes employed mothers of infants aged 0-24 months made in their nutrition with the aim of increasing their milk production and extending their breastfeeding period. The study was done on 135 full-time employed mothers who enrolled for the study at Akdeniz University Hospital in Turkey. According to the researcher mentioned above, all of the mothers made changes in their diets while breastfeeding. The main change that mothers made was to increase their fluid intake (38.6%) while second was to increase their consumption of sweets (25.3%). The main type of food mothers excluded from their diet was dried legumes and grains (28.9%). The most important reason for this was the belief that these food items will increase the baby's chance of developing colic (89.4%). There were also statistically significant differences between foods avoided by breastfeeding mothers related to their age, level of education and those who mentioned increasing their consumption of fluids.

In a prospective birth co-hort study done on 1803 live-born children and their mothers in Perth, Australia, Oddy et al. (2006), concluded that pregnancy BMI is associated with reduced breastfeeding duration, and that mothers who are overweight or obese before pregnancy tend to breastfeed their infants for shorter duration than normal weight mothers independent of maternal socioeconomic and demographic characteristics. Similarly, a systematic review conducted in January and February 2007, using the following databases: Medline, CINAHL and the Australian Breastfeeding Association's Lactation Resource Centre, concluded that overweight and obese women are less likely to breastfeed than normal weight women (Amir & Donath, 2007). The reasons given may be biological or psychological, behavioral and/or cultural.

5.7 Limitations of the study

A possible limitation to the study was language. Most of the mother's home language was Sotho (55.73%) and Tswana (23.99%), and only 0.31% spoke English, and 0.93% Afrikaans at home. To overcome this limitation, trained interviewers, together with Sotho and Tswana interpreters were used to complete the questionnaire in an interview with each respondent.

CHAPTER 6
CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

In this study of a community where cultural beliefs and taboos are still very much practiced poor knowledge about breastfeeding and breastfeeding practices were identified. The stigma around HIV and AIDS are also reflected in the current feeding choices mothers make for their unborn children.

6.2 Conclusions

The following conclusions evolved from the study:

6.2.1 Socio-demographic factors

The main conclusions related to socio-demographic factors include the following:

- The mean age of the women who participated in this study was 26.7 years, with the mean gestational age of 25 weeks.
- The maximum years the women lived in an urban area were 39 years, with a minimum of 1 year.
- A majority of 55.73% of the participants' home language was Sotho, while only 0.31% spoke English at home. Tswana was spoken by 23.99%, while 0.93% spoke Afrikaans at home.
- The majority of respondents were unmarried (63.16%).
- As many as 15 people lived together in some houses, with an average room density of 4.5 people.
- Grade 10 was the average level of education achieved by the respondents, and 75.54% of respondents were unemployed.

- In most households only 1 person contributed to the household's monthly income, with 44.58% of households receiving between R501 to R1000 per month, and only 1% of households earned more than R5000 per month.
- In 45.67% of households the parent was the head of the household, and 87.77% of respondents lived in a brick house.

6.2.2 BMI

The main conclusions related to BMI include the following:

- Ninety percent of women had a BMI of 25kg/m^2 or more, indicating overweight.
- Only 8.68% of respondents had a BMI in the normal range of 20-25kg/m^2
- Very few women (only 8) were underweight.

6.2.3 Knowledge about breastfeeding

The main conclusions related to knowledge about breasfeeding include the following:

- The majority of respondents (97.98%) were planning to breastfeed their child. Of the 1.40% that were not planning to breastfeed, 33.33% mentioned that their reason for not planning to breastfeed was illness.
- Almost 46% of respondents had received breastfeeding education before the interview, and 54.74% of these received it from the local clinic sister.
- Only 9.13% of mothers thought that breastfeeding was a method of contraception, while 83.90% of the mothers did not think that breastfeeding will prevent her from falling pregnant again.
- Most of the mothers (92.72%) believed that they could go back to work when they are breastfeeding.
- Most mothers did not think that breastfeeding should continue when the baby has diarrhea (53.80%).

