

THE RELATIONSHIP BETWEEN INFANT FEEDING PRACTICES AND DIARRHOEAL INFECTIONS

by

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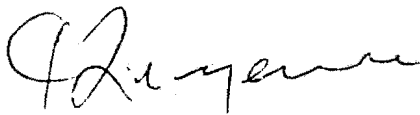
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I declare that **THE RELATIONSHIP BETWEEN INFANT FEEDING PRACTICES AND DIARRHOEAL INFECTIONS** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.



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SUMMARY

THE RELATIONSHIP BETWEEN INFANT FEEDING PRACTICES AND DIARRHOEAL INFECTIONS

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To determine the relationship between infant-feeding practices and diarrhoeal infections, a descriptive survey was conducted to infants between six to 12 months of age.

A guided interview was conducted to 105 mothers of infants who attended the health facilities of Mbabane, Swaziland.

The results show that breast-feeding is routinely practiced by the majority of mothers and exclusive breast-feeding is very low, but supplementary feed in the form of formula or solids are introduced by the majority of respondents within the first three months of life. Infants who were given colostrum and breast milk had fewer diarrhoeal attacks. Other factors, for example education and cultural factors influenced the feeding practices and number of diarrhoeal attacks.

It is recommended that breast-feeding should be promoted as an important intervention in the control of diarrhoea.

KEY TERMS:

Infant-feeding; breast-feeding; exclusive breast-feeding; supplementation; non-human milk; diarrhoea; formula colostrum; feeding practices; human milk.

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Response to letter**

Annexure C: Questionnaire

GLOSSARY

Cramer's Value	=	If the Cramer's Value is bigger than 0,2, then it usually implies that there is association between variables
Chi-square	=	A chi-square should be smaller than 0,05 to indicate a significant difference between variables
f	=	Frequency
IBFAN	=	International Baby Food Action Network
ILO	=	International Labour Organisation
MOH	=	Ministry of Health
n	=	In this study "n" refers to the total number of respondents included in the study (in this case 105) (Downie & Heath 1983:11)
N	=	In this study "N" refers to the statistics of a sample of the study population (portion of 105) (Downie & Heath 1983:11)
SINAN	=	Swaziland Infant Nutrition and Action Network
UNICEF	=	United Nations Childrens Fund
Unisa	=	University of South Africa
WHO	=	World Health Organisation
%	=	Percentage

CHAPTER 1

Overview of the study

1.1 INTRODUCTION

Infant-feeding practices have long been recognised as one potentially important determinant of specific childhood infections (Savage-King 1985:12).

Gordon in Brown, Black, De Romana and De-Kanashrio (1989) noted the temporal relationship between the onset of weaning and increased rates of diarrhoea coined the term "weanling diarrhoea" to describe this association (Brown *et al* 1989:31).

Since these early epidemiologic investigations, the relationships between infant-feeding practices and diarrhoea have been examined in numerous additional studies (Akre 1991:31; Ketsela, Kasfaw & Kebede 1990:180; Woolridge, Phil & Baum 1993:1).

The existence of an inverse relationship between infant-feeding practices and morbidity from diarrhoeal diseases is strongly indicated by the evidence from poor communities.

For example, in a world-wide study, it was observed that diarrhoeal diseases are the most common illnesses and have the greatest negative impact upon the growth and well-being of infants accounting for 1,3 thousand million episodes and almost a million deaths in early infancy in the developing countries each year (De Zoysa, Rea & Martimes 1991:371; Motarjemi, Kaferstein, Moy & Quevedo 1993:79).

Africa alone has a diarrhoeal mortality of 109/1000 in infancy due to poor feeding practices (Ashford 1995:28). In South Africa, the available data from Transkei reflect an infant mortality of 130/1000 (Irwig & Ingle 1984:608). About 75,0 percent of infant deaths are caused by lack of breast-feeding in early (below four months) infancy.

In Ethiopia, for example, non-breastfed infants were 5,2 times more likely to develop diarrhoea in the first six months of life (Ketsela *et al* 1990:180). Diarrhoea mortality appear to be worse (37,0 percent) in the Sub-Saharan Africa as opposed to North Africa (5,0 percent) where breast-feeding practices is the norm (Organisation of African Unity Publication 1994:1).

Swaziland experiences similar problems which account for high (98/1000) infant mortality rate (UNICEF 1994:13). The incidence of diarrhoea among non-breast-fed infants is 23,0 to 30,0 percent (MOH 1995:6). On average, a Swazi infant who is denied breast milk has three episodes of diarrhoea during the first year of life (UNICEF 1994:13).

According to Mbabane Hospital data of 1995, there is about 15 percent mortality among non-breast-fed infants in the peri-urban area of Mbabane. There is a further 33,0 percent outpatient diarrhoeal incidence among non-breast-fed infants in the first six months of life (Mbabane Hospital Records 1996:10).

Though impressive progress has been made in the control of diarrhoea, such as the use of rehydration salts globally, the issue of breast-feeding as a prophylactic measure for diarrhoeal infections has not been effectively practised (WHO 1995:2). It was through this observation that the Minister of Health signed a policy statement on infant-feeding which should be adopted in all health care systems in Swaziland.

The policy's main aim is to promote breast-feeding exclusively in the first four to six months of life and to continue breast-feeding for two years.

Further, the policy discourages the use of breast milk substitutes in early infancy (less than four months) as it predisposes infants to diarrhoeal infections (MOH 1995:1) (see annexure A).

The policy is in line with the traditional infant-feeding practices in Swaziland (Cree & Kroeger 1993:9; SINAN 1995:5).

According to Swazi culture, infants should be breast-fed until they are two to three years old (SINAN 1995:5). This practice is beneficial in preventing diarrhoeal infections in view of the immunoglobulins which are present in breast milk (IBFAN 1995:3).

1.2 STATEMENT OF THE PROBLEM

Infant mortality is high in Swaziland (98/1000). About 70,0 percent of infant deaths occur before the age of six months (UNICEF 1994:13). In this age group, early infant death is due to poor feeding practices - that is introduction of breast milk substitutes at one to two months of age (Friedman 1991:1).

Yet it is widely documented that exclusive breast-feeding during the first four to six months of age can prevent diarrhoeal mortality among infants (Savage-King 1994:25).

In Swaziland, however, exclusive breast-feeding for six months is as low as 8 percent (UNICEF 1994:13), early supplementation with cereals, maize and sorghum gruel is widespread even in rural areas, hence diarrhoeal mortality is 15,0 percent among infants (UNICEF 1994:13).

1.3 OBJECTIVES

The objectives of the study are to

- determine the prevailing feeding practices among mothers of infants from birth to 12 months in Mbabane, Swaziland
- determine factors that are related to or contribute to the feeding practices and diarrhoea among infants such as socio-cultural factors, level of education of the mother, gender of infant and use of colostrum as an initial feed
- make recommendations to the MOH regarding infant-feeding in health care systems

1.4 RESEARCH QUESTIONS

The specific questions that shall be addressed in this study are as follows:

- (1) **IS** there any association between the number of diarrhoeal attacks and breast-fed versus non-breast-fed infants?
- (2) **IS** there any association between the use of colostrum as an initial feed and the incidence of diarrhoeal attacks?
- (3) **DOES** the level of education of the mother play a role in infant-feeding practices and the number of diarrhoeal attacks?
- (4) **DO** cultural factors influence the feeding practices of the infant?
- (5) **IS** there any association between the place of delivery (home or hospital) of the infant and the feeding practices as well as diarrhoeal attacks?

- (6) **IS** there any difference between feeding practices of infants who live in the urban, peri-urban or rural area of Mbabane, Swaziland?

1.5 SIGNIFICANCE OF RESEARCH

Conducting a study on infant-feeding practices is of great importance, since more information on various feeding practices could contribute to the development of programmes informing mothers and educating nurses. Additionally, the findings of this study can be used by Swazi nurse educators to teach nursing students on the current feeding practices among Swazi infants. Thus relevant advice can be given to mothers on safe feeding practices.

Health policies can also be formulated in favour of breast-feeding if it is found to be the ideal feeding practice.

Also, mother-support groups can be introduced to assist those mothers who experience problems regarding infant-feeding, as a result promoting infant health.

Finally, this study will investigate the current infant-feeding practices and their relation to diarrhoea, in Mbabane, Swaziland. No study of this nature could be found in Mbabane, Swaziland.

1.6 CONCEPTUAL FRAMEWORK

The conceptual framework for this study is developed by the researcher and is based on the factors which contribute to feeding practices according to the literature reviewed. These factors are as follows:

(1) Personal factors

The decision to use a particular mode of infant-feeding practice is influenced by personal factors such as the age of the mother, support network, literacy of the mother or maternal attitude.

(2) Socio-cultural factors

Urbanisation/modernisation and new social values influence feeding practices. Similarly, cultural practices may either reinforce or condemn a particular feeding practice which may prove detrimental to an infant's health.

(3) Economic factors

Economic factors such as poverty or employment may affect feeding practices. The availability of food or the mother working outside the home (away from baby) may promote the use of non-human milk, thus resulting to diarrhoeal mortality if used inappropriately.

(4) Health care delivery systems

Hospital deliveries are now prevalent (33,0 percent in Transkei, 50,0 percent in Swaziland and 98,0 percent in Bangkok) (Jelliffe & Jelliffe 1991:3).

The impact of hospital/health centres on early infant-feeding practices deserves special attention.

1.7 CONCLUSION

In conclusion, the conceptual framework identifies four main factors which may influence feeding practices. These are personal, socio-cultural, economic and health care delivery systems.

These factors will be further discussed in the literature review.

1.8 DEFINITION OF TERMS

The following terms will be used in this study:

○ **Feeding practice**

The giving of food either by a bottle, cup or hand-feeding (Sykes 1988:355). Feeding infants on either breast milk or artificial milk (Auerbach, Renfrew & Minchin 1991:63).

For this study, feeding practices shall imply to the manner of giving food to infants either by breast-feeding, bottle-feeding, or by cup and spoon feeds; using breast milk, traditional or commercially prepared foodstuff.

○ **Health**

Health may be defined as a state of physical, mental and social wellbeing and not merely the absence of diseases or infirmity (WHO 1985:1).

Health is also viewed as a basic right for every person (Encyclopaedia Britannica 1993:779).

For this study, health will imply a state of wellbeing to an infant, a normal growth chart, with the absence of diarrhoea.

○ **Systems for health care delivery**

The context "systems for health care delivery" mean governmental, non-governmental or private institutions or organisations engaged directly or indirectly in the health care of mothers and infants (IBFAN 1987:3). It also includes health workers in private practice (MOH 1995:6).

For this study, systems for health care delivery will include regional hospitals, health centres, government, private and mission clinics.

○ **Health worker**

The health worker is a person working in a component of such a system for health care whether professional or non-professional including voluntary unpaid workers (IBFAN

1987:37).

For the purpose of this study, a health worker will imply a qualified nurse, nursing assistant or a physician. These are key health workers in Swaziland.

○ **Infant**

An infant is a baby during the first year of life (Encyclopaedia Britannica 1993:307; Sykes 1988:512). An infant in this study will imply a baby from birth to 12 months of age.

○ **Breast-feeding**

Breast-feeding may be defined as a natural way of feeding infants. It has the nutritional, psychological, social and health advantages (Akre 1991:73). For this study, breast-feeding will mean an infant-feeding directly from the biological mother's breast.

○ **Exclusive breast-feeding**

Exclusive breast-feeding can be referred to an infant receiving breast milk only and no other liquids, not even water or fruit juices (Savage-King 1985:1; WHO 1991:2).

For this study, exclusive breast-feeding will imply the use of mothers milk only either directly from the breast or expressed breast milk.

○ **Partial breast-feeding**

Partial breast-feeding/weaning or breast milk supplement means that an infant is breast-fed but also receives other supplementary feeds such as non-human milk, sorghum, porridge and glucose water (Ketsela *et al* 1990:181; WHO 1991:2).

For this study, partial breast-feeding will imply the use of breast milk and any other food either traditional or commercially prepared.

○ **Infant formula**

Infant formula can be defined as a food which simulates human milk which can totally or partially replace human milk (Infant Formula Act 1980). Infant formula is adapted to the infants' physiological characteristics. It can be formulated industrially or at home (IBFAN 1987:37). For this study, infant formula will refer to industrially prepared breast milk substitute (humanised milk).

○ **Non-human milk**

Non-human milk can be defined as breast milk substitutes such as animal milk, for example, cow's milk, goat's milk, ass's milk, buffalo's milk or soya based formula (Bennett & Brown 1993:505; IBFAN 1995:5).

For this study, non-human milk will refer to cows, goats and artificially prepared milk or soya based products.

○ **Colostrum**

Colostrum can be defined as a sticky yellowish milk which is expressed from the breast during the first few days of puerperium. It is high in immunoglobulin and is a host of other properties, thus capable of preventing infections including diarrhoea to infants (Akre 1991:25; Bennett & Brown 1993:501).

For this study, colostrum will refer to human milk in the first three days of puerperium.

○ **Bottle-feeds**

Bottle-feeds are those feeds either human or non-human milk, water and weaning foods administered to an infant via a feeding bottle with a nipple/teat (WHO 1991:2).

In this study, bottle-feeds will imply to commercially or locally prepared foods given via a bottle with an artificial nipple.

○ **Diarrhoea**

Diarrhoea implies to excessive evacuation of watery or too fluid faeces (Sykes 1988:264). For example, more than eight stools in 24 hours during the first month of life, more than five stools in 24 hours during the second and third month, or more than three stools in 24 hours from the fourth to 12th month (Ketsela *et al* 1990:180).

With reference to this study, diarrhoea will imply to more than three watery stools to a non-breast-fed infant and more than four stools to a breast-fed infant in 24 hours.

○ **Rural**

Rural refers to country side (Sykes 1988:916). In this study, a rural area will imply the part of Mbabane that has no safe water supply, no roads and no health services.

○ **Urban**

Urban refers to living in a town/city area (Sykes 1988:1181). For this study, urban will refer to a town or city area (Mbabane) where there are essential services such as safe water, good communication systems and health services within reach.

○ **Peri-urban area**

Peri-urban area is a place closer to the town/city where poor immigrant settlers reside (slums) (Sykes 1988:761). In this study a peri-urban area will imply shanty town with poor environmental sanitation and immigrant dwellers living closer to the city of Mbabane (refer to 3.2.1 in chapter 3).

○ **Scope of this study**

The study will describe infant-feeding practices that are currently prevailing in Mbabane, Swaziland.

This area comprises of the working class group (urban elite), rural, and poorest sectors

of the population from the peri-urban area who live in slums and shanty towns.

The investigator aim at identifying the feeding practices and their relationship to diarrhoea in this contrasting group of the society.

Additionally, the population to be investigated has easy access to health facilities. These health facilities should have the policy on infant-feeding practices.

Finally, infants from birth to 12 months of age will be investigated because they appear to be the most vulnerable group in view of the high (98/1000) infant mortality rate.

1.9 ORGANISATION OF THE DISSERTATION

The dissertation will comprise five chapters in this format.

CONCEPTUAL PHASE

Chapter 1

Introduction

Chapter 2

Literature review

DESIGN, PLANNING AND EMPIRICAL PHASE

Chapter 3

Methodology

Data collection

Instruments

Population and sampling method

ANALYTICAL PHASE

Chapter 4

Data analysis

Dissemination phase

Chapter 5

Data interpretation and presentation

1.10 SUMMARY

It has been argued that poor feeding practices are the main cause of mortality and morbidity among non-breast-fed infants world-wide.

This is especially true in Africa as well as in Swaziland.

Diarrhoea is the most important infection identified among non-breast-fed infants.

The conceptual framework for this study therefore focuses on the literature on infant-feeding practices and identifies factors like personal, cultural, economical and systems for health care delivery, as responsible for influencing mothers' decision to choose a particular mode of feeding their infants.

The aim of the study is to describe the prevailing feeding practices among infants in Mbabane area - Swaziland.

Further, the relationship between the feeding practices and diarrhoeal infections will be described.

The next chapter will discuss studies that have been conducted elsewhere with regard to this topic.

CHAPTER 2

Literature review

2.1 INTRODUCTION

In chapter 1 the problem to be studied has been discussed as well as inter alia the rationale for the study; objectives and research questions that the researcher wishes to answer. An outline was given of the study to be undertaken. In this chapter the literature relevant to the problem will be discussed .

Studies on infant-feeding practices indicate that 98,0 percent of infants born in Africa, 96,0 percent of those born in Asia and 90,0 percent of those born in South America are breast-fed during the first few (two to three) months of life (WHO 1992:2). The period of exclusive breast-feeding is usually short (less than one month), even in Swaziland where infants are traditionally breast-fed for over two years of age (UNICEF 1994:13).

It is not surprising that early introduction of supplementary food is the main cause of 3,2 million infant deaths world-wide due to diarrhoeal diseases through contamination of

infant foods (Motarjemi *et al* 1993:79; WHO 1992:3).