- Most of the mothers believed that they should stop breastfeeding if they are pregnant again (58.29%), and will then not be able to start to breastfeed again (79.69%).
- The majority of the mothers also believed that the size of their breasts determined the efficacy of their breastfeeding practices (67.03%).
- Most respondents (64.40%) believed that breastfeeding has advantages.
- Only 3.26% of respondents believed that breastfeeding has disadvantages.
- Most of the mothers (90.25%) did not believe they should continue to breastfeed when they have mastitis, while most of them (81.89), also believed that they should continue to breastfeed when engorgement is present.
- Most of the mothers (59.29%) believed that the mother will need special types of food to ensure that she breastfeeds successfully.
- The average age at which the mothers would give their babies water in combination with breast milk was 4 months (n=370). Most (67.34%) of the respondents also reported that they would add extra food to the diet of the breastfed baby before 6 months.
- Out of 645 respondents, 644 (99.84%) respondents believed that breast milk is the best food for a newborn baby, and only 1 (0.16%) respondent believed that formula milk was better than breast milk.
- Almost three quarters (72.91%) of respondents believed that a mother should breastfeed her baby even if she is HIV infected, while 15.33% believed that the HIV infected mother should not breastfeed her baby. Of these, 25.56% said that the main reason a HIV positive mother should not breastfeed is that the baby will be infected with the HIV virus.

6.2.4 Cultural factors

Inadequate nutritional knowledge and adherence to cultural practices lead to poor quality feeding practices. Most (87.15%) respondents reported that their cultural

beliefs will influence their choice to breastfeed or not. Thus, cultural factors and taboos have a very powerful influence on feeding practices and eating patterns. Young mothers often find it impossible to ignore their ill-informed elders or peers, with 78.87% of respondents that said that their family will decide whether or not they should breastfeed. Nutrition knowledge needs to be changed in a first step toward implementing improved feeding practices, and an effort should be made towards achieving cultural competence. The only way towards achieving cultural competence should be self-assessment of one's (mother and healthcare provider) own blind spots and biases. Identifying the ways in which the mother's/healthcare provider's "home" culture might influence his/her views on breastfeeding (Riordan et al.., 2001).

6.2.5 Associations between variables

The following associations between variables were determined:
Knowledge of breastfeeding with age, BMI, marital status and level of education as well as cultural factors with age, BMI, marital status and level of education.

- Significantly more overweight women (BMI $\geq$25kg/m^2) had received breastfeeding education (49.80%) compared to normal and underweight women with a BMI <25kg/m^2.
- Significantly more overweight women believed that breast size determines how well one is able to breastfeed (70.24%), compared to normal and underweight women (65.29%).
- When asked if one can breastfeed if returning to work, significantly more overweight women knew that one could (94.33%) compared to normal and underweight women (53.64%).
- Overweight women were more likely to know that breastfeeding has numerous advantages (67.61%) compared to women with a BMI <25kg/m^2 (53.64%).

- Normal and underweight women were significantly more likely to think that breastfed babies need water (66.89%) compared to overweight women (54.66%).
- More overweight women (76.16%) thought that one should add additional food to the baby's diet before six months of age, compared to the 64.78% of normal and underweight women.
- Significantly more married mothers have received breastfeeding education before (59.53%), compared to single mothers (38.84%).
- More single mothers (11.14%) thought that breastfeeding was a method of contraception than there married counterparts (5.12%).
- Significantly more married mothers (76.28%) knew that there were advantages when breastfeeding a baby, compared to 58.47% of single mothers.
- More married mothers (66.05%) thought that they will need special types of food to breastfeed effectively, compared to 55.92% single mothers.
- However, more single mothers (71%) compared to 60% of married mothers, thought that the baby will need other food including breast milk after 6 months of age.
- Most of the mothers (100% single and 99.53% married) knew that breast milk is the best food choice for their baby.
- Single mothers (74.71%) predominantly believed that an HIV-positive mother can breastfeed, while 69.30% of married mothers also believed the above mentioned.
- Significantly more mothers with grade 11-12 education (60.27%), will stop breastfeeding if they were to fall pregnant again, compared to 48.45% of mothers with school education < Grade 7.
- Surprisingly, only 51.19% mothers with grade 11-12 education believed that breastfeeding will help them attain their pre-pregnant weight, while 65.98% of mothers from group 1, and 66.94% of mothers from group 2 believed this.

- More mothers from group 2 (73.39%) thought that their breast size will determine how well they will be able to breastfeed, compared to 63.14% of mothers from group 3, and 65.98% of mothers from group 1.
- Significantly more mothers from group 3 (68.26%) knew there were advantages when breastfeeding there babies, compared with 56.70% of mothers from group 1.
- More mothers from group 1 (11.34%) knew that they should continue to breastfeed when they have sore nipples, compared to only 3.75% of mothers from group 3.
- Only 47.44% of mothers from group 3 thought that their baby will need water as well breast milk, while 67.01% of mothers from group 1, and 64.92% of mothers from group 3 thought the same.
- Significantly more normal weight and under weight women (16.60%) thought there were food items not be consumed when breastfeeding compared to only 9.93 % overweight women.
- Most normal weight and underweight women (96.36%) also believed that expressed breast milk should not be given to their babies, compared to 92% of overweight women.

6.3 Recommendations

Recommendations to improve breastfeeding practices are discussed in the following section:

Ideally, infant and young child feeding should be viewed from a life course perspective that begins with a well-nourished woman and proceeds through a healthy pregnancy and a safe and supportive delivery and postpartum period (Kong & Lee, 2004). Following childbirth, women continue to need timely and accurate information, encouragement, and support to address their concerns and to enable them to practice optimal breastfeeding, which includes timely initiation of breastfeeding; exclusive breastfeeding for six months; the introduction of

adequate, safe, and appropriate complementary foods at six months; and continued breastfeeding up to two years of age or beyond (WHO, 2000).

The development of community-based initiatives for breastfeeding promotion and support is an extension of more than two decades of global advocacy and systematic research. Evidence indicates that community-based breastfeeding promotion and support can be effective in increasing optimal breastfeeding and improving infant health (Wandersman et al., 1996). As experience with community-based approaches increases, the elements that define the capacity for behaviour change and specific strategies for success are becoming clear.

Community-based strategies, health system strategies, and national policies all have a role in creating a supportive environment for optimal infant and young child feeding, growth, and development (Arora et al., 2000). Development of successful infant-feeding interventions aimed at promoting overall infant health can benefit from knowledge of these breastfeeding patterns. Communities can make a major difference in improving infant and young child feeding. This is particularly so when community members participate in the design of interventions and, with expert support, contribute to shaping the content and mode of delivery. Full engagement of health care providers and supportive policies are other elements important for success.

Breastfeeding counseling and training within the context of HIV is another very important factor. This will ensure that breastfeeding is not undermined by the current HIV-pandemic, and exclusive breastfeeding continues to be promoted for all HIV-uninfected women, women of unknown status, and HIV-infected women who choose to breastfeed (Mennella, 1997).

The capacity for breastfeeding behaviour change at the community level requires effective leadership, forming intersectional partnerships, informing and engaging

opinion leaders, conducting formative research to shape explicit and effective messages, and monitoring and evaluating program progress. Strategies for improving breastfeeding behaviour include approaches that focus on individual as well as group behaviour based on behaviour change theory and address stages of change, including trials of improved practices. Well-designed behaviour change communication, training of health-care workers and lay counselors to provide accessible and appropriate counseling support to mothers, and active involvement of women's groups are important elements of effective breastfeeding behaviour change strategies that may be applied somewhat differently in diverse circumstances (Arora et al., 2000).