Additionally, young infants who receive supplements have a lower intake of breast milk than are the exclusively breast-fed and are more likely to be breast-fed for shorter periods (WHO 1992:2).

Further, early supplementation, especially in poor communities increases the incidence and prevalence rates of diarrhoeal mortality (Motarjemi *et al* 1993:79).

Poor feeding practices are also an economic burden for developing countries, more than one third of hospital beds are occupied by infants with diarrhoeal infections through lack of breast-feeding (WHO 1992:6).

These infants are often treated with expensive nutrients, yet breast-feeding offers complete nutrition (Savage-King 1994:25; Smyre 1993:75).

This chapter will review the impact of poor feeding practices on diarrhoeal mortality and morbidity and how breast-feeding protects the infant from diarrhoeal diseases.

Lastly, factors which influences feeding practices will be discussed.

2.2 THE IMPACT OF POOR FEEDING PRACTICES ON MORTALITY

Diarrhoeal diseases are a major cause of mortality among infants (Hanson & Jalil 1991:1; WHO 1990a:11). It is estimated that there are approximately 1,3 thousand million episodes of diarrhoea and almost 4 million deaths in infancy in the developing countries each year (De Zoysa *et al* 1991:371). Most of the cases of diarrhoea occurs within the first six months of life (WHO 1992:2).

The beneficial effects of breast-feeding in reducing diarrhoeal mortality are substantiated by the following studies.

In the Transkei, a survey of 5 000 women who responded to questionnaires revealed

that infant mortality of 130/1000 was due to poor feeding practices (ie early introduction of supplements) before four months of age (Irwig & Ingle 1984:606).

In Southern Brazil, infant-feeding practices and infant mortality from diarrhoea were investigated in a population-based case-control study in two urban areas. Each of the 170 infants who died due to diarrhoea were compared with two neighbourhood controls. The results showed that infants who received powdered milk or cows milk in addition to breast milk were 4,2 times (95,0 percent confidence interval 1,7-10,1) more at risk of death from diarrhoea compared to infants who did not receive artificial milk, while the risk for infants who did not receive any breast milk was 14,2 times higher (95,0 percent confidence interval 5,2-34,1). Similar results were obtained when the number of infants who died from diarrhoea were compared with the number of infants who died from other non-infectious diseases (Victora, Smith, Vaughan, Nobre 1989:1032).

These findings were confirmed by Roskens (1990) when he demonstrated that Brazilian infants were 25 times more likely to die from diarrhoea in the first two months of life, if non-human milk replaced breast milk.

Likewise diarrhoeal mortality doubled among slum infants in Lima (Peru) where households were without piped water and sanitation (Roskens 1990:10).

Further, Feachen and Koblinsky reviewed 35 studies which investigated the association between mode of infant-feeding and diarrhoeal mortality. These studies showed that breast-feeding protected substantially against death from diarrhoea. When infants receiving no breast milk were contrasted with infants on exclusive breast-feeding, the median relative risk of death from diarrhoea during the first six months of life was 25. When partially and exclusively breast-fed infants were contrasted, the median relative risk of death from diarrhoea was 8,6 (De Zoysa *et al* 1991:374).

In Swaziland, according to the MOH Report, 70,0 percent of infants die during the first six months of life due to poor feeding practices (MOH 1995:6).

In view of the above findings, mothers should thus be encouraged/supported to breast-

feed exclusively in the first four to six months of life as a prophylaxis against diarrhoeal mortality (WHO 1995:2).

2.3 IMPACT OF POOR FEEDING PRACTICES ON MORBIDITY

Breast-feeding has the advantage of decreasing infant morbidity by about 50,0 percent compared to infants fed on artificial milk powders and those fed on solid foods. The impact is particularly dramatic in poor communities (Akre 1991:31; WHO 1990b:2).

For example, Feacher and Koblinsky in De Zoysa *et al* (1991) reviewed 35 studies which investigated the association between mode of infant-feeding and diarrhoeal morbidity. Sixty five percent of the studies reported that infants who received no breast milk were at greater risk of diarrhoea than infants who were partially breast-fed. While infants who were partially breast-fed were at greater risk than infants who were exclusively breast-fed.

When infants who received no breast milk were contrasted with infants on exclusive or partial breast-feeding, the median relative risks were 3,0 for those aged zero to two months, 2,4 for those aged three to five months and 1,3 to 1,5 for those aged six to 11 months. When infants receiving no breast milk were contrasted with infants on exclusive breast-feeding the median relative risks were 3,5 to 4,9 in the first six months of life (De Zoysa *et al* 1991:371).

These findings can be generalised in poor communities of both developed and under-developed countries. Whilst breast-feeding decreases the morbidity rate by 50,0 percent (WHO 1992:2).

2.4 INFANT-FEEDING AS A PROTECTION AGAINST DIARRHOEA

Studies on infant-feeding practices confirm that human milk, as early as the colostrum phase confers protection from diarrhoeal infections.

For example, Mickleson and Moriarty (1982:318) observed that human colostrum contain secretory immunoglobulin A (SIgA) which transfers specific immunity from mother to the gastro-intestinal mucosa of the infant. The SIgA has the ability to adhere to the mucosal surface of the infant thus protecting it from the invasion of *Escherichia coli* which causes diarrhoea (Garza 1984:14).

Smaller amounts of immunoglobulin M (IgM) and Immunoglobulin G (IgG) antibodies are transferred in the same manner and further protect infants against gastro-intestinal infection (Mickleson & Moriarty 1982:381).

These findings were confirmed by 20 clinical studies (Dillon & Totten 1989:156). However, these researchers also acknowledged the fact that the protection effect of breast-feeding is mostly demonstrated in non-industrialised countries (Dillon & Totten 1989:156).

Ruiz-Palacios, Calva and Pickering (1990) investigated the role of breast-feeding in preventing diarrhoea caused by *campylobacter jejuni*.

Ninety-eight Mexican infants were followed for two years beginning from birth. The incidence of diarrhoea to infants less than six months of age who were not breast-fed was 2,3 times greater than their breast-fed counterparts. Breast-fed infants remained free of diarrhoea for a longer time (plus minus two years) (Ruiz-Palacios *et al* 1990:707).

In Brazil, infants who were supplemented within their first week of life were three times more likely to have persistent diarrhoea and five times likely to be hospitalised for diarrhoea before the age of three months than infants of the same age who were exclusively breast-fed. Yet infants who stopped breast-feeding were at a twelve times higher risk of hospitalisation for diarrhoea before the age of three months than the breast-feeding group (De Zoysa *et al* 1991:373).

O'Dent (1992: 34) further demonstrated that breast milk is protective in the sense that colostrum is an army able to suppress any kind of infection. It contains up to ten grams

per litre of an ingenious anti-infection weapon called lactoferrin. The future of the intestinal flora depends on lactoferrin, white cells and macrophages which are components of human milk. These are able to neutralise and digest germs which cause diarrhoea.

If infant feeds consist of water, sugar or artificial milk, the microbes ingested are different from those of human milk thus are capable of causing diarrhoea (O'Dent 1992:34).

In Finland, a cohort study of 336 infants was followed from birth to prove the above findings. Acute diarrhoea was observed to 28,0 percent infants who were not breast-fed. Yet, breast-feeding for over six months reduced the incidence of diarrhoea in the first two years of life (Ruuska 1992:27).

Finally, a study of 674 infants demonstrated a marked lower (4,0 percent) frequency of diarrhoeal symptoms in the 277 infants who were breast-fed for more than 13 weeks relative to infants who were breast-fed for periods less than 13 weeks (17,0 percent of 180) or who were bottle-fed (16,0 percent of 267).

Breast-fed infants for 13 weeks also had significantly fewer admissions to hospital for diarrhoeal infections representing potential cost saving for any health care system willing to promote breast-feeding as a preventative medicine health intervention (Woolridge *et al* 1993:12).

It is thus advantageous to adopt breast-feeding practices since human milk comprises specific immunoglobulins which are bacteriostatic against organisms which causes diarrhoea to infants (Bennett & Brown 1993:493; Chen, Yu & Li 1994:58).

2.5 FACTORS WHICH INFLUENCE FEEDING PRACTICES

The literature reviewed so far has identified four main factors which influences infant-feeding practices, these are:

- personal
- socio-cultural
- economic
- systems for health care delivery

These will be discussed below.

2.5.1 Personal factors

According to Savage-King (1985:6) there are a number of personal factors which influence feeding practices. These can be sub-divided as follows:

2.5.1.1 *Support network*

In all traditional cultures, it is usual for one or more persons (a family member, friend or birth attendant) to assist a new mother in terms of feeding an infant. This individual termed by Raphael (1973) as a “doula”, supplies traditional knowledge, as well as physical and emotional support to the mother. During this time breast-feeding (which is a norm and indeed the only practical option) becomes firmly established (Kuzwayo 1992:20; Morse 1982:80).

This feeding experience received from the society leave no doubt to new mothers that their milk is the best way of feeding infants (Kuzwayo 1992:21). Some of the advice includes: putting the infant on breast soon after delivery, rooming in and bedding in (IBFAN 1994:16).

Colostrum is often regarded as important (Savage-King 1994:41). However, in some communities, colostrum is expressed and discarded (IBFAN 1995:5). In this situation, the infant may be fed for a few days by a lactating relative or given traditional gruels (SINAN 1995:5).

Prelacteal feeds may also be given prior to nursing (IBFAN 1995:5). These feeds are the main causes of diarrhoea through contamination of infant's food. While breast milk has anti-infective properties which coats the intestinal linings and protect it from the

invasion of diarrhoeal infections (Chen *et al* 1994:177).

Despite the innocuous feeding practices which have socio-cultural origin, the doula is an important person in promoting breast-feeding practices in traditional societies. For example, when examining patterns of infant-feeding practices in 278 cultures, Raphael found that these societies were breast-feeding for about two to three years mainly because of the presence of a doula in their society (Raphael 1979:37).

Reports of the support persons available to new mothers vary according to race. Ellerbee, Atterbury and West (1993) suggested that the primary support persons (doula) were male partners for Whites, best friends for Blacks and mothers for Mexican-Americans.

However, Freed, Clark, Sorenson, Lohr, Cefalo and Curtis (1995) found that the most important variable for bottle-feeding in a sample of low-income women was lack of support from a significant other. Therefore, in Freed *et al* (1995) view, a husband/partner (the infant's father) has been reported as an important source of support in infant-feeding.

In fact, without the supportive help, milk ejection reflex may be inhibited, consequently, breast-feeding will not be sustained. This may result in the use of other feeding practices and may result in the development of diarrhoea (Sciacca, Phipps, Dube & Ratliff 1995:323).

This is especially true with migrant labour, forced removals or any other sociological factors which result in the absence of support, both physically and emotionally, which may lead to poor let-down reflex associated with stress (Gabbe, Niebyl & Simpson 1991:764).

For example, in a study of 50 Asian immigrants to Wolverhampton, England, only 2,0 percent of mothers were breast-feeding. The majority (98,0 percent) were frightened, misinformed and felt apathetic towards breast-feeding since they had no doula, consequently they bottle-fed their infants (Morse 1982:80).

Similarly, a survey of 1 000 primiparous British women from a low social group also demonstrated similar results of poor feeding practices due to lack of a doula (Holt & Woolking 1983:349).

Thus it may be concluded that socio-cultural influences of infant-feeding practices appear to form the base(s) of one's feeding practices. These practices may further influence the health status of infants in terms of diarrhoeal infections (Howie, Forsyth & Ogston 1990:11).

2.5.1.2 *Maternal education*

Maternal education has long been recognised as an important factor in health-related behaviours including infant-feeding (Siskind, Del Mar & Schofield 1993:103).

For example, Ellerbee *et al* (1993:45) demonstrated that high school education level was associated with breast-feeding for women of all ethnic groups. Similarly, primary education or no formal education was associated with the use of non-human milk in a world-wide study (Siskind *et al* 1993:104).

In another development, Miner, Witte and Nordstrom (1994:95) found that mothers in Russia (57,0 percent) and the United States of America (52,0 percent) who were above high school education breast-fed because they received information on the advantages of breast-feeding from printed materials, television and through prenatal classes. In contrast, mothers with less than high school education bottle-fed because they observed such feeding practices from television, friends and from tourists.

Low educational level (below high school) has a negative effect on infant-feeding practices (Ruuska 1992:27). For example, the multiple dialects and languages used in food tins/packets may result in incomprehensive directions and formula mixing without measuring (Savage-King 1994:28).

Furthermore, the relatively high cost of the formula in poverty stricken areas foster over dilution, hence diarrhoea occurs (UNICEF 1994:13). Eventhough if breast-feeding is adopted as a normal feeding practice, no physical preparation of milk is done as milk

is drawn direct from the breast (SINAN 1995:5); hence diarrhoea may not occur (Savage-King 1994:12).

This is especially true in America where highly educated women breast-fed longer than six months since they understand the advantages of breast-feeding (Lawrence 1989:16). Indeed, groups concerned with promoting good mothering through breast-feeding mainly involve middle-class, well-educated women in Sweden (Mohamed 1993:10).

The situation is different in Swaziland where the majority ($\frac{2}{3}$) of deliveries in hospitals comprise adolescents (Lapidos, Mamba, Shongwe & Vilakati 1996:2). These young women have not completed their high school education (UNICEF 1994:14), and thus require knowledge and skills in terms of infant-feeding.

Mother-support groups (with regard to breast-feeding) were thus initiated to a group of young women who have not completed their high school education; since they require basic knowledge on breast-feeding practices.

It can thus be concluded that maternal level of education may have an effect on infant-feeding practices in terms of diarrhoeal infection. This in turn improves infant health and prevents diarrhoea.

2.5.1.3 *Maternal attitude(s)*

Maternal attitude(s) deserves special attention since mothers often adopt other feeding practices such as bottle-feeding, because they perceive they have insufficient milk to satisfy their infants (Savage-King 1994:59).

The insufficient milk syndrome seems to be a universal phenomenon although its incidence and cause are quite variable. A WHO collaborative study showed that of mothers who started regular supplements by three months of age, ten (87,0 percent) did so because of insufficient milk production (WHO 1981:28; WHO 1994:20). In that study, this complaint crossed all socio-economic boundaries both in developed and developing countries. These results were confirmed by Howie (1981:757) and Mukasa (1992:80).

In a study of 384 mothers, 100 (28,0 percent) reported insufficient milk syndrome as a factor which caused mothers to feed their infants on artificial milk preparations hence diarrhoea occurred to these infants (Bobak & Jensen 1993:628).

According to Akre (1991:50) and Bennett and Brown (1993:273) insufficient milk syndrome occurs most frequently among educated, healthy and well-nourished mothers for whom there is no physiological evidence of low milk production and still less for inadequate milk composition. The real stumbling block is frequently related to emotional and psychosocial factors or to an incomplete understanding of the mechanics of lactation and breast-feeding techniques (Akre 1991:50; Bennett & Brown 1993:273; Bobak & Jensen 1993:628).

The physiological/psychological factors are the main cause of diarrhoeal diseases to non-breast-fed infants as reported in other studies (Jackson, Imong & Wongsawasdi 1992:149; Savage-King 1994:59; Wellstart International 1994:4).

Therefore there is a need for health workers to address the problem of insufficient milk production, as it results to poor feeding practices (WHO 1995:2).

2.5.1.4 *Infant's age*

Current infant-feeding guidelines recommend exclusive breast-feeding until infants are about four to six months old to reduce the risk of diarrhoeal infections associated with weaning foods (IBFAN 1995:5; Savage-King 1994:30; WHO 1995:2).

However, in many cultures exclusive breast-feeding for the first four months is unusual, instead prelacteal feeds are a norm (WHO 1992:6). Also mixed feeding (that is breast, bottle-feeds) which comprises teas and gruels are common (Savage-King 1994:4; SINAN 1992b).

Additionally, artificial milk preparation and/or traditional foods are also given as supplementary to breast milk, this is termed triple-nipple-syndrome (breast, bottle and solids) (Akre 1991:57).

Records from studies report that common reasons for introducing supplements or early termination of breast-feeding in developed and developing countries are insufficient milk from the mother, infant failing to fix on breast, advice from relatives or health personnel and mass media (Mohammed 1993:17).

Whatever is the reason for introduction of weaning foods, it has been demonstrated that weaning earlier than four to six months of age interferes with the physiological processes of the gastro-intestinal track and thus diarrhoea may occur (IBFAN 1995:5). At that early stage only essential liquid (breast milk) is desirable as the best nutrient (WHO 1995:4).

2.5.1.5 *Gender of infant*

The gender of an infant appears to be an important characteristic in infant-feeding practices. Mothers seem to determine by virtue of gender (male or female) whether to breastfeed or to use other feeding practices to their infants.

An earlier study, for example, in East Africa (Mali) reported that male infants were breast-fed longer (plus minus two years) and gradually weaned (over one month) as opposed to their female counterparts who were weaned earlier (below one month of age) (Dettwyler 1986:659).

This finding was confirmed by Lucas, Brooke, Morley, Cole and Bamford (1990:340) in a retrospective study of 100 infants delivered in hospital. Lucas *et al* (1990:340) reported that male infants were breast-fed more often than female infants ($P < 0,06$). The population in that study was of diverse ethnic background.

Contrary to the above findings, Ransome, Chalmers, Herman and Reinach (1989:413) in a study of 200 South African mothers demonstrated that female infants were more likely to be breast-fed for more than 36 weeks of age as opposed to male infants. However, the researcher was unable to explain the difference.

This finding was confirmed by a comparative study of three countries - Brazil, Honduras and Mexico, where a multi-variable analysis identified factors which appear to support

breast-feeding.

Female infants ($P < 0,05$) were identified as a positive factor towards breast-feeding (Sanghvi 1990:1).

It would be interesting to know if such findings can be confirmed or refuted in Swaziland. As yet there is no study which support this evidence.

2.5.2 Socio-cultural factors

Breast-feeding, is a biological function (Akre 1991:1). In addition, anthropological studies confirm its social origin in which its patterns must be learned like any other social behaviour (Mohamed 1993:11).

Most women (65,0 percent) in traditional cultures are successful in infant rearing because they can find support from other women who are breast-feeders themselves, as well as gaining the art from the society (Mohamed 1993:1).

In cultures, like Americans, where alternative feeding practices are socially accepted, the duration of breast-feeding is short, thus other feeding practices are used (such as bottle-feeding) (Morse 1982:77). Such feeding practices have been the main cause of diarrhoea in the Third World countries (WHO 1994:20). This is especially true with urban and peri-urban communities where families are smaller and there is lack of support for new mothers (WHO 1992:6).

2.5.2.1 Urbanisation

The urban cities of the developing countries provide an important group of trend setters - the urban elite who use commercially prepared milk to feed their infants (Ashford 1995: 16).

These women are generally successful in feeding their infants in this practice (WHO 1994:20). However, poor urban and peri-urban dwellers emulate the life-style of the elites and use uncustomary feeding practices such as bottle-feeding and the breast milk

substitutes (Morse 1982:77).

Additionally, this group of women are exposed to unfair marketing and advertising practices which supports bottle-feeding and the use of non-human milk (Ashford 1995: 17). Given the problems of peri-urban dwellers which are:

- lack of education regarding the advantages of breast-feeding
- if employed, there is no legislation for paid maternity leave or nursing breaks to feed infants
- unsafe water supply
- shanty/squatter settlement

If non-human/commercially prepared food is used, diarrhoeal infection is inevitable to infants (Motarjemi *et al* 1993:79; Savage-King 1994:13).

In Huascar (Peru), for example, the relationship between poor feeding practices and the incidence of diarrhoeal infection was studied in the peri-urban areas. The results demonstrated a higher prevalence of diarrhoea (15,5 per 100 days of observation) at zero to two and three to five months of age, whilst exclusively breast-fed infants had a lower prevalence of diarrhoea (1,89 and 1,47 per 100 days of observation) (Brown *et al* 1989:34).

These findings were confirmed by Woolridge *et al* (1993:7) in a study of 277 British infants.

Meanwhile, there is an increasing evidence which demonstrates a significance reduction in diarrhoeal infections among exclusively breast-fed infants (Children and Women in Swaziland 1990:18; Grant 1991:4; Savage-King 1994:24).

Evidence of the above statement was reported in an industrial area at Malkerns, Swaziland where 20 low income mothers (pineapple pickers) were encouraged to bring their infants to the crèche (within the working area).

Mothers in this study breast-fed exclusively since they were allowed nursing breaks. Consequently, there was a low (4,0 percent) incidence of diarrhoea observed on breast-fed infants when contrasted with the non-breast-fed group (IBFAN 1995:15).

These results confirm the unique anti-infective properties of breast milk in the prevention of diarrhoea even in poverty stricken families (IBFAN 1995:4).

2.5.2.2 *Community's attitude towards feeding practices*

Whether mothers breast-feed successfully or not depends partly on the attitude of other people in the community - fathers, grandmother, relatives, friends, employers, community leaders and others. These people can provide mothers with knowledge and encouragement towards healthy feeding practices (Mohamed 1993:9).

Where people think that breast-feeding is normal most mothers succeed (Savage-King 1994:153). In these places it is important to protect breast-feeding. However, where people think of breast-feeding as old fashioned, difficult, embarrassing or a nuisance, mothers are more likely to fail and use artificial milk preparations (Savage-King 1994:155).

In New Mexico, for example, a breast-feeding task force has developed work-place recommendations for the support of breast-feeding. Women are assisted to maximise their parenting and breast-feeding skills, thus infants are protected from diarrhoeal diseases (Spisak & Gross 1991:41).

In America, a La Leche league has emerged which emphasises on scientific information to mothers on the benefits of breast-feeding as a prophylactic treatment against diarrhoeal diseases (Mohamed 1993:9).

In Swaziland, SINAN (a breast-feeding promotion group) has trained a multi-sectoral group (traditional birth attendants, traditional healers, health workers, agricultural workers, nutritionists and mother support groups) of breast-feeding counsellors who visit the community and provide support to breast-feeding mothers.

These mothers experience less diarrhoeal diseases since exclusive breast-feeding is encouraged in early infancy (Cree & Kroeger 1993:8).

Therefore, communities' attitude towards breast-feeding can promote infants' health whilst the attitude that supports the use of non-human milk can prove detrimental to infants' health especially in diarrhoeal mortality (WHO 1995:6).

2.5.2.3 *Taboos*

The benefits of colostrum and early initiation of breast-feeding have received increased attention lately (WHO 1990:2). Colostrum has unique anti-infective properties especially adapted to protect the infant from diarrhoeal infections (Akre 1991:41).

In contrast to this positive model, medical view, many cultures around the world consider colostrum to be of no value and even harmful to their infants and discard it (SINAN 1992b).

It is not only colostrum that is regarded unfavourable, the whole breast-feeding period may be hampered by diverse ideas on milk quality as a consequence of the mother's mental or physical health, food intake, sexual relationship or her other activities (Savage-King 1994:96; SINAN 1992b).

In Guinea-Bissau, for example, 20 elderly women were interviewed in order to explore ideas about bad milk found among nursing mothers. The results of the study showed that colostrum was unpleasant, watery looking/yellow fluid, the taste was bad and irritating to infants, and is capable of causing diarrhoea to infants (Gunnlaugsson & Elnarsdottir 1993:283).

Similar results were reported by a study to both grandmothers and new mothers in the rural area. They view colostrum as "dirty" milk which can cause diarrhoea. Hence mothers are advised to express and discard it till "clean" milk can be expressed (IBFAN 1995:5). Meanwhile artificial milk preparations or traditional gruels are offered to infants. These feeds are the main cause of diarrhoeal mortality to infants (Savage-King 1994:96).

2.5.2.4 *Exposure to contaminants*

Contaminated infants' food accounts for about 70,0 percent of diarrhoeal diseases world-wide (WHO 1994:20). Nevertheless, the importance of food safety in the prevention of diarrhoeal diseases are often overlooked.

The following review provides evidence that food contamination is one of the major contributors to diarrhoeal diseases among infants.

In Malaysia, for example, findings from a retrospective study of 1 262 probability sample women reported that infants who did not breastfeed were five times more likely to die if they lived in households without piped water or toilets. This poor environmental condition was responsible for faecal contamination to infants food (Habicht, Da Vanzo & Butz 1988:456).

Studies also done in Bangladesh showed that 41,0 percent of samples of food items fed to infants were contaminated with *Escherichia coli*. Water used for preparing food was also contaminated with faecal matter (Black 1989:785; De Zoysa *et al* 1991:375).

In fact, in many cultures infant stools are not considered to be dirty or contaminated. For example, in one community-based study of the etiology of diarrhoea in Papua New Guinea, infants whose mothers did not perceive faeces to be important in causing diarrhoea had a 7,4 times greater risk of having diarrhoea than those infants whose mothers recognised their importance (Motariemi *et al* 1993:87).

Similarly, poor hygiene in food handlers, dirty bottles and teats, lack of safe water and poor sanitary conditions can be other contributory causes to contaminating infants food (WHO 1994:20).

Breast-feeding is thus an important factor since it is clean and free from contamination. The fact that infants suck directly from the breast prevents contamination by *Escherichia coli* which causes diarrhoea (Jackson *et al* 1992:149; Savage-King 1994:25).

2.5.3 Economic factors

The use of non-human milk in infant-feeding is an economic burden both financially and nutritionally (Campen 1992:12). Families, especially women, have to work hard to raise money to grow/buy infants food.

The cost also includes money for paying hospital fees and to treat infants suffering from diarrhoea (Savage-King 1994:31).

In view of the enormous cost-incurred by families and the companies that advertise non-human milk and infant food, the next review will focus on the working woman, marketing of artificial infant's milk and also look at the effectiveness and cost-effectiveness of feeding practices in the control of diarrhoeal diseases.

2.5.3.1 *Women and work*

Employment while breast-feeding is as old as humanity itself. In the time of the hunter-gatherers, herders and farmers, women breast-fed when necessary while on trek or when performing their tasks vital for survival and subsistence (Bergh 1991:37). This may have meant being away from the baby for short whiles, or taking the baby along to the field.

It is only since the Industrial Revolution that combining work and breast-feeding have become more difficult. Women do two-thirds of the worlds' work and hence fail to do their biological role of breast-feeding (Johnsson 1995:15). This is especially true in poverty stricken areas where the majority of households are female headed (WHO 1995:4).

Furthermore, these women have to work in situations which are not conducive to breast-feeding: in factories, in large commercial agricultural establishments and in shops (Walker 1992:20).

In Sweden, for example, where there is a high rate of female employment (95,0 percent) initiation of breast-feeding is 100,0 percent, but at six months the breast-feeding rate

falls to 50,0 percent (Mohamed 1993:13).

In South Africa, a survey of hospital workers at Baragwanath, Coronation and Johannesburg hospitals regarding infant-feeding practices was undertaken by Mkhasibe and Wagstaff (1991:19).

Questionnaires (273) were distributed to sisters, staff nurses and nursing assistants. Response rate was 67,0 percent.

The findings showed that 6,0 percent of infants were never breast-fed, but the majority (68,0 percent) were breast-fed for more than 12 weeks.

Breast-feeding after returning to work was most commonly practised at Baragwanath hospital (60,0 percent) and by mothers who were nursing assistants (75,0 percent).

Nurses stated that they had to return to work because of financial necessity, hence non-human milk had to be introduced to infants (Mkhasibe & Wagstaff 1991:19).

This finding was confirmed by Chalmers, Ransome & Herman (1990:1127) in a study of 200 coloured South African women. Bottle-feeds were introduced to infants because work and breast-feeding was incompatible, resulting in their infants suffering from diarrhoeal diseases (Chalmers, Ransome & Herman 1991:1128).

In Swaziland, women comprise 62,0 percent of employees in teaching, nursing, clerical fields and in subsistence farming (Okore 1991:225). These mothers introduce non-human milk and traditional gruels within the first three months of life (UNICEF 1994:14). These foods are the main cause of diarrhoea to infants (Savage-King 1994:26).

Thus working outside home affects the duration of breast-feeding and early use of artificial/commercial or traditional infant foods. These feeding practices have proved to be detrimental to infants' health (Ransome *et al* 1989:433).

According to the Innocenti declaration of the protection, promotion and support of breast-feeding signed by 30 governments states, all governments by 1995 should

- enact imaginative legislation protecting the breast-feeding rights of working women and establish means for its enforcement
- ensure the implementation of the International Code of marketing of breast milk substitutes so that the marketing of such substitutes is not targeted at employed women

The International Labour Organization Convention No 3 of 1919 further states that

- a 12 weeks maternity leave with cash benefits of at least 66,0 percent of previous earnings must be granted to women
- a 2½ hour breast-feeding break during each working day must be granted to working women
- dismissal during maternity leave must be prohibited

These international recommendations are effected in order to promote infants health and to protect them from diarrhoeal diseases (SINAN 1995).

Indeed, in America, a nation-wide survey of 900 hospitals reported that 62,0 percent provided facilities for lactating employees. Eighty three percent had a place to express breast milk, 67,0 percent provided electricity pump and 86,0 percent had a refrigerator.

Consequently, less absenteeism due to diarrhoea from infants was noted (Spisak & Gross 1991:41).

In Swaziland, working mothers are encouraged to breastfeed at night, express and refrigerate milk for use while at work. This feeding practice has resulted to fewer (4,0 percent vs 23,0 percent) attacks of diarrhoeal infections among infants (SINAN 1991; SINAN 1995).

In conclusion, it has been demonstrated that there is a direct correlation between infant survival and breast-feeding in the developing world. Yet it is widely demonstrated that

each generation breast-feed less than the previous one, especially among working women. Hence the need for international recognition for breast-feeding facilities within the work situation in order to protect infants from diarrhoeal infections.

2.5.3.2 *Effectiveness and cost-effectiveness of infant-feeding practices in the control of diarrhoeal diseases*

Theoretical calculations made by Feachen and Koblinsky in their review (1984) indicate that the promotion of breast-feeding could reduce diarrhoeal morbidity rates by 8,0 to 20,0 percent and diarrhoeal mortality rates by 24,0 to 27,0 percent in the first six months of life (Feachen & Koblinsky 1984:271).

Data from Costa Rica and Brazil indicates that these estimates are reasonable. In Costa Rica, a 36,0 percent reduction in the incidence of diarrhoea was noted in infants aged zero to five months in a population exposed to intensive breast-feeding promotion. While in Brazil infant mortality rates in Sao Paulo fell by 33,0 percent following the breast-feeding promotion programme (Monteiro 1990:23).

Breast-feeding programmes are believed to have led to a 32,0 percent reduction in infant deaths caused by diarrhoea globally (De Zoysa *et al* 1991:375). Breast-feeding should thus be promoted as an effective measure against diarrhoea.

2.5.3.3 *Costs*

The cost incurred by nutritional and infective consequences of using artificial feed is enormous.

In Ghana and Ivory coast, for example, a study revealed the cost of 16 to 18 million US dollar annually (WHO 1990a:6).

Whilst in Asian countries artificial feed ranged from 15,0 percent (Phillipines) to 14,0 percent (India) of a family's annual per capital income (Campen 1992:12).

In Swaziland the total cost of artificial feeding for one month is equivalent to the cost of buying monthly starch for a family of four (US \$12) (IBFAN 1992:36).

However, the national costs in terms of treating an infant with diarrhoea are more difficult to estimate. According to De Zoysa *et al* (1991:375) the cost per diarrhoea case averted ranged from 2,4 US dollar to 143 US dollar. The estimated cost of delivering a package of breast-feeding promotional activities includes

- change in hospital routine
- face to face education and support
- promotion to control the marketing of breast milk substitutes

The costing were between 1,00 US dollar and 10,00 US dollar per mother exposed to such activities (De Zoysa *et al* 1991:375).

From the above evidence, it appears that breast-feeding is the only feeding practice that is cost-effective in reducing diarrhoeal mortality and morbidity to infants (Tootil 1995:150).

2.5.4 Systems for health care delivery

Health care units have long been recognised as the centres which influence a particular mode of infant-feeding practice to mothers (WHO 1989:1). These units deserve special attention in terms of routine practices which may either promote or discourage safe feeding practices.

According to WHO (1989:1) infants must be breast-fed within the first 30 minutes of birth as this initial feed has anti-infective properties which prevent diarrhoeal infections (Savage-King 1994:24).

The next discussion is concerned with health systems which promote poor feeding practices with the resultant diarrhoea. These are:

2.5.4.1 *Separation of mothers and infants*

The practice of separating mothers and infants occurs frequently in institutional settings for a variety of reasons such as prevention of infection and allowing mothers and infants to rest (Jelliffe & Jelliffe 1988:13). While infants are separated from mothers, feeds such as glucose water and formulas are given, thus diarrhoea occurs following contamination from these feeds (WHO 1992:1).

Eventhough it is widely documented that rooming-in increases the feeling of motherhood and prolonged maternal infant contact. It also increases survival chances of infants because the appropriate feeding practices are used (Jelliffe & Jelliffe 1988:13; Savage-King 1994:41).

In Indonesia, for example, infant mortality from diarrhoeal infection after initiation of rooming-in at Sanglah hospital decreased from 41,5 to 5,5 per 1 000 live births (Soetjiningsih & Suraatmaja 1994:231).

In Philippines, a comprehensive rooming-in programme established by a team of Wellsart Associates for all newly born infants reported a breast-feeding initiation rate of 100,0 percent. No artificial milk was distributed at the hospital and a reduction of 5,0 percent in the diarrhoea incidence was noted, reflecting an annual cost saving equal to 8,0 percent of the hospital annual budget.