Attention is required to integrate breastfeeding with multiple programs affecting maternal and child health and nutrition in the formal health sector and the community at large. Attention is also needed to support breastfeeding mothers in circumstances that require them to return to work in the first few weeks or months postpartum. Special care must also be taken regarding breastfeeding promotion and support in HIV-prevalent areas and emergency situations (Ward et al., 2004). Because obese women may be hesitant to gain any weight at all during their pregnancy, professional and appropriate dietary recommendations should be made by their health professionals, to ensure adequate weight gain for adequate fetal development.

Although it may not be possible to prevent every case of insufficient milk supply, breastfeeding tragedies are preventable by appropriate education of parents and professionals, vigilant screening for lactation risk factors, early follow up after hospital discharge, appropriate guidance for breastfeeding mothers, and timely intervention when ineffective breastfeeding is detected (Chezem et al., 2003).

The following practice strategies will help to ensure optimal outcomes in breastfed infants:

- Encourage expectant mothers to attend a prenatal breastfeeding class and to become as knowledgeable as possible about breastfeeding before delivery.
- Ensure that pregnant women undergo a prenatal breast examination to screen for anatomic variations that could impact lactation performances.
- Hands on assistance in the hospital setting to help the mother get the best possible start with breastfeeding, including hands on assistance with correct breastfeeding technique.

Thus, culturally and linguistically sensitive breastfeeding promotion and postpartum support services will ensure that pregnant mothers and their families will get the best help and support regarding feeding choices for the new born, as well as all the needed knowledge and information regarding breastfeeding and feeding practices (Kong & Lee, 2004).

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APPENDIX A

Associations between knowledge of breastfeeding with Cultural factors and Maternal characteristics of pregnant women attending the ante-natal clinic at MUCPP
CHARACTERISTICS OF THE MOTHER
(All information in this questionaire is confidential)

Name:_____

Respondent number: [ ][ ][ ] 1-3

	D	D	M	M	Y	Y	Y	Y	
Birth Date:									4-11
Interview Date:									12-19

Age (years) if Birth Date unknown:_____ [ ][ ] 20-21

Gestational age:_____ **weeks** [ ][ ] 22-23

Address:_____
Tel No (H):_____ **(W):**_____

How many years have you been living in an urban area (like Mangaung)? [ ][ ] 24-25

Encircle the appropriate answer:

Language: [ ] 26
1. Sotho
2. Tswana
3. English
4. Afrikaans
5. Other, specify_____

Number of children: (born):_____ [ ][ ] 27-28
Number of children: (alive):_____ [ ][ ] 29-30

Do you smoke at all? [ ] 31
1. Yes
2. No

If yes, how many cigarettes per day? [ ][ ] 32-33

Household composition:

How many persons live in the house permanently (5-7 days per week)? [ ][ ] 34-35
Number of children (< 18 yrs):_____ [ ][ ] 36-37
Number of adults (> 18 yrs):_____ [ ][ ] 38-39

Marital status of respondent: [ ] 40

1. Single
2. Married
3. Divorced
4. Separated
5. Widowed
6. Living Together
7. Traditional Marriage
8. Other, specify_____

What is your highest level of education? ☐☐ 38-39

0. None
1-12. Grade 1-12 Grade_____
13. Tertiary education
14. Other

Employment status of respondent ☐ 43

1. Housewife by choice
2. Unemployed
3. Self Employed
4. Full time wage earner (receive a salary)
5. Other, specify (part-time, piece job etc.)_____
6. Don't know

Who is the head of this household? ☐ 44

1. Self
2. Husband
3. Children
4. Parent
5. Grandparent
6. Friend
7. Other, specify_____

Type of dwelling: ☐ 45

1. Brick, Concrete
2. Traditional mud
3. Tin
4. Plank, wood
5. Other, specify_____

How many people contribute to the total income?_____ ☐☐ 46-47

Household income per month (including wages, rent, sales of vegs, etc. State grants). ☐ 48

1. None
2. R100-R500
3. R501-R1000
4. R1001-R3000
5. R3001-R5000
6. Over R5000
7. Don't know

Is this more or less the income that you had over the past six months? ☐ 49

1. Yes
2. No

ANTHROPOMETRIC MEASUREMENTS

WEIGHT

On date of interview_____ kg ☐☐☐☐ 50-54

HEIGHT

_____ cm ☐☐☐☐ 55-59

APPENDIX B

Associations between knowledge of breastfeeding, Cultural factors and Maternal characteristics of pregnant women attending the ante-natal clinic at MUCPP

KNOWLEDGE AND CULTURAL FACTORS ABOUT BREASTFEEDING
(All information in this questionaire is confidential)

KNOWLEDGE ABOUT BREASTFEEDING

Did you breastfeed your previous children?

Child 1	1. YES 2. NO	☐ 1
Child 2	1. YES 2. NO	☐ 2
Child 3	1. YES 2. NO	☐ 3
Child 4	1. YES 2. NO	☐ 4
Child 5	1. YES 2. NO	☐ 5

If NO, why NOT?

Child 1:	_____	☐ 6
Child 2:	_____	☐ 7
Child 3:	_____	☐ 8
Child 4:	_____	☐ 9
Child 5:	_____	☐ 10

Do you plan to breastfeed this child? ☐ 11

1. Yes
2. No
3. Not sure

If NO, why not?

A: _____ ☐ 12

B: _____ ☐ 13

C: _____ ☐ 14

Have you ever received breastfeeding education before this interview? ☐ 18

1. YES
2. NO

If YES, from whom? _____

_____ ☐☐ 19-20

- Should you continue to breastfeed your baby when the baby has diarrhea? ☐ 21

1. YES
2. NO
3. NOT SURE

- Should you stop breastfeeding if you find out that you are pregnant again? ☐ 22

1. YES
2. NO
3. NOT SURE

- Can you start breastfeeding again after you have stopped for a few weeks or months? ☐ 23

1. YES
2. NO
3. NOT SURE

- Does breastfeeding help you attain your pre-pregnancy weight more quickly? ☐ 24

1. YES
2. NO
3. NOT SURE

- Does your breast size determine how well you will be able to breastfeed? ☐ 25

1. YES
2. NO
3. NOT SURE

- Is breastfeeding a method of contraception that will definitely prevent you from becoming pregnant? ☐ 26

1. YES
2. NO
3. NOT SURE

- Can you breastfeed even if you have to go back to work? ☐ 27

1. YES
2. NO
3. NOT SURE

- Do you think there are any advantages to breastfeed? ☐ 28

1. YES
2. NO
3. NOT SURE

- If YES, what do you think the advantages of breastfeeding are?

A: _____ ☐☐ 29-30
B: _____ ☐☐ 31-32
C: _____ ☐☐ 33-34

- Do you think there are any disadvantages to breastfeed? ☐ 35

1. YES
2. NO
3. NOT SURE

- If YES, what do you think the disadvantages of breastfeeding are?

A: _____ ☐☐ 36-37
B: _____ ☐☐ 38-39
C: _____ ☐☐ 40-41

- Should you continue to breastfeed if you have Mastitis (Breast infection)? ☐ 42

1. YES
2. NO
3. NOT SURE

- Should you continue to breastfeed if you have engorgement (breasts that become too full)? ☐ 43

1. YES
2. NO
3. NOT SURE

- Should you continue to breastfeed if you have sore nipples? ☐ 44

1. YES
2. NO
3. NOT SURE

- Do you as a mother need special types of food to breastfeed successfully? ☐ 45

- If a mother is breastfeeding her baby, do you think that baby should be given water as well as the breast milk? ☐ 46

1. YES
2. NO
3. NOT SURE

if YES, at what age should the mother give her baby water? ☐☐ 47-48
_____ months

- If a mother is breastfeeding her baby, do you think that baby should be given any other foods well as the breast milk? ☐ 49
(If the baby is <6 months)
1. YES
2. NO
3. NOT SURE