Similarly, a comparative field study conducted in Brazil, Honduras and Mexico using multivariate analysis revealed that a higher breast-feeding rate was attained (53,7 percent vs 38,6 percent at one month post-partum and 43,4 percent vs 19,9 percent at three months) when rooming-in was introduced in hospitals (Wellstart International 1994:3).

According to the WHO (1995:4) a high breast-feeding rate which is promoted by rooming-in, decreases diarrhoeal incidence through the immunoglobulin found in the breast milk.

2.5.4.2 *Delayed feeds*

Delay in the initiation of breast-feeding in the immediate post-partum period is a common practice in some health institutions. This delay may result in poor sucking reflex displayed by infants as well as diminished breast milk production.

As a result, supplementary foods may be given which are likely to cause diarrhoeal infections to infants (Righard & Alade 1990:1105).

For instant, comparative studies conducted in Sweden and England on mothers who had early (less than one hour) access to their infants revealed a longer (+50,0 percent) duration of breast-feeding than the late (+one hours) contact group.

The early contact infants were also heavier and experienced fewer (1,0 percent) episodes of diarrhoea than the contrast group (Mukasa 1992:81; Spisak & Gross 1991:45).

These results also revealed that when infants were offered the breast soon after birth (within 20 to 55 minutes) and then breast-fed frequently thereafter, milk comes in earlier and the mother is more likely to breast-feed for a longer period (Mukasa 1992:82; O'Dent 1992:34; Perez-Escamilla, Pollit, Lonnerdal & Dewey 1994:89). Thus an infant is protected from diarrhoeal infections from the anti-infective properties of human milk (Savage-King 1994:24).

2.5.4.3 *Fixed time-feeding*

In some health institutions, infant contact, including breast-feed is scheduled to maintain the maternity wards and nurseries in impeccable order (Jelliff & Jelliff 1988:13; Mukasa 1992:78).

Mothers may breastfeed every three to four hours during the day and night feeds may be withheld (Walker 1992:24). This practice prevents adequate emptying of breasts and

may lead to milk stasis, venous and lymphatic engorgement. Also pressure atrophy of myoepithelial and alveolar cells may occur and no further milk may be produced (Enkin, Kerise, Renfrew & Neilson 1995:354). Consequently, breast milk supplements will be used and diarrhoea may occur (IBFAN 1995:4).

2.5.4.4 Routine medical orders and procedures

Medication given to mothers during labour or early post-natal period may delay the establishment of breast-feeding by hours or days (Lawrence 1989:27). Yet it is documented that within the first hour of birth, infants sought out a nipple, latch on it and suckle correctly if a drug like demerol was not administered during labour (Lawrence 1989:28; Righard & Alade 1990:1105).

In Sweden, for example, a comparative study of 80 normal deliveries was undertaken in 1992. Seventy two mothers were given Pethidine during labour. The results showed that infants were also sedated (25/40) did not suckle at birth. Consequently, they were given artificial milk preparation via tube feeds (Walker 1992:22). Similar results were demonstrated by Crowell, Hill and Humenic (1994:150) when butorphanol was given in labour.

However, Rajan (1994) assessed the impact of analgesia during delivering on breast-feeding at six weeks post-partum. Method used was the secondary analysis of data from the United Kingdom study of pain relief in labour using a postal questionnaire. The sample comprised 1 149 participants. The results showed that infants needed assistance in breast-feeding otherwise there were difficulties in latching on the breast (Rajan 1994:87).

The end result will be pre-lacteal feeds given to infants and these feeds may be contaminated resulting to diarrhoeal infections (WHO 1994:20).

2.5.4.5 Staff attitude and knowledge

One of the impediments to reorganisation of hospital routines is the fact that the health care professionals are frequently uninformed about the management of the appropriate

infant-feeding practices (Jelliffe & Jelliffe 1988:12).

Indeed, a survey of 100 health professionals in a developed country demonstrated a profound lack of professional expertise (70,0 percent) in breast-feeding counselling among Mexicans (Jelliffe & Jelliffe 1988:12).

Chalmers (1991:162), however, in a telephone survey of a comparative random sample of community midwives and health visitors found that there were conflicting advice given by the two groups of health professionals regarding infant-feeding. These messages may be the main cause of poor feeding practices among poorly informed mothers (Chalmers 1991:162).

From a different view, Walker (1992:27) in an observational study revealed that health care professionals may project a message that breast-feeding and bottle-feeding are equivalent, and that formula and breast milk are the same.

Similarly, health care professionals are quick to suggest the use of oral rehydration salts if diarrhoea occurs instead of breast-feeding (WHO 1995:2).

Eventhough it is widely documented that any feed given to infants other than human milk interferes with the flow of milk and prevents the establishment of bifidus flora which produces a resistant mechanism against diarrhoeal infections to infants (SINAN 1995).

Therefore pre-service and post-service training are important services in educating health professionals on the advantages of breast-feeding as a prophylactic measure against diarrhoeal diseases. In Mexico, for example, an evaluation study on the knowledge of health care personnel regarding lactation revealed an improvement in the hospital practices (breast-feeding improved from 12 weeks to 17+ weeks) after a training programme was implemented. Significant pre- and post-programme differences at four months of age were observed for infants born in the hospital. Diarrhoeal infections reduced from 78,4 percent to 53,1 percent (Vandale-Toney, Reyes-Vasquez & Montano-Uscanga 1992:4).

In 1994 a lactation management course was attended by 11 country representatives from Eastern and South African countries. These countries presented data on infant-feeding practices. Although initiation of breast-feeding was around 95,0 percent in all countries, exclusive breast-feeding hardly existed hence diarrhoea was a killer disease among infants (IBFAN 1994:16).

2.5.4.6 *Infant-feeding policies in maternity wards*

There are strong reasons to believe that beneficial infant-feeding policies in the maternity ward can contribute to safe feeding practices (Jelliffe & Jelliffe 1988:12).

In 1989, for example, the WHO in conjunction with the United Nations Children's Fund made several recommendations to promote breast-feeding in institutions that provide maternity services. These recommendations included rooming-in throughout the hospital stay, breast-feeding on demand, early initiation of breast-feeding, breast-feeding guidance by health personnel and avoidance of supplementary fluids.

Given the increasing number of births attended in clinics or hospitals world-wide (WHO 1992:85) an in-depth assessment of the impact of such policies is worthwhile.

In 1989, a descriptive study of changes in hospital policies in Indonesia to favour breast-feeding resulted in an increase in exclusive breast-feeding, from 61,4 percent to 93,9 percent with no diarrhoea cases among the exclusively breast-fed group (Gerung 1989:205).

Similar results were noted in Thailand and in Chile where breast-feeding rates increased by 5,0 percent (Pichalpat & Thanomsingh 1992:13; Valdes, Perez & Pugin 1993:142).

In America 65 studies on hospital based intervention experimental design with randomisation procedures showed that breast-feeding interventions have a beneficial effect on lactation success, particularly among primigravida women (Perez-Escamilla, Pollit, Lonnerdal & Dewey 1994:89).

2.5.4.7 *Marketing of artificial infant milk*

Artificial infant milk is one of the fastest growing food industries in the world (Jelliffe & Jelliffe 1988:350). Current estimates place the world sales figures at over US \$4 billion, increasing at 15,0 percent per year. Half of that is sold to developing countries (Jelliffe & Jelliffe 1988:13).

Exposure to misleading advertisements encourages the use of formula feed and the decline of breast-feeding (Cunningham, Jelliffe & Jelliffe 1991:659). Indeed any advertising of breast milk substitutes induces doubts about breast milk hence hinder the let-down reflex (Savage-King 1994:12). This is especially true in Swaziland where some milk companies were advertising their products as superior to breast milk (SINAN 1994:10). Consequently, mothers introduced non-human milk within the first two months of life (IBFAN 1995:5) and diarrhoeal diseases occurred.

Also, an introduction of breast milk substitutes in poverty stricken areas and in poor environmental conditions increases the prevalence of diarrhoeal infections (WHO 1995:1).

Breast milk has anti-infective properties which prevent the occurrence of diarrhoea (WHO 1995:2) and systems for health care delivery are therefore the ideal institutions for promoting safe feeding practices since hospital deliveries are becoming a norm world-wide.

Policies for these health institutions should promote breast-feeding since it is a prophylactic feeding practice against diarrhoeal infections.

2.6 CONCLUSION

The literature review has revealed breast-feeding as the beneficial feeding practice in terms of diarrhoeal mortality and morbidity.

Further, factors which influence feeding practices which are socio-cultural, economical, personal and systems for health care delivery have been discussed. These factors can

promote safe feeding practices during infancy.

The next chapter will discuss the methodology for the present study.

CHAPTER 3

Research design and method of investigation

3.1 INTRODUCTION

In the previous chapter a literature review was given on the impact poor feeding practice have on the morbidity and mortality of infants and the factors which influence feeding practices. In the review it was clear that a poor health outcome of a non-breast-fed infant especially in poverty stricken areas can be expected; where the hygienic standards are below average and that diarrhoeal incidents tend to be higher in the abovementioned infants as compared to their breast-fed counterparts.

The poor health state of non-breast-fed infants contributed to high infant mortality rate especially in Swaziland.

Breast-feeding was thus identified as a prophylactic feeding practice against diarrhoeal diseases, hence it should be promoted in all health care facilities and in the community.

In this chapter the methodology of the study undertaken to determine the prevailing feeding practices of infants from birth to 12 months will be discussed.

3.2 DELIMITATION OF FIELD OF STUDY

3.2.1 Geographical area

Swaziland is one of the smallest kingdoms in Southern Africa measuring 17,364 sq km. It is divided into four regions, these are: Hhohho in the North, Manzini in the Centre, Lubombo in the East and Shiselweni in the South. Mbabane is the main city in the Hhohho region, which is the administrative capital.

The city was founded in 1902 and was chosen as the site of the colonial administration with all the Government offices based there.

The area of Mbabane is 392,2 sq km (Development Plan 1993/94:30). Mbabane is partly surrounded by the peri-urban area ($\frac{1}{4}$ of the total land area), which consists of migrant workers who come to seek employment in the city. The peri-urban area is poorly developed. There is no infrastructure, no safe water and there are poor sanitary facilities. In some areas there are no permanent houses. Residents live in temporary structures.

In general the peri-urban area is underdeveloped and people have to travel to the city for basic requirements including health care services (Rosenberg & De Suarez 1996:12).

The urban area, on the other hand comprises people who have access to basic services such as safe water and good sanitary facilities and have paying jobs hence they can use non-human milk without problems. Rural residents of Mbabane generally breast-feed their infants since they have no other option because they have limited resources.

3.2.2 The study population and area

Swaziland has a population of about 869,000 people (Development Plan 1993/4:30). Children constitute 47,7 percent of the population and infants constitute 3,1 percent of the population (Children and Women in Swaziland 1990:11). Mbabane has a population of 49 807 people. In the peri-urban area where the majority of the people of Mbabane live, the population is about 27,8 percent of the total population of Swaziland (Development Plan 1993/4:30).

The rapid population growth in the peri-urban area is due to continued concentration of economic activities in the city thus attracting migrants from rural areas (Okore 1992:32).

The study was conducted at Mbabane health centre and hospital. It focused mainly on peri-urban dwellers. The peri-urban area comprises people from the low-income bracket (27,8 percent of the population of Swaziland). These families have limited financial resources since unemployment is as high as seventy percent (Development Plan 1993/4:30). They live under shockingly poor circumstances, barely surviving. Some have no access to health services. In general, they have received little formal education (Manzini 1991:226), hence they cannot be employed in the city because white collar jobs are reserved for the elite (Development Plan 1993/4:31). Additionally, teenage pregnancy is common among peri-urban girls. About 27 percent of girls drop-out of school is due to pregnancy (Okore 1991:226). It is not surprising that Mbabane Government hospital (the main hospital in the city) has about 4 300 deliveries per year (Mbabane Hospital Records 1996:2). Whilst the Mbabane Government well-baby clinic examines about 300 newly born infants per month (Public Health Unit Records 1996:1).

Given the problems of peri-urban dwellers which are: poverty due to unemployment, teenage pregnancy which is 27,8 percent, illiteracy due to lack of financial resources or due to school drop-outs, and the poor living circumstances; introducing breast milk substitutes in these unhealthy conditions would result in diarrhoeal infections and death to infants, as reported world-wide (WHO 1995:3).

3.2.3 Sample

A non-probability quota sampling method was used for the study. The main advantage of using quota sampling was that it defined the group of infants that formed the study population. A quota sample is also one of convenience. Those who were available and complied to the set criteria for the sample were selected to make a certain number. In this case more than 30 percent of the visits monthly registered to these clinics. The sample focused on infants between six and 12 months old that attended the two government health facilities in Mbabane, Swaziland.

The researcher felt that this age group was ideal for the study since it had passed the exclusive breast-feeding period and thus has a history of various feeding practices being used.

Criteria set for a respondent to be included in the study was the following:

- Infants had to be accompanied by mothers or permanent caretakers who can give a reliable history regarding feeding practices as stated on the questionnaire used as instrument for this study.
- Infants had to be between six months and 12 months of age (this age group has been exposed to a variety of feeding practices and could have had diarrhoeal diseases).
- Infants must have possessed a health card which had records regarding feeding practices and the health profile of infants. These documents were useful in confirming the feeding practices and the diarrhoeal episodes which infants had suffered from.
- Infants must have attended the health service for more than three times. These regular users of health services, were not likely to be frightened by an interviewer and give false information.

A total of 105 mother/caretakers who accompanied infants to a well-baby clinic and the Mbabane Government hospital were interviewed. These two health facilities are the only two health facilities rendered by the Government in Mbabane.

The subjects (105) formed 30 percent of the monthly registration rate (303) of infants in the Mbabane well-baby clinic of both these health facilities (Public Health Unit Records 1996:27).

This group of infants was selected for the study because in general peri-urban dwellers do not conform to the traditional practices of breast-feeding (WHO 1991:6). They use artificial feedings, but due to poor sanitary conditions, faecal contamination may occur resulting to diarrhoeal diseases (WHO 1992:3).

3.3 METHODOLOGY

3.3.1 Research approach: quantitative research

A descriptive quantitative survey approach was chosen as an ideal method of research for this study and provided the following advantages for this study:

- It provided insight into the prevailing infant feeding practices. It also suggested relevant questions to be asked and the direction the research should take (Robinson & Neutens 1987:82).
- The survey proved to be economic in terms of time, money and other financial resources (Polgar & Thomas 1991:74).
- Generally, the survey approach has a high degree of representativeness, hence it was used for this study (McLaughlin & Marascuilo 1990:88).

Based on the abovementioned advantages, the researcher felt that the quantitative research was the ideal approach in describing infant-feeding practices among Mbabane residents.

3.3.2 The interview

The interview method was selected for the following reasons:

- Data collected from each interview was usable, since the interviewer ensured that no items were left blank (Polit & Hungler 1989:194).
- Re-wording of items was done when the interviewee was unsure or misunderstood a question.
- Response rate was 100 percent since people were willing to participate in the study, and all the interview schedules were completed.
- The interview elicited information from a broader group since respondents did not have to be literate as the case may be with questionnaires (Polit & Hungler 1989:195).

The researcher personally conducted the interviews of all the respondents.

A standardised schedule was used because it was less time consuming and the same information was collected from all respondents (Polgar & Thomas 1991:120)

The interview schedule comprised both closed-ended and open-ended questions.

The strength of close-ended items were the following:

- Close-ended questions are more efficient to conduct.
- Interview offers a high degree of consistency for comparative purposes.
- The same information is collected for all respondents (Polit & Hungler 1992:283).

- With respondents who are unable to express themselves well verbally, close-ended items have a distinct advantages (Polgar & Thomas 1991:120).
- Easy to analyse.

The major disadvantage of close-ended questions lies in the possibility of the researcher neglecting or over looking some potentially important responses.

The omission of possible alternatives can lead to inadequate understanding of the issues and to outright bias if the respondents choose an alternative that misrepresents their opinion (Polit & Hungler 1992:284).

Only a few open-ended questions were used in order for respondents to express their opinion on the feeding practices. Open-ended questions were also used where more information was needed and where the researcher could not anticipate the answers of the respondents. The main disadvantage to the use of open-ended questions was that they were difficult to analyse. Responses were categorised subjectively and thus bias may have been introduced.

The questionnaire (interview schedule) was constructed according to the objectives of the study (compare chapter 1) and organised according to the literature review (compare chapter 2). The questionnaire was organised into the following sections:

(1) Mothers personal factors

The following aspects were covered in the section:

- Age of mother, marital status, residential address, educational background, the type of employment, whether she takes her baby to work, and if not, who looks after the baby while she is working.

(2) Information on living children

This information was aimed at investigating the feeding practices based on surviving children.

(3) Information on deceased children

This section examined the feeding practices of the infants that did not survive; their age, gender and cause of death.