If YES, at what age should the mother give her baby other foods? ☐☐ 50-51
_____ months

- How long should you breastfeed exclusively? ☐☐ 52-53
(giving your baby only breast milk, and no other foods, drinks, water and/or dummies)
_____ months

- How long can you breastfeed in combination with complementary foods (other food that the baby receives)? ☐☐ 54-55
_____ months

- What milk is thew best for the newborn baby? ☐ 56

1. Breast milk
2. Formula milk
3. Cow's milk
4. Other

- Should a mother who is HIV positive breastfeed her baby? ☐ 57

1. YES
2. NO
3. NOT SURE

If NO, why not? _____ ☐☐ 58-59

If NO, what other types of milk should she give her baby? ☐☐ 60-61
_____
_____
_____

CULTURAL FACTORS

- Will your culture (beliefs/influences of mother and/or family) determine whether you will breastfeed, or choose not to breastfeed? ☐ 62

1. YES
2. NO

If YES, who will influence your choice to breastfeed or not to? ☐ 63

1. No one
2. Mother
3. Husband
4. Grandmother
5. Other: _____

How do they influence yor choice to breastfeed or not to? ☐☐ 64-65

_____
_____
_____

- Are there certain foods that a mother may not eat when breastfeeding? ☐ 66

1. YES
2. NO

If YES, please list them:

1: _____ ☐ 67
2: _____ ☐ 68
3: _____ ☐ 69

If YES, why should she not eat these foods

1: _____ ☐☐ 70-71
2: _____ ☐☐ 72-73
3: _____ ☐☐ 74-75

- Do you believ that breast milk can be spoilt? ☐ 76

1. YES
2. NO

If YES, what can cause breast milk to spoil? ☐☐ 77-78

_____
_____
_____

- Can a mother give expressed breast milk to her baby? ☐ 79

1. YES
2. NO

If NO, why not?

_____ ☐☐ 80-1

Respondent number: | | | |

APPENDIX C

Deelnemer Vrywaringsvorm

Die navorsingstudie handel oor u kennis i.v.m borsvoeding, sowel as die kulturuele aspekte en karaktereienskappe wat hierdie kennis gaan beinvloed.

Tydens die evaluering sal die volgende plaasvind:

1. ‘n Onderhoud gaan met u gevoer word waartydens u self, of met die hulp van die onderhoudvoerder of interpreteurder twee vraelyste gaan invul. Die een vraelys gaan handel oor u karaktereienskappe soos bv: u gesinsamestelling, waar u woon ens., terwyl die tweede vraelys u kennis en kulturele faktore rakende borsvoeding gaan toets.
2. Na die vraelyste voltooi is gaan u gewig en lengte gemeet word. Daarvoor moet u asseblief vooraf u blaas ledig en die oorjas aantrek wat aan u verskaf word.

LET OP: Alle inligting wat tydens die studie ingesamel is sal deurentyds konfidensieel gehou word. Geen inligting sal vir ander doeleindes as die navorsingstudie gebruik word nie. U is ook vry om enigetyd gedurende die verloop van die studie te ontrek.

U keuse om deel te neem is vrywillig en sal waardeer word.

Me: _____

Geteken te _____ **op**____ **/** ____ **/ 2004**

dd **mm**

_____ _____

Deelnemer Handtekening **Navorser Handtekening**

Respondent number:

APPENDIX D

Participant Consent Form

This research study concerns the evaluation of the beliefs about breastfeeding that the mothers attending the ante-natal clinic at MUCCP might have.

The evaluation will involve the following:

1. An interview whereby the completion of a questionnaire regarding your socio-demographic background and breastfeeding experiences will be done.
2. Measuring your body weight and height.

For the above mentioned measurements you will be asked to wear the overcoat provided to you by the clinic sister.

If needed, there will be an interpreter to assist you with completion of the questionnaires during the interview.

PLEASE NOTE: All information will be kept strictly confidential, and no information will be used for purposes other than the above mentioned research project. You are also allowed to withdraw from the study at any time.

Your decision to participate is completely voluntary and will be greatly appreciated.

Me: _____

Signed at _____ **on** ____ **/** ____ **/ 2004**

dd **mm**

_____ _____

Participant signature **Reasearcher signature**

Respondent number:

APPENDIX E

Foromo Ya Motho Ya Nkang Karolo

Patlisiso ena e keretise netefatso ya ditumelo tsa ho nyantsa hore bat same kliniki ya baimana mona MUCCP.

Netefatso E tla Kenya tse latelang:

1. Dipotso tseo tse qetellang mabapi le socio demographic background ka tsebo ya ho nyantsa e tla etswa.
2. Ho meshara boima ba mmele le botele.

Ho meshara o tla kopuwe ho apara overcoat eo o tla e fuwa mooki wa mona kliniking.

Ha ho hlokahala ho tla ba le mofetoledi wa puo ya hao ho o thusa ya dipotso.

HLOKOMELA: Tlhahiso leseding ena e tlaba lekunutu la lona, mme tlatiso leseding ena etla sebediswa ho re ka tswa thuthong ena ka nako tsohle.

Qeto ya hao ya ho nka karolo ke fela ya boithaupi mme re tla lebohela thuso ya lona.

Me: _____

Signed at _____ **on**____ **/** ____ **/ 2004**

dd **mm**

_____ _____

Participant signature **Researcher signature**

Respondent number:

APPENDIX F

IFOROMO YOPHANDO

Olu phanolo luxhomekeke ukujonga iinkolo malunga nokuncancisa kumama ohamba ikliniki yabamithiyo e MUCCP abangaba nayo.

Uphando Luzakuba ne:

1. Imibuzo apho umntu ofila iforomo malunga nemdlela aphila ngayoimvelaphi nolwazi lokucancisa.
2. Ukumejalisa umzimba ubuzima nobude.

Ngomejalisho olungaphezulu uzakucelwa ukuba unxibe isinxibo osaku sinikwa ngu sista ekjliniki.

Xa kufeneka kukho oguqulayo intetho uza kuncedisa ukgcwalisa iforomongexesha lophando

QAPHELA: Yonke incazo izacuba yimfihlelo yaye akukho apho iza kusetyenziswa khona ngaphandle kwee project zophando. Uvumelekile ukuyeka nanini xa ufuna.

Tsogqibo sokweze uyazikheta wean ngokwakho aye siya kwankela kakhulu.

Mna:_____

Sayina e _____ op____ / ____ / 2004

dd mm

_____ _____

Umenzi Isignature **Umphandi Isignature**

APPENDIX G

Consent Form – MUCCP Management

I am hereby asking permission to enter your facility's ante-natal clinic to perform the research project regarding the associations between the knowledge about breastfeeding, Cultural factors and Maternal Characteristics of the pregnant women attending the ante-natal clinic at MUCCP.

The evaluation will involve the following:

1. An interview will take place, during which the completion of a questionnaire regarding the pregnant women's knowledge about breastfeeding, cultural factors and maternal characteristics will take place.
2. Thereafter, her body weight and height will be determined.

For above mentioned measurements participants will be asked to empty their bladder and to wear the examination gown provided.

If needed, there will be an interpreter to assist them with the completion of the questionnaire during the interview. The questionnaires are in Afrikaans, English, Sotho, and Xhosa. It is the respondent's choice in which language they would like to complete it.

PLEASE NOTE: All information will be kept strictly confidential, and no information will be used for purposes other than the research project. You are also allowed to withdraw from the study at any time.

Your decision to participate is completely voluntary and will be greatly appreciated.

Me: _____

Signed at _____ **op**____ **/** ____ **/ 2004**
dd **mm**

_____ _____
Participant signature **Researcher signature**