(4) Information on present infant

In this section questions were asked to collect data on the feeding practices of the present infant, for instance age and gender of infant. It also included the following subheadings seen below.

(5) Cultural factors

The following aspects were inter alia included in this section that could have influenced the feeding practices or diarrhoeal attacks of the present infant: place of delivery, initial feed, beliefs surrounding the use of colostrum and non-human milk. According to various sources these factors influences feeding practices in a given society or family.

(6) Service factor

The factors inquired about in this section that could have an influence on the feeding practice and incidence of diarrhoea were: the services used by the mother for the infant; the use of non-human milk and the introduction of family foods. According to the literature (compare chapter 2) these factors have a positive correlation with diarrhoeal diseases.

(7) Disease profile of the infant

This factor examined the incidence of diarrhoea and other related illnesses and their relationship to the feeding practices (compare annexure B and chapter 2).

Data for the interview schedule was extracted from the literature reviewed. Data was collected according to the structured plan which indicated the information that was relevant to the study.

Other questions allowed respondents to express their views in a natural way, hence unstructured questions were used where applicable.

Numerical coding was done to each item in order to analyse the questionnaire through the use of the main frame computer at the University of South Africa. The researcher coded the answers during the interview according to a key decided on before the questionnaire was printed.

Some items did not need coding as indicated by Polit and Hungler (1989:470) for example where numerical data was collected such as in the case of the age of mothers or infants.

3.3.3 Pretesting of the instrument

A first draft of the questionnaire (interview schedule) was compiled and sent to the supervisors for approval. The supervisors ensured that

- questions were relevant to the objectives of the study
- questions were phrased in a manner that protected respondents from emotional abuse
- questions were clearly stated and did not introduce bias

The supervisors tested the instrument for content reliability to this end. Feeding practices related by the mother were confirmed by data written on the infants' card hence the information was proved as reliable. (See 3.4 for a discussion on the validity and reliability of the instrument.)

Face validity was also tested by the two supervisors for this study at the University of South Africa. This type of validity relies basically upon the judgement of the researcher and in this case also the supervisors.

A health care centre which was not involved in the study was used to test the instrument for reliability (Polit & Hungler 1989:246).

Ten mothers of infants in a well-baby clinic formed the study population. The first draft of the questionnaire was used to test whether the questions were stated clear enough for the respondents to understand. The questionnaires were manually analysed. The results showed that there is a consistency in the results and that the instrument will be able to collect the data as intended by the study, or that a different investigator can achieve the same results using the same instrument and method.

After the instrument was edited and corrected a copy was sent to the supervisors as well as the statisticians for approval. After it had been evaluated by the statisticians it was sent to the computer programmer for approval. Again the questionnaire was edited and finalised. A final copy was sent to the computer programmer and a computer programme was written. In the meantime the questionnaire was reproduced and the researcher started to collect the data.

The researcher personally conducted a total of 105 interviews of mothers with infants at the following health services:

- eighty mothers from the well-baby clinic
- thirteen mothers whose infants were admitted for diarrhoeal diseases, and
- twelve mothers whose infants were attended to at the outpatient department for minor diarrhoeal diseases

The study lasted for about a month since the interviews were conducted during the mornings, when mothers presented their infants to health care workers.

Each interview schedule was re-checked by the researcher for accuracy and completeness before the clients left for home.

The completed questionnaires were sent to the computer department at Unisa for analysis (refer to annexure C for copy of questionnaire).

3.4 RELIABILITY AND VALIDITY

3.4.1 Validity of the research instrument

Validity refers to the degree to which an instrument measures what it is supposed to be measuring (Polit & Hungler 1989:246). Therefore, an unreliable instrument cannot be valid.

The variables to be measured were defined and relevant literature is examined to aid in delineating the variable's dimensions (see discussion in chapter 2). The next step was the construction of items (questions in the questionnaire) to be representative of each dimension of the variables as discussed in chapter 2. The remaining step was a judgement as to whether the items indeed reflected the defined variables and its dimensions. At this stage individuals who were familiar with the content area was called upon to judge the appropriateness of the items (Polit & Hungler 1989:246). The supervisors at Unisa were asked to test the instruments for content validity, because both have many years of experience in the community nursing, midwifery and post-natal fields of nursing. The questionnaire was also given to ten respondents that did not take part in the actual study as indicated previously.

In accordance with the best judgement of the researcher the instrument was found to measure what it was supposed to measure.

3.4.2 Reliability of the research instrument

An instrument can be said to be reliable if its measures accurately reflects the true scores of the attribute under investigation (Polit & Hungler 1989:246). Reliability therefore means stability, consistency or dependability of an instrument. In this study, reliability was assured by the following:

- Questions were clearly worded in order to be interpreted correctly.
- The interview was conducted by one person (the researcher).
- The interview was conducted in Siswati (the local language) to limit any misinterpretations.
- The response given by mothers were compared to the documented information on the hospital card.
- Questions which were not interpreted correctly during the pre-test were reconstructed.
- Finally, respondents who participated in the pre-test responded in the same manner as those who formed the study population. So the instrument can be accepted as reliable.

3.4.3 Validity and reliability of the study

Validity and reliability of the study was ensured through the following:

- Literature study.
- Organisation of loose standing constructs into a conceptual framework.
- Operational definitions.

- Sample size - considered big enough to be representative of the behaviour being measured.
- Correlation between findings.
- Congruence between research questions, objectives, investigation, findings and recommendations (Polit & Hungler 1989:246).

3.5 ANALYSIS OF DATA

The data was analysed by the SAS Analysis at the computer department at Unisa. The first computer print out consisted of frequency tables. More statistics were requested, for example correlations between findings (chi-square) and associations (Cramer's Value).

3.6 ETHICAL ASPECTS

Permission was obtained from the chief nursing officer in the MOH to conduct the study (compare annexure B for letter of permission and for the letter of approval).

Other authorities were consulted, these were the matrons, sisters and senior nurses in each department where the study was conducted. This was done in order to get access and cooperation at unit level whilst conducting the study.

Permission was also obtained from the parents of infants to interview them after the following was explained to them:

- The reasons for undertaking the research and the objectives of the study.
- That their participation was voluntary and that they could withdraw at any stage of the study if they feel otherwise in participating.
- That no harm will be done to themselves or their infants.

- That they could stay anonymous.
- That the information collected will be kept confidential.

Confidentiality could be maintained because names were not written on the questionnaires and results were reported statistically.

3.7 SUMMARY

In this chapter the methodology of the study was discussed. The study was conducted to mothers of infants who used the modern health services in the government health centres in Mbabane, Swaziland. The reasons for conducting the study were explained as well as inter alia, the sample; the composition, administration and pretesting; and analysis of the instrument as well as ethical aspects related to this study.

The next chapter focuses on the analysis of the data.

CHAPTER 4

Data analysis and data interpretation

4.1 INTRODUCTION

In this chapter the statistical analysis of data obtained from the questionnaire will be discussed. The SAS statistical software package was used for analysing the data.

Using the objectives of the study, the following questions were answered:

- **IS** there any association between the number of diarrhoeal attacks in breast-fed versus non-breast-fed infants?
- **IS** there any association between the use of colostrum as an initial feed and the incidence of diarrhoeal attacks?
- **DOES** the level of education of the mother play a role in infant feeding practices and the number of diarrhoeal attacks?
- **DO** cultural factors influence the feeding practices of the infant?

- **IS** there any association between the place of delivery (home or hospital) of the infant and the feeding practices and diarrhoeal attacks?
- **IS** there any difference between feeding practices of infants who live in the urban, peri-urban or rural area of Mbabane, Swaziland?
- **WHAT** are the prevailing feeding practices among mothers of infants from birth to 12 months in Mbabane, Swaziland?

The questionnaire was grouped under the following sub-sections and data was analysed in the same order.

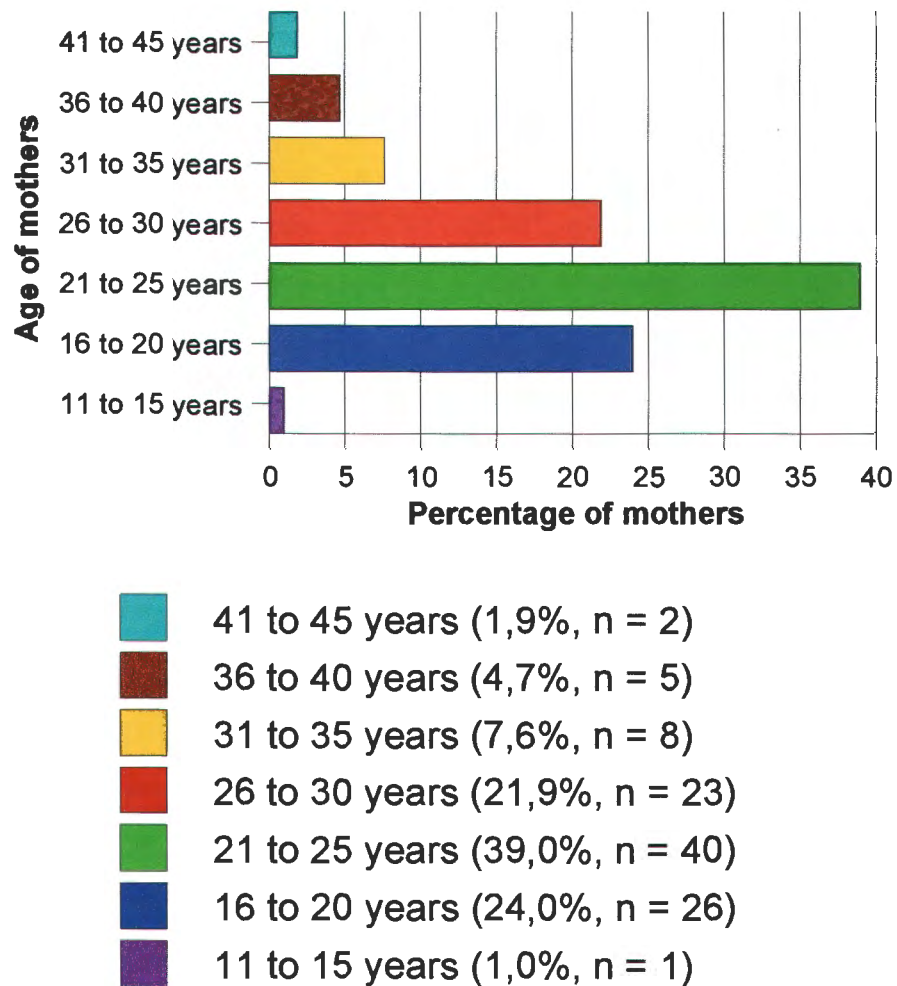
- Section 1: Information on mothers' personal factors
- Section 2: Information on alive children
- Section 3: Information on deceased children
- Section 4: Information on the personal factors of present infant
- Section 5: Cultural factors
- Section 6: Service factors
- Section 7: Disease profile of infant

SECTION 1

4.2 INFORMATION ON MOTHERS' PERSONAL FACTORS

Item 1: The age of mothers

The ages of the mothers ranges from 15 to 43 years.



**Figure 4.1: Age of respondents
(n = 105)**

Figure 4.1 shows that the majority of mothers, namely 38,0 percent (n = 40) are between 21 to 25 years, 24,0 percent (n = 26) ranges between 16 to 20 years and 21,9 percent (n = 23) are between 26 to 30 years of age. Only 7,6 percent (n = 8) of the respondents are between 31 to 35 years of age, 4,7 percent (n = 5) are between 36 to 40 years and 1,9 percent (n = 2) were between 41 to 45 years. The youngest mother, 1,0 percent (n = 1) is 15 years old. (Consult the glossary for an explanation of the difference between the use of "n" and "N" in this study.)

Item 2: Marital status of the mothers

The majority, 63,8 percent (n = 67) are single, whilst 36,2 percent (n = 38) are married. None are divorced, widowed or live together.

Item 3: Place of residence of respondents.

According to the literature there is a difference between the feeding practices in urban, peri-urban and rural areas in developing countries. The poor urban and peri-urban dwellers emulate the life-styles of the elites and use uncusomary practices such as bottle-feeding and breast milk substitutes (Morse 1982:77) (compare 2.5.2.1 in chapter 2).

The majority of respondents in this study, 87,6 percent (n = 92) live in the peri-urban area, 10,5 percent (n = 11) live in the rural area and only 1,9 percent (n = 2) resides in the urban area, of Mbabane, Swaziland.

Item 4: Educational background of the mothers with infants.

According to Morse's (1982:79) low educational level (ie primary education and no formal education) can result it incomprehensible directions and formula mixing of non-human milk hence diarrhoea may occur.

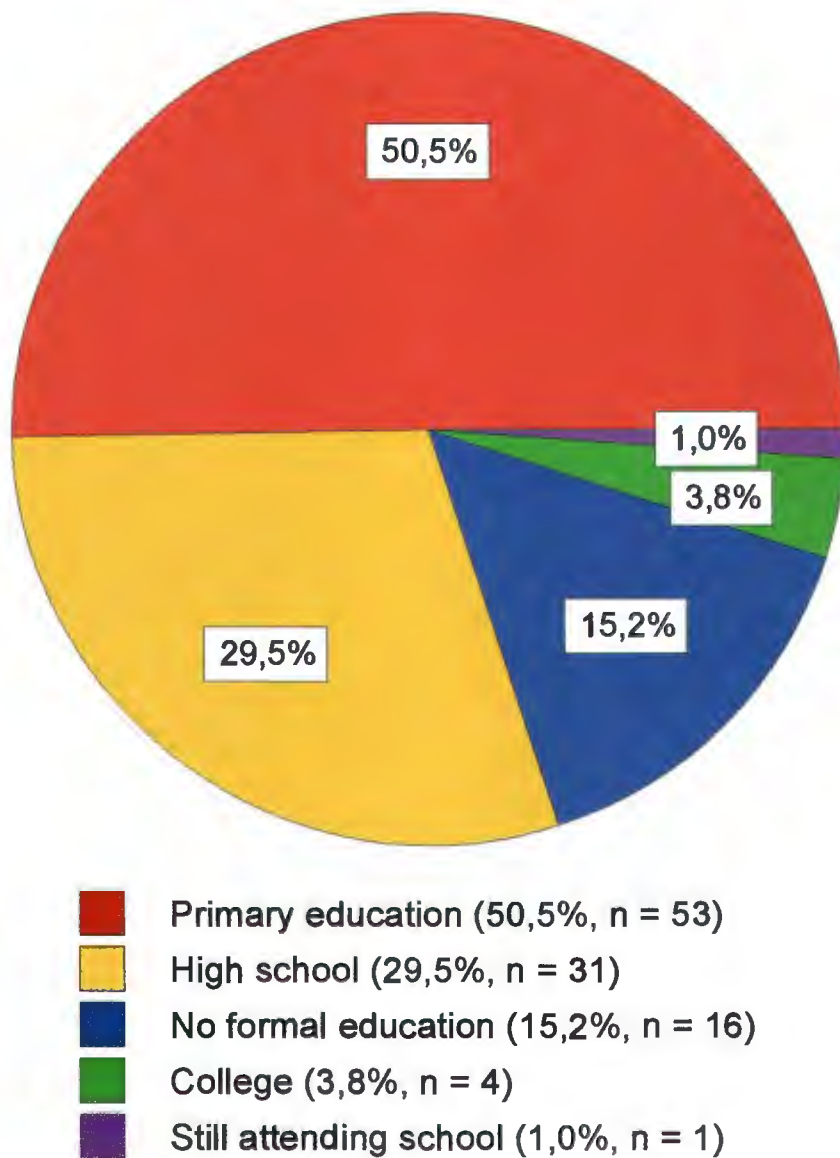


Figure 4.2: The educational background of respondents (n = 105)

The data collected, as indicated in figure 2 show the majority of the women in this study, namely 50,5 percent (n = 53) of the respondents attained primary education, 29,5 percent (n = 31) attained a high school education, and 15,2 percent (n = 16) had no formal education, only 3,8 percent (n = 4) had college education and 1,0 percent (n = 1) was still attending school.

The majority of the infants in this study were therefore at risk to develop diarrhoea because their mothers had no formal education or only primary education.

Item 5: Employment status of mothers with infants

It is important to determine the employment status of the mothers in this study because it has been found in studies (compare Chalmers , Randsome and Herman (1991) in chapter 2) that employment of the mother could influence feeding practices of infants by early supplementation (compare 2.5.3 in chapter 2 as well as table 4.15 in this chapter).

Table 4.1: Employment status of respondents (n = 105)

EMPLOYED	%	f
Yes	28,6	30
No	71,4	75
TOTAL:	100,0	105

Table 4.1 Indicates that the majority of women in this study were unemployed 71,4 percent (n = 75) Only 28,6 percent (n = 30) were employed.

Item 6: Nature of employment.

The nature of employment of the mother will also play a role in the feeding practices to the infant in so far as that the working mothers in certain fields of employment might have the opportunity to take their infant with them to work and thus continue breast-

feeding. Certain work situations are also not conducive to breast-feeding (compare 2.5.3.1 in chapter 2).

Of all the employed respondents in this study (100,0%, N = 30), only 10,0 percent (N = 3) were professional employees. The majority 90,0 percent (N = 27) were involved in unskilled jobs.

Item 7: Infants that accompanied the mother to work

In a study done in an industrial area at Markerns, Swaziland mothers who were allowed to take their infants to work had a low incidence of diarrhoea because they could continue breast feeding their infants (IBFAN 1995:1) (refer to 2.5.2.1 and 2.5.3.1 in chapter 2).

Table 4.2: Number of infants who accompanied the mother to work (N = 30)

TAKE BABY TO WORK	%	f
Yes	17,0	5
No	83,0	25
TOTAL:	100,0	30

Table 4.2 indicates that the majority of the employed mothers, namely 83,0 percent (N = 25) did not take their infants to work compared to 17,0 percent (N = 5) mothers that took their infants to work.

The majority of infants could therefore be considered at risk of developing diarrhoea.

Item 8: The individual looking after the infant at home.

It is important to know who looks after the infant while the mother is at work, because the hygienic standard as well as the type of feed that is used may differ.

Of the respondents (100,0%, N = 25) that did not take their babies to work, 80,0 percent (N = 21) were looked after by baby minders, 12,0 percent (N = 3) were looked after by grandmothers and 4,0 percent (N = 1) were still on maternity leave.

Item 9: The number of employed mothers that received maternity leave.

If the employed mother received maternity leave after the birth of the infant the exclusive breast-feeding practice could have been firmly established before she returned to work.

From the employed respondents (100,0%, N = 30) 83,0 percent (N = 25) had maternity leave, while 17,0 percent (N = 5) did not have maternity leave. These findings are in contrast to the ILO which states that every employee should have maternity leave for recuperation and for breast-feeding.

Item 10: Length of maternity leave

The length of the maternity leave will also play a role in establishing an exclusive breast-feeding practice and giving the infant the important protection he/she needs against diarrhoeal infections (read 2.4 in chapter 2).

The majority of the respondents who did receive maternity leave, received less than one month (52,0%, N = 13). Twenty four percent (N = 6) of the respondents' leave lasted between one to two months and 24,0 percent (N = 6) of the respondents received more than three months.

SECTION 2

4.3 INFORMATION ON LIVING CHILDREN

Item 11: Number of living children

Table 4.3: Living children (n = 105)

NUMBER OF CHILDREN	%	f
Present infant only	31,4	33
2-4	52,2	55
5-7	12,5	13
8-10	3,9	4
TOTAL:	100,0	105

The majority of respondents in this study, 52,2 percent (n = 55) had between two and four children, 31,4 percent (n = 33) had only the present infant; 12,5 percent (n = 13) had between five and seven children , 3,9 percent (n = 4) had between eight and ten alive children at the time of data collection.

Item 12: Feeding practices during early (birth to four months) infancy on living children

According to Akre (1991:62) giving non-human milk to infants early in infancy predisposes infants to diarrhoea. So this question was asked to determine what the feeding practices were of the infants that did survive.

Table 4.4: Feeding practice used on living children (n = 105)

CHILD NUMBER	f	BREAST		BREAST AND NON-HUMAN MILK		NON-HUMAN MILK		SOLID	
		%	f	%	f	%	f	%	f
1	33	45,5	15	30,3	10	18,2	6	6,0	2
2	36	14,0	5	50,0	18	5,5	2	30,5	11
3	17	23,5	4	47,0	8	12,0	2	17,5	3
4	11	36,4	4	63,6	7	0,0	0	0,0	0
5	1	100,0	1	0,0	0	0,0	0	0,0	0
6	1	0,0	0	100,0	1	0,0	0	0,0	0

From the above table, it is evident that the majority of infants of the mothers, with only one child namely, 45,5 percent (N =15) were solely breast-fed, 30,3 percent (N = 10) were given breast and non-human milk, 18,2 percent (N = 6) were given non-human milk, and 6,0 percent (N = 2) were given solids in the first four months of life.

From all (100,0%, N = 36) of the respondents who had two children, 14,0 percent (N = 5) of their present infants were solely breast-fed, 50,0 percent (N = 18) are given breast milk and non-human milk, and 30,5 percent (N = 11) were given solids during the first four months of life.

Of all the respondents (100%, N = 17) who had three children 23,5 percent (N = 5) of their present infants were exclusively breast-fed in early infancy, while 47,0 percent (N = 8) were fed on breast and non-human milk and 17,5 percent (N = 3) received solids.

The infants of mothers with only one child received mostly breast milk (exclusively (45,4%, N = 15) or in combination with non-human milk (30,3%, N = 10). The infants of the mothers with two children received mostly breast milk and non-human milk (50,0%, N = 18) and solids (30,5%, N = 11). And the infants of mothers with three children also mostly received breast milk in combination with non-human milk (47,0%, N = 8) and breast milk exclusively (23,5%, N = 4).

It is clear therefore that breast-feeding is still used by the majority of women in this study though it is disturbing to note that some infants were given non-human supplements in early infancy which put them at risk of developing diarrhoea (Akre 1991:62).

SECTION 3

4.4 INFORMATION ON DECEASED CHILDREN

Item 13: Number of deceased children

The majority of the respondents in this study, namely 82,9 percent (n = 87) have not lost any children by death, 14,3 percent (n = 15) mothers lost one child, 1,9 percent (n = 2) mothers lost two children and only 1,0 percent (n = 1) of mothers lost three children.

Item 14: Cause of death

According to the WHO diarrhoea appears to be the main killer disease among infants world-wide (WHO 1992:1).

From all the deceased children in this study (100,0%, N = 18), 44,4 percent (N = 8) died of diarrhoea, 11,1 percent (N = 2) of pulmonary infections and 44,4 percent (N = 8) of unknown causes.

Item 15: Feeding practice used in early infancy (zero to four months) on deceased children

According to Savage-King (1994:18) infants who did not receive breast milk during the first four months of life were more at risk of developing diarrhoea and other diseases (compare 2.1 to 2.4 in chapter 2).

Table 4.5: Feeding practice used on deceased children (N = 18)

NUMBER OF CHILDREN	f	BREAST	BREAST AND NON-HUMAN MILK	NON-HUMAN MILK	SOLIDS
1	15	2	4	2	7
2	2	1	1	-	-
3	1	1	-	-	-
TOTAL:	100,0% N = 18	22,2% N = 4	28,0% N = 5	11,0% N = 2	38,8% N = 7

From the above table, it is clear that the majority of infants 77,7 percent (N = 14) were not breast-feed exclusively in early infancy hence putting them at risk for developing diarrhoea and other related diseases.

Item 16: Gender and age of deceased children

In some cultures the gender of the infant tends to play a role in the feeding practices of such an infant. Male infants were breastfed longer and more often than female infants, in certain cultures for example, putting them less at risk to develop diarrhoea than the infants of the opposite sex (compare 2.5.1.5 in chapter 2).

The majority of infants that died were male, 66,6 percent (N = 12) and 33,3 percent (N = 6) were females. More male infants are also born in Swaziland therefore it could also be the reason for the higher infant mortality in males indicated in this study (Lukhele 1992:4).

Seventy percent of infant deaths occur before the age of six months (UNICEF 1994:13), and according to WHO (1994:23) 10+ months could be considered as a critical stage for weanling diarrhoea (refer to 1.2).

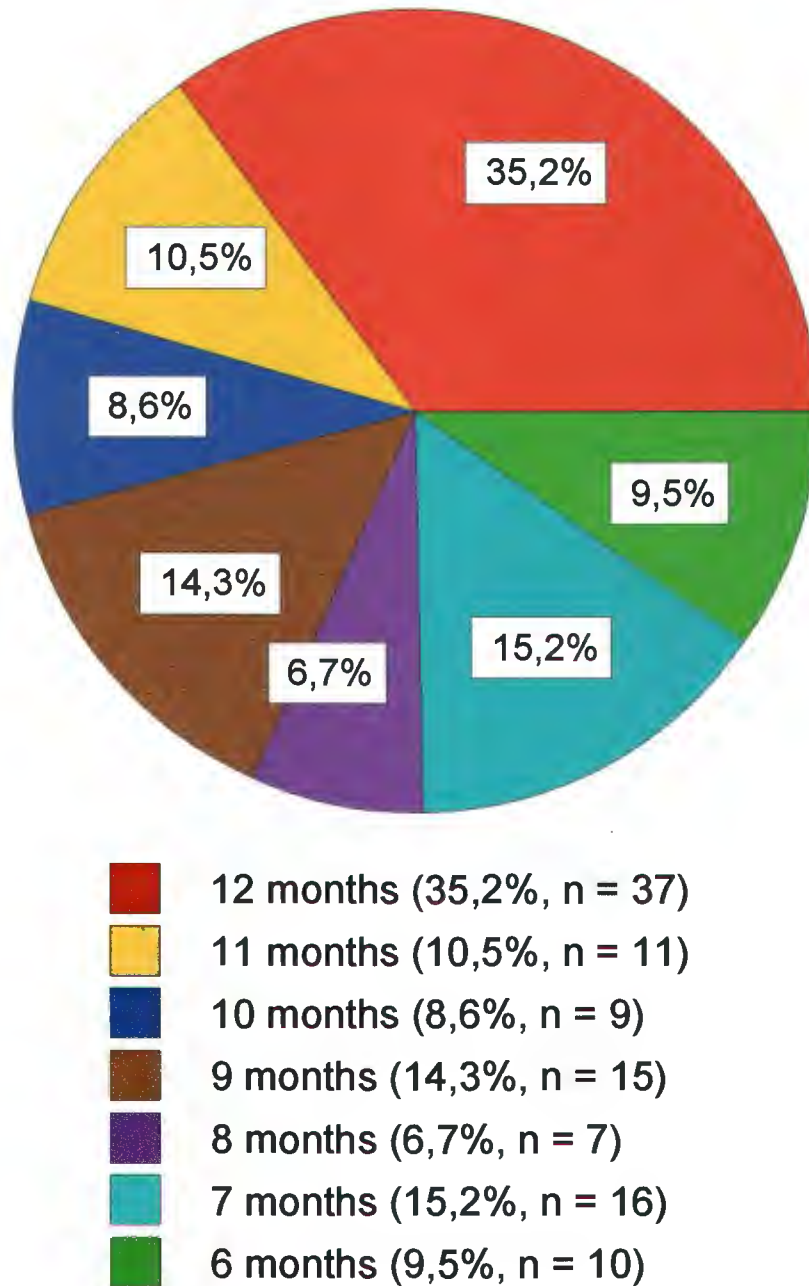


Figure 4.3: Age of present infants in months (n = 105)

Table 4.6: Age in months of deceased infants at time of death (N = 18)

AGE (IN MONTHS) OF DECEASED INFANTS	%	f
1-3	27,7	5
4-6	16,6	3
7-9	16,6	3
10-12	38,8	7
TOTAL:	100,0	18

The majority of deceased infants, 38,8 percent (N = 7) were between the ages 10 and 12 months and the second largest number of infants were between one and three months of age, at time of death.

SECTION 4

4.5 INFORMATION ON PRESENT INFANT PERSONAL FACTORS

Item 17: Age of present infant

According to WHO (1994:23) 10+ months could be considered as a critical stage for weanling diarrhoea. The majority of infants, 54,3 percent (n = 57) in this study were at this critical stage for weanling diarrhoea (read 2.5.1.4 in chapter 2).

The smallest group in this sample namely 6,7 percent (n = 7) were infants eight months of age. Only 9,5 percent (n = 10) were six months of age. The majority namely 35,2 percent (n = 37) were 12 months old.

Item 18: Gender of infant

The majority of respondents, 56,2 percent (n = 59) were male whilst 43,8 percent (n = 46) were female. This is consistent with the census report of 1986 on the gender inequalities on newly born infants (Swaziland Statistical Bulletin 1992:4).

SECTION 5

4.6 CULTURAL FACTORS

Item 19: Place where infants were delivered.

The place (home or health institution) where the infant is born may influence a particular mode of infant feeding practice to mothers (WHO 1989:1).

The majority of infants, 83,3 percent (n = 88) were delivered in health institutions while 16,2 percent (n = 17) were delivered at home. The high hospital/health institutional birth is consistent with the practice in modern/developed countries and usually not a developing country as identified by Mohamed (1993:13). Swaziland can be considered a developing country.

Item 20: Time lapse between time of birth and time of first feed

The practice of early feeding is recommended by WHO (1994:21) since this stage of life the sucking reflex is stronger and the infant can adapt well to breast-feeding.

Table 4.7: Time lapse between time of birth and time of first feed of infant (n = 105)

TIME OF FIRST FEED IN HOURS	f	%
< 1 hour	89	84,8
1-2 hours	6	5,7
3+ hours	10	9,5
TOTAL:	105	100,0

The majority of infants 84,8 percent (n = 89) were fed within the first hour of birth, while 5,7 percent (n = 6) were fed between the first and second hour after birth and 9,5 percent (n = 10) of the infants were fed after three hours of birth. These findings of feeding an infant within the first hour of birth is in line with the recommendations of WHO of modern breast-feeding practices (WHO 1989:1).

One will expect the health workers to know the importance and advantages for the infant and mother of putting the infant onto the breast as soon as possible after birth. In some cases where there is not sufficient supportive help, the milk ejection reflex may be inhibited, hence breast-feeding will not be sustained. Medication given to mothers during labour in health institutions may delay the establishment of breast-feeding by hours or even days (see 2.5.1.1 for more information).

Table 4.8: Comparison between place of delivery and the time after birth the initial feed was given to the present infant (Q19 and Q20) (n = 105)

TIME OF FIRST FEED IN HOURS	HOME DELIVERY		HEALTH INSTITUTION DELIVERY		TOTAL	
	%	f	%	f	%	f
Less than 1 hour	11,4	12	73,3	77	84,8	89
1-2 hours	1,0	1	4,8	5	5,7	6
3+ hours	3,8	4	5,7	6	9,5	10
TOTAL:	16,2	17	83,8	88	100,0	105

From the above table, it is evident that the majority, namely 73,3 percent ($n = 77$) of the infants who were delivered in health institutions were fed within the first hour of birth. The same tendency can be observed in those infants born at home where the majority namely 11,4 percent ($n = 12$) of the infants were fed within the first hour of birth. From the above table it is therefore evident that the majority of infants were fed within the first hour of birth. Reasons for not feeding the infant within the first hour of birth could be inter alia the condition of the mother or infant after birth. This fact was not investigated during the study.

The Cramer's Value of 0,211 indicates that there is some association between infants delivered in health institutions and whether they received any feed early after the delivery. So it seems that infants delivered in health institutions received the first feed earlier than the infants born at home.

Item 21: Initial food given to infant after birth

According to Akre (1991:41) and O'Dent (1992:34) colostrum is a prophylactic feed for diarrhoeal diseases, especially if given within the first hour of birth.

**Table 4.9: Time of first feed versus the type of feed given (Q 20 by Q 21)
($n = 105$)**

FREQUENCY	WATER		COLOSTRUM		FORMULA		SORGHUM		OTHER		TOTAL	
	%	f	%	f	%	f	%	f	%	f	%	f
Less than 1 hour	14,3	15	66,7	70	0,0	0	0,9	3	2,9	3	84,8	89
1-2 hours	1,9	2	2,9	3	0,9	1	0,0	0	0,0	0	5,7	6
3+ hours	0,0	0	5,7	6	0,0	0	0,9	3	2,9	3	9,5	10
TOTAL:	16,2	17	75,3	79	0,9	1	1,8	6	5,8	6	100,0	105

Colostrum was the most popular feed given to infants, 75,3 percent ($n = 79$) compared to 16,2 percent ($n = 17$) who used water, more than 5,0 percent (5,8%, $n = 6$) who used sorghum and 1,8 percent ($n = 2$) who used formula feeds. Colostrum was given to 66.7 percent ($n = 70$) of the infants within the first hour.

Water was used by 16,9 percent ($n = 15$) of infants within the first hour, solids in 3,4 percent of cases ($n = 3$) and sorghum in 1,2 percent ($n = 1$) of cases.

A strong association was found between early (within the first hour of birth) feeding and the use of colostrum feeds, as shown by Cramer's Value 0,411. The majority of the infants, 66,7 percent ($n = 70$) therefore did receive a prophylactic feed in the form of colostrum within the first hour of birth.

Medication given to mothers during labour in health institutions may delay the establishment of breast-feeding by hours or even days (see 2.5.1.1 for more information).

Table 4.10: Comparison between place of delivery and initial food given to infant (Q19 and Q21) ($n = 105$)

PLACE OF DELIVERY	INITIAL FOOD GIVEN TO INFANT							
	WATER		COLOSTRUM		OTHER		TOTAL	
	%	f	%	f	%	f	%	f
Home	3,8	4	7,6	8	4,8	5	16,2	17
Health institution	12,4	13	67,6	71	3,8	4	83,8	88
TOTAL:	16,2	17	75,2	79	8,6	9	100,0	105

The above table shows that the majority 67,6 percent ($n = 71$) of infants born in health institutions received colostrum as initial feeds, whilst 12,4 percent ($n = 13$) were fed on water and 3,8 percent ($n = 4$) received non-human milk.

Among infants delivered at home 7,6 percent ($n = 8$) were fed on colostrum, 3,8 percent ($n = 4$) were given water and 4,8 percent ($n = 5$) were fed on sorghum and non-human milk.

There was a close association between the births that took place in health institutions and the use of colostrum as the initial feed, this is evident by Cramer's Value which was 0,353. Health institutions were therefore found to be more favourable to the use of

colostrum as an initial feed.

Item 22: The individual responsible for giving the infant his/her first feed

Taboos may play a role in the type of initial feed given. This view could be held by the person attending to the mother delivering at home (refer to 2.5.2.3 in chapter 2).

The majority of infants, 92,4 percent (n = 97) were fed by their mother, however, 5,7 percent (n = 6) were fed by their grandmother and 1,9 percent (n = 2) were fed by nurses the first time.

Item 23: Colostrum as a feed given to infants

Culturally, colostrum is expressed and discarded as observed by SINAN (1992:16) So some infants may never have received colostrum at all.

The majority, namely 82,9 percent (n = 87) infants in this study were given colostrum feed, while 17,1 percent (n = 18) were not given colostrum feed. These results reveal an improvement in the feeding practices of Swazi infants (IBFAN 1995:9) (consult 2.5.2.3 in chapter 2).

Item 24: Reasons for not feeding the infant colostrum.

In a study done by Gunnlaugsson and Elnarsdottir (1993:283) it was found that respondents felt that colostrum was unpleasant, watery, tasted bad and irritating to infants and is capable of causing diarrhoea of infants (refer to 2.5.2.3 in chapter 2).

All the respondents (100,0%, N = 18) in this study who did not give colostrum to their infants, felt that colostrum was dirty milk, which when given to infants is capable of causing diseases.

Item 25: The regularity of infant feeds

The demand feeding is in line with the feeding practice which promotes regular "supply

and demand reflex" identified by Savage-King (1994:18). In some health institutions breast-feeding is scheduled to maintain the maternity wards and nurseries in impeccable order (Jelliff & Jelliff 1988:13). This practice prevents adequate emptying of breasts and does not promote a regular "supply and demand" reflex (Savage-King 1994:18) (refer to 2.5.4.3 in chapter 2).

The majority of infants, 99,0 percent (n = 104) in this study were fed on demand, only 1,0 percent (n = 1) were fed on fixed time feeding basis.

Item 26: Day feeding practice of present infants

Table 4.11: How infant is fed during the day (n = 105)

FEEDING PRACTICE	%	f	CUMULATIVE	
			%	f
Breast-fed	1,9	2	1,9	2
Breast, bottle and solids	20,0	21	21,9	23
Breast and solids	50,5	53	72,4	76
Bottle and solids	14,3	15	86,7	91
Solids	13,3	14	100,0	105

The majority, 50,5 percent (n = 53) of infants were fed on breast and solids during the day.

However, 20,0 percent (n = 21) infants were given breast, bottle and solids, a feeding practice which is termed "triple nipple syndrome" common in breast-feeding/bottle-feeding societies and capable of causing diarrhoea according to Savage-King (1994:22).

It was discouraging to note that 14,3 percent (n = 15) of infants were given bottle and solids and 13,3 percent (n = 14) were given solids only. These infants are not given breast milk hence they are denied the immunoglobulins which protects infants from diarrhoeal diseases.

Only 1,9 percent ($n = 2$) infants were exclusively breastfed, these are less likely to suffer from diarrhoeal infections as demonstrated by Savage-King (1994:20).

All the infants in this study were in the age group where the risk of developing diarrhoea is the highest. It is therefore important to compare age to type of day feed given to infants.

Table 4.12: Comparison between age of infant and day feed offered to infant (Q17 and Q26) ($n = 105$)

AGE GROUP OF INFANT	BREAST-FED		BREAST, BOTTLE AND SOLIDS		BREAST AND SOLIDS		BOTTLE AND SOLIDS		SOLIDS ONLY		TOTAL	
	%	f	%	f	%	f	%	f	%	f	%	f
Younger than 8 months	1,9	2	8,6	9	15,3	16	1,9	2	3,8	4	31,5	33
9-11 months	0,0	0	6,7	7	19,1	20	5,7	6	1,9	2	33,3	35
12 months	0,0	0	4,7	5	16,1	17	6,7	7	7,6	8	35,2	37
TOTAL:	1,9	2	20,0	21	50,5	53	14,2	15	13,3	14	100,0	105

From the above table, it is clear that breast milk (breast milk alone or breast and bottle/solids) is the most popular feed given by the majority of respondents as day feeds, during the first year of life.

However, only 1,9 percent ($n = 2$) respondents are exclusively breast-fed until the eight month of life.

It is disturbing to note that breast milk is not given to 5,7 percent ($n = 6$) of the infants younger than eight months of age.

Generally, breast and solids is used by 50,5 percent ($n = 53$) of respondents during infancy whilst 20,0 percent ($n = 21$) use breast milk, bottle and solids.

It is clear from the findings that the younger infants received more breast milk than the older infants. This was confirmed by the Cramer's Value.

According to the Cramer's Value of 0,242 there is a strong association between the use of breast milk and the age of the infant.

According to the literature the gender of the infant appears to be an important characteristic in infant feeding as discussed in 2.5.1.5 in chapter 2.

Table 4.13: Comparison between gender of infant and day feed offered to infant (Q18 and Q26) (n = 105)

GENDER OF INFANT	BREAST-FED		BREAST, BOTTLE AND SOLIDS		BREAST AND SOLIDS		BOTTLE AND SOLIDS		SOLIDS ONLY		TOTAL	
	%	f	%	f	%	f	%	f	%	f	%	f
Male	1,9	2	10,5	11	23,8	25	10,5	11	9,5	10	56,2	59
Female	0,0	0	9,5	10	26,7	28	3,8	4	3,8	4	43,8	46
TOTAL:	1,9	2	20,0	21	50,5	53	14,3	15	13,3	14	100,0	105

Table 4.13 indicates that a total of 56,2 percent (n = 59) male and 43,8 percent (n = 46) female infants were included in the study (see item 18). The above table shows that the same number of female and male infants are breast-fed, but because there are more male infants in the sample, female infants are breast-fed more compared to the male infants. This was confirmed by the Cramer's Value of 0,250 and the chi-square of 0,162.

Table 4.14: Comparison between place of residence and type of day feed of infants (Q3 and Q26) (n = 105)

RESIDENCE	BREAST-FED		BREAST, BOTTLE AND SOLIDS		BREAST AND SOLIDS		BOTTLE AND SOLIDS		SOLIDS ONLY		TOTAL	
	%	f	%	f	%	f	%	f	%	f	%	f
Rural	0,0	0	2,9	3	4,8	5	0,9	1	1,9	2	10,5	11
Urban	0,0	0	0,0	0	0,9	1	1,0	1	0,0	0	1,9	2
Peri-urban	1,9	2	17,1	18	44,8	47	12,4	13	11,4	12	87,6	92
TOTAL:	1,9	2	20,0	21	50,5	53	14,3	15	13,3	14	100,0	105

The above table indicates that the majority, namely 87,6 percent (n = 92) of the respondents resided in the peri-urban area. (As indicated also by item 3) They mostly (51,1%, n = 47) feed their infants on breast milk and solids. However, 19,5 percent (n = 18) give breast, bottle and solids, and 1,9 percent (n = 2) exclusively breast-feed their infants.

Half of the urban residents give breast and solids (n = 1) and half give bottle and solids (n = 1).

Rural residents feed their infants on breast, bottle and solids (2,9 percent, n = 3 of the total sample), breast milk and solids 4,8 percent (n = 5), breast milk and solids 0,9 (n = 1) and solids only 1,9 (n = 2).

The majority of respondents give their infants breast milk exclusively or in combination with other food as also indicated in item 26 presently during the day.

However, there is no statistical evidence that there is any association or correlation between the residential area and the type of feeding used for the infant as shown by the Cramer's Value of 0,129.

Item 27: The feeding of non-human milk to infants

Infants receiving non-human milk are more at risk to develop diarrhoeal disease and it will also interfere with the production of breast milk (consult 2.5.4.7 and 2.3 in chapter 2 and 1.1 and 1.2 in chapter 1).

The majority 86,7 percent (n = 91) give non-human milk to their infants, while 13,3 percent (n = 14) do not give non-human milk.

This practice confirms Friedman's report (1991:1) that Swazi infants are given non-human milk in early infancy.

Item 28: Type of non-human milk given to infants

A study done by UNICEF (1994:13) among Swazi mothers found that cereals, maize and sorghum was given to supplement infants feeds. However, this study found that Swazi mothers were using either NAN or Nespray (46,2 percent versus 19,8 percent (see table 4.15).

In a study done by Jones (1961) cows milk is widely used as in the traditional feeding practices because it could be served as sour milk for infants.

Table 4.15: Type of non-human milk used by infant (N = 91)

TYPE OF NON-HUMAN MILK	%	f	CUMULATIVE	
			%	f
Cows	21,9	20	21,9	20
Nespray	19,8	18	41,7	38
NAN	46,2	42	87,9	80
Other	12,1	11	100,0	91

From the 91 subjects who use non-human milk (refer to item 27), the majority 46,2 percent (N = 42) use NAN, cows milk is used by 21,9 percent (N = 20) respondents, Nespray is used by 19,8 percent (N = 18) and other milk such as Pellargon, Lactogen and Soya milk is used by 12,1 percent (N = 11) respondents.

This finding is in contrast with the findings of the study by the Nutrition Council (UNICEF 1994).

Item 29: Reasons given by mothers for introducing non-human milk to infants

The attitude of the mother of her personal circumstances can influence her to introduce non-human milk to her infant (see 2.5.1.3 and 2.5.3.1 in chapter 2).

Table 4.16: Reasons for introducing non-human milk (N = 91)

REASON FOR INTRODUCING NON-HUMAN MILK	%	f
Work	26,4	24
Inadequate milk	66,0	60
Baby refused breast	3,3	3
Mother sick	3,3	3
Mother dead	1,0	1
TOTAL:	100,0	91

The majority, 66,0 percent (N = 60) of mothers introduced non-human milk, because there was inadequate milk in their breasts. Indeed if non-human milk is introduced, the infant will suck less and less milk will be produced in the breast as stated by Akre (1991:26). So this may become a vicious circle.

Work is cited as the second common reason for introducing non-human milk, 26,4 percent (N = 24). In item 5 it is indicated that 28,6 percent (N = 30) of the mothers are employed and only 17 percent (N = 5) of the infants accompanied their mothers to work. This finding emphasises the need for baby units within workplaces where mothers could breast-feed during breaks as recommended by IBFAN (1995:2).

Only 3,3 percent (N = 3) respondents give non-human milk, because baby refused the breast. In most cases baby refuses breast, because of a variety of nipples that are introduced especially with bottle-feeding. Thus the breast becomes a less favourable nipple for feeding as described by Savage-King (1994:12).

In 3,3 percent (N = 3) of the respondents, mothers were sick and thus could not breast-feed infants hence non-human milk was introduced. Again, this points out a need for health professionals to educate mothers on diseases that could or could not affect breast-feeding.

One percent of the mothers of the infants ($n = 1$) had died and the caretaker had to introduce non-human milk. It is understandable because it is the logical feed one will give in these circumstances

Item 30: The age of the infants when non-human milk was introduced

According to the WHO (1991) standards infants should not be given non-human milk before they are at least seven months old.

Table 4.17: Age of infant when non-human milk was introduced (N = 91)

AGE (IN MONTHS)	%	f	CUMULATIVE	
			%	f
Below 1	16,5	15	16,5	15
1-2	14,3	13	30,8	28
3-4	42,0	38	72,8	66
5-6	25,2	23	98,0	89
7+	2,0	2	100,0	91

The table above shows the majority, 42,0 percent ($N = 38$) of infants were given non-human milk when they were between three to four months old. In just over 25,0 percent (25,2%, $N = 23$) of the infants were five to six months old when non-human milk was used and a disturbing 16,5 percent ($N = 15$) were given non-human milk when they were below one month old and 14,3 percent ($N = 13$) were given non-human milk when they were one to two months old. Only 2,0 percent ($N = 2$) of the respondents in this study were given non-human milk at the recommended age of (at least) seven months (WHO 1991).

Although the majority of the infants received breast milk the majority of infants, 98,0 percent ($N = 89$) in this study are still at risk of developing diarrhoeal infection since they received non-human milk in early infancy (under six months of age).

Item 31: The opinion of the respondents on non-human milk as a feed for infants

Many factors could influence the mothers opinion on the use of non-human milk as a feed for the infant, for example advertisements on artificial food (see 2.5.4.7 and 2.5.1.3 in chapter 2).

The majority of respondents, 62,0 percent (n = 65) thought that non-human milk, especially NAN is of the same value as breast milk. This is understandably so because formulas are identically labelled as human milk in terms of nutritional composition. This could also be part of a marketing strategy as identified by Jelliff and Jelliff (1988:280).

Although only 13,3 percent (n = 14) of the respondents in this study do not offer human milk to their infants (see item 27), 25,0 percent (n = 26), thought non-human milk was capable of causing diarrhoea and vomiting to infants.

It was disappointing to note that 13,0 percent (n = 14) of the respondents stated that non-human milk was better than human milk. This points out a need to strengthen education on mothers regarding the nutritional values of breast milk.

Item 32: Opinion of the respondents on human milk as a feed for infants

This question was asked to determine whether mothers were aware of the advantages of breast milk.

Although 62 percent of the respondents (item 31) felt that non-human milk is of the same value as human milk and that 26,7 percent made use of non-human milk the majority, 80,0 percent (n = 84) felt that human milk was good for infants and should be encouraged to all infants. This response clearly demonstrates a knowledge of the advantages of breast-feeding among mothers as stated by Bennett and Brown (1993: 493). However, 20,0 percent (n = 21) of the mothers felt that human milk was inadequate to satisfy a hungry infant. This response is demonstrated by early supplementation which is common among respondents as shown in table 4.11 (see also 2.4 in chapter 2).

Item 33: The opinion of the respondents on the quality of their own breast milk

Eighty percent ($n = 84$) of the respondents feel that their breast milk is of superior quality. This is in accordance to the nutritional components of breast milk according to Chen *et al* (1994:58) (consult 2.4 in chapter 2).

However, 20 percent ($n = 21$) feel that breast milk is of inferior quality thus cannot satisfy a hungry infant. Obviously, these mothers feel that they have to add either non-human milk or solids in order to supplement breast milk. These supplements can possibly be responsible for diarrhoeal diseases in early infancy as confirmed by Savage-King (1994:12).

Item 34: Feeds offered to the infant by night

Breast milk may be offered to the infant at night because it may be convenient for mothers since no physical preparation of milk is required. Breast milk is always ready for the infant. By feeding the infant breast milk even if it is only at night he/she will receive some of its protective value.

Table 4.18: Night feed for infants ($n = 105$)

NIGHT FEED	%	f	CUMULATIVE	
			%	f
No feed	8,6	9	8,6	9
Breast milk	72,4	76	81,0	85
Non-human milk	14,3	15	95,3	100
Solids	4,7	5	100,0	105

The majority, 72,4 percent ($n = 76$) of infants are fed on breast milk during the night.

However, 14,3 percent ($n = 15$) respondents use non-human milk and 4,7 percent ($n = 5$) give solids and 8,6 percent ($n = 9$) do not give night feed. Giving of non-human milk predisposes infants to diarrhoeal infections due to contamination of feed/feeding

utensils especially at night when sterilisation may not be practised (WHO 1992:3).

Item 35: Type of water source used to prepare the infant's food or to store and clean the infant's utensils

Contaminated water may cause diarrhoeal disease in infants.

The majority, 61,9 percent (n = 65) used piped water, 25,7 percent (n = 27) used stream water and 12,4 percent (n = 13) used spring water.

Item 36: Methods used to purify water at home for the use for the infant's food/utensils

The majority, 92,4 percent (n = 97) of respondents do not purify water. However, 7,6 percent (n = 8) purified water by either boiling, 2,9 percent (n = 3) by storing, or adding a bleach in 0,9 percent (n = 2) of cases. Storing is a method they use by storing water over night and sediments then move to the bottom of the container. Although larger particles will not be in the water when used to prepare the infants feeds there may still be micro-organisms present.

Table 4.19: Comparison between place of delivery and whether water was purified for use by infant (Q19 and Q36) (n = 105)

PLACE OF DELIVERY	PURIFIED		NOT PURIFIED		TOTAL	
	%	f	%	f	%	f
Home	0,9	1	15,2	16	16,2	17
Health institution	6,7	7	77,1	81	83,8	88
TOTAL:	7,6	8	92,3	97	100,0	105

The above table shows that the majority of home deliveries, namely 15,2 percent (n = 16) do not purify water used for the infant. Only 0,9 percent (n = 1) purify water for infant's food and utensils.

Similarly 77,1 percent (n = 81) of the respondents who delivered in health institutions do not purify their water. Only 6,7 percent (n = 7) purify water.

No statistical evidence could be found that the place of birth played a role whether water was purified or not. It can be deducted that when mothers were discharged from hospital their infants were on breast milk and that the well baby clinic personnel were supposed to educate the mothers on purifying water (consult 2.5.1.1 and 2.5.2.2 in chapter 2).

SECTION 6

4.7 HEALTH SERVICE FACTORS

Item 37: Type of health service used by mothers for the care of their infants

A combination of traditional and modern health service is common among Swazis as stated by the UNICEF (1994:16).

Table 4.20: Health service used by mothers for the care of their infants (n = 105)

HEALTH SERVICE	%	f	TOTAL	
			%	f
Modern, spiritual and traditional	23,0	24	23,0	24
Traditional and modern	43,0	45	43,0	45
Spiritual and modern	34,0	36	34,0	36

All subjects in the study, (100,0 percent, n = 105) use modern health service. This is understandable, because clients were interviewed in the health institutions. However, 43,0 percent (n = 45) of respondents also make use of traditional services in the form of giving traditional herbs to infants.

A further 34,0 percent (n = 36) respondents use both modern and spiritual service in the form of prayer or taking water solutions that have been prayed for. A further 23,0 percent (n = 24) combine modern, traditional and spiritual services. It has been observed in the well baby clinics that mothers living in the peri-urban areas receive advice to mothers regarding the health of infants from people of various back grounds.

Item 38: Type of infant feeding advice given by the services in early infancy (from birth to four months)

It is important to know what advice mothers receive and from which source. Incorrect health education could then be identified and corrected as soon as possible.

The majority of the respondents, namely 89,0 percent (n = 94) are advised in **modern health services** as follows:

- **exclusive breast-feeding** was advised in 41,0 percent (n = 43) of respondents
- **breast-feeding** and solids in 45,0 percent (n = 47) of the respondents
- cup and spoon in 2,8 percent (n = 3)
- solids only in 1,0 percent (n = 1) of the respondents

In the **traditional health services** only 4,7 percent (n = 2) of the respondents that made use of this service, are advised to breast feed their infants solely in early infancy. The majority of the respondents, namely 95,3 percent (n = 41) **were not given any advice**.

In the **spiritual health services**, **no advice** was given to any of the mothers on infant feeding that made use of these services.

This finding reveals that modern health services are the cornerstone in giving feeding advice to mothers regarding their infants. Hence health care workers must update their knowledge regarding infant feeding advice, for the better health of infants (consult 2.5.1.1 in chapter 2).

Item 39: The distribution of free non-human milk at the health services.

The practice of giving non-human milk to breast-feeding mothers is what Lawrence (1994) terms as “conflicting” messages by health professionals. Much as they promote breast-feeding but they give free milk distribution - just in case breast-feeding fails. These milk powders discourage breast-feeding and promote the reliance to non-human milk (refer to 2.5.4.7 in chapter 2).

The majority, namely 97,1 percent (n = 102) were never given free non-human milk in health institutions. This practice is in line with the WHO (1989) statement that mothers should not be given any food or drink for their infant, either than breast milk in order to promote breast-feeding exclusively in early infancy.

However, 1,9 percent (n = 2) of the mothers are sometimes given non-human milk and 1,0 percent of the mothers (n = 1) are always given non-human milk to feed their infants.

One percent (n = 1) of the mothers of the infants died, so this could be the reason why 1,0 percent of mothers are always given non-human milk to feed their infants.

Item 40: The influence of the distribution of free non-human milk at the health services on the choice of feed to infants

From the 1,9 percent (n = 2) of the respondents who were given non-human milk, 50,0 percent (N = 1) were not influenced towards the use of non-human milk. However, 50,0 percent (N = 1) of the respondents is using non-human milk since it is given at the health centre. This again can be the caregiver of the orphaned infant.

So the findings could not confirm the statement that this is a marketing strategy used by non-human milk industries in order to capture people towards using their product as stated by Jellifee and Jellifee (1981:129).

Item 41: Reasons why mothers were influenced to use non-human milk

The 1,0 percent (N = 1) of the respondents who is influenced by being given non-human

milk, assumed that health professionals know better regarding the use of human and non-human milk. The message to the mother was that both human and non-human milk were the same. This is understandable, because it will put the substitute mother's mind at rest

Item 42: Feed advised by the health services to be given to infants during an attack of diarrhoea

Studies done by Feachen and Koblinky (De Zoysa *et al* 1991:374) showed that to breast-feed an infant during an episode of diarrhoea lowers the mortality risk for infants (refer to 2.2 in chapter 2). Breast-feeding is the ideal feeding practice that should be encouraged in health care institutions in view of the nutritional and immunoglobulin advantages found in breast milk as stated in Akre (1991:45).

The majority 75,2 percent (n = 79) of respondents in this study are advised to give sugar and salt solution when their infants have diarrhoea. This advice is consistent with the treatment of diarrhoeal infections as advised by the WHO (1994:23). Eight percent (8,1%, n = 19) of the mothers were not given any advice on what to feed their infants during diarrhoeal attacks.

Seven percent (n = 7) of the mothers were advised to give breast and solids.

Item 43: Age of the infants when other food was introduced

It has been demonstrated that early weaning earlier than four months of age and early supplementation interferes with the physiological processes of the gastro-intestinal track and thus diarrhoea may occur (IBFAN 1995:5; Motarjemi *et al* 1993:79) (refer to 2.5.1.4 in chapter 2).

Table 4.21: Age (in months) when feeds were introduced (n = 105)

FOOD	NOT INTRO-DUCED		BELOW 1 MONTH		1-3 MONTHS		4-6 MONTHS		7-9 MONTHS		10-12 MONTHS		TOTAL	
	%	f	%	f	%	f	%	f	%	f	%	f	%	f
Cereal	55,2	57	0,0	-	21,0	23	20,0	21	1,9	2	1,9	2	100	105
Formula	28,0	29	13,0	14	38,0	40	12,0	13	5,0	5	4,0	4	100	105
Cows milk	49,0	51	13,0	14	4,0	4	15,0	16	17,0	18	2,0	2	100	105
Eggs	9,0	9	0,0	-	19,0	20	52,0	55	16,0	17	4,0	4	100	105
Fruit juices	5,0	5	0,0	-	34,0	36	45,0	47	12,0	13	4,0	4	100	105
Vegetables	7,0	7	0,0	-	15,0	16	70,0	74	8,0	8	0,0	-	100	105
Soft porridge	1,0	1	3,0	3	39,0	41	53,0	56	4,0	4	0,0	-	100	105
Glucose solution	82,9	87	4,8	5	2,8	3	7,6	8	1,9	2	0,0	-	100	105
Meat/soup	12,0	13	0,0	-	14,0	15	68,0	71	6,0	6	0,0	-	100	105
Milk powder	49,0	51	2,0	2	15,0	16	26,0	27	7,0	8	1,0	1	100	105
Solids	95,0	100	3,0	3	-	-	2,0	2	0,0	-	0,0	-	100	105

Cows milk fat is poorly digested and absorbed, hence it is likely to cause diarrhoea to infants (Bennett & Brown 1993:535).

Formula is modified cows milk with the nutritional values closer to breast milk. However, some infants may still have gastric disturbances if fed on formula, hence diarrhoea may occur (Savage-King 1994:16).

From the above table, it is clear that 13,0 percent (n = 14) of infants were given formula and cows milk before they were one month old.

According to Savage-King (1994:6) glucose has no nutritional values either than carbohydrates, if infants are denied breast milk in favour of glucose. More than four

percent (4,5%, n = 5) of the respondents in this study received glucose before the age of three months.

Further, a glucose feed is just a sugar and water solution. If the water used for the infant's food and utensils are not purified, as the case was in 92,4 percent (n = 97) of respondents (see item 36), diarrhoea may occur.

All the food, listed in table 4.13 were introduced by the third month of life. The introduction of food either than breast milk within the first three months of life possess danger to infants.

For example, if solids or semi-solid food is placed in the infant's mouth, it is normally vigorously rejected by the infant's normal reflexes (Akre 1991:56). It is only after six months of age, when the tongue thrust, that the infant is able to cope with semi-solid feed (Lawrence 1994:186).

Further, the digestion of carbohydrates and absorption by the small intestines is made possible after six months of age, when the digestive enzyme is secreted. If carbohydrates are then introduced at an early age, they are likely to cause diarrhoea to infants as demonstrated in table 4.17.

Similarly, high intake of protein (eg milk, eggs and meat) at an early age (one to three months), as was the case in this study, may cause problems with gastric digestion, hence diarrhoea may occur (Akre 1991:56).

Vegetables and fruits, if offered in early infancy may cause health problems. For example, Akre (1991:63) states that infants usually vomit, have diarrhoea or refuse the food when initially fed on fruit and vegetables. Vegetables (15,0%, n = 16) and fruit juices (34,0, n = 36) were introduced to infant between the ages of one and three months to the infants in this study.

Item 44: The person who advised the introduction of the previous mentioned food

The majority of respondents, 61 percent (n = 62) are advised by their mothers on the

introduction of weaning feed. This finding shows the influence of culture/ignorance towards infant-feeding. It is therefore important to educate both mothers and grandmothers of infants regarding good feeding practices (refer to item 38 in this chapter and 2.5.1.1 and 2.5.2 in chapter 2).

Nurses are the next influential group accounting for 46,6 percent ($n = 48$), this is understandable since the respondents attended the well baby clinics. As nurses are the initial contacts to new mothers, they should teach safe feeding practices to mothers.

Although doctors, friends and husbands are the least influential people towards feeding practices in this study, the modern trend is to involve all members of the community to promote safe feeding practices as advised by the WHO (1989:1).

Item 45: The washing of hands prior to the preparation of the infant's food

Hand washing with soap and water cuts down the rate of micro-organism which can cause diarrhoea to infants. In fact, enteropathogenic micro-organisms do not necessarily have to be present in weaning food before they are consumed; they may enter the infant's alimentary tract at the time of feeding. For example, rota viruses were detected in hand washing from 79,0 percent of the attendants in Bangladesh patients (Akre 1991:63).

Finally, water quality and quantity may be the most important factors in the killing of micro-organism by hand washing, as demonstrated by Akre (1991:68).

The majority, namely 98,1 percent ($n = 103$) of the respondents wash their hands before preparing the infant's food. While 1,9 percent ($n = 2$) do not wash their hands.

Item 46: The protection of the infant's food from contamination

The infant's food can be contaminated before use. It is therefore important to determine what the respondents do to prevent contamination.

All of the respondents (100%, n = 105) cover their infants' food to keep it clean. This is an important finding that is aimed at keeping flies, dust or any other contaminants away which can cause diarrhoeal diseases to infants.

Additionally, 21,0 percent (n = 21) of the respondents have a refrigerator which stores infants' food. In fact, food storage is a critical issue in terms of diarrhoeal control, food stored for as little as three hours may be contaminated with bacteria and thus cause diarrhoea (WHO 1992:2).

Only 6,0 percent (n = 6) respondents kills flies at home. The majority, namely 94,0 percent (n = 99) do not kill flies. These flies, if they come in contact with infants' food/utensils can cause diarrhoea as reported world-wide by the WHO (1992:6).

SECTION 7

4.8 DISEASE PROFILE OF INFANT

Item 47: The incidence of diarrhoea among the infants

It has been found in a study by UNICEF (1994:13) that on average Swazi infants who are denied breast milk have three episodes of diarrhoea during the first year of life. Infant mortality due to diarrhoea in Swaziland is high and about 70,0 percent of infant deaths occur before the age of six months (UNICEF 1994:13).

Table 4.22: Number of attacks of diarrhoea (n = 105)

NUMBER OF ATTACKS OF DIARRHOEA	%	f	CUMULATIVE	
			%	f
No diarrhoeal attack	13,0	14	13,0	14
1-3	44,0	46	57,0	60
4-6	33,0	35	90,0	95
7-9	2,0	2	92,0	97
10-12	5,0	5	97,0	102
13+	3,0	3	100,0	105

The majority, 44,0 percent (n = 46) of respondents had diarrhoea/attacks and 33,0 percent (n = 35) had about four to six diarrhoeal attacks during the first year of life. These findings confirm the WHO (1994) findings in a world-wide study that infants in developing countries may have about three diarrhoeal attacks annually. It was shocking to note that some infants had more than ten attacks of diarrhoea. Nevertheless, it was encouraging to note that 13,0 percent (n = 14) infants had no diarrhoeal attacks. It could be possible that the mothers guessed about the number of diarrhoeal attacks, but the researcher checked the records to confirm this.

Table 4.23: Comparison between number of diarrhoeal attacks at place of delivery of infant (Q19 and Q47) (n = 105)

NUMBER OF DIARRHOEA ATTACKS	HOME DELIVERY		HEALTH INSTITUTION DELIVERY		TOTAL	
	%	f	%	f	%	f
0-2	1,9	2	39,1	41	41,0	43
3-5	7,6	8	38,1	40	45,7	48
6+	6,8	7	6,7	7	13,3	14
					100,0	105

The above table shows that a total of 41,0 percent (n = 43) infants had nil to two attacks of diarrhoea. The majority of them 39,1 percent (n = 41) were delivered in health institutions while 1,9 percent (n = 2) were delivered at home.

More than 45,0 percent (45,7%, n = 48) had three to five attacks of diarrhoea, 38,1 percent (n = 40) were delivered in health institutions, 7,6 percent (n = 8) were delivered at home.

Finally, 13,3 percent (n = 14) of infants had between six to fifteen attacks of diarrhoea, 6,7 percent (n = 7) were delivered in health institutions and 6,8 percent (n = 7) were delivered at home.

Infants born in health institutions tend to have less diarrhoeal attacks than infants born at home.

It is statistically confirmed because a strong correlation and strong association between number of diarrhoeal attacks and where the infant was delivered was found as evident by the chi-square of 16,021 and Cramer's Value of 0,391.

Table 4.24: Comparison between number of diarrhoeal attacks and whether infant received colostrum as initial feed (Q23 and Q47) (n = 105)

ATTACKS OF DIARRHOEA	RECEIVED COLOMSTRUM				TOTAL	
	YES		NO			
	%	f	%	f	%	f
0-2	36,2	38	4,8	5	41,0	43
3-5	39,0	41	6,7	7	45,7	48
6-15	7,6	8	5,7	6	13,3	14
TOTAL:	82,8	87	17,2	18	100,0	105

The above table reflects that the majority of infants 36,2 percent (n = 38) who received colostrum feeds had less (nil to two) attacks of diarrhoea, whereas 39,0 percent (n = 41) who received colostrum feeds had three to five attacks of diarrhoea and 7,6 percent (n = 8) who received colostrum feeds had more (six to 15) attacks of diarrhoea.

So there was some indication that the infants who received colostrum had less attacks of diarrhoea. This was also evident by the Cramer's Value of 0,270 that can be considered as a fair association and the chi-square of 0,022 that there was some correlation.

Receiving colostrum alone as an initial feed cannot prevent the occurrence of diarrhoea in infants. Other factors for instance contaminated water can certainly cause diarrhoea in infants. Particularly where non-human feeds are given to the infant (refer to item 36 in this chapter).

Table 4.25: A comparison between number of diarrhoeal attacks and whether water was purified for use to an infant (Q36 and Q47) (n = 105)

NUMBER OF DIARRHOEAL ATTACKS	PURIFIED WATER		NOT PURIFIED WATER		TOTAL	
	%	f	%	f	%	f
0-2	5,7	6	35,2	37	40,9	43
3-5	1,0	1	44,7	47	45,7	48
6-15	1,0	1	12,4	13	13,4	14
TOTAL:	7,5	8	92,3	97	100,0	105

The above table reflects that the majority of respondents namely 92,3 percent (n = 97) do not purify water used for infants' food and utensils. Only 7,6 percent (n = 8) purify water. Those who purify water, namely 14,0 percent (N = 6) had nil to two attacks of diarrhoea. This is much less than the 86,6 percent (N = 37), compared to 86,6 percent (N = 37) who had nil to two attacks of diarrhoea and did not purify the water. The majority of respondents that had three to five attacks of diarrhoea, namely 98,0 percent (N = 47) do not purify their water.

However, there was a weak association between the incidence of diarrhoea and purified or not purified water according to the Cramer's Value of 0,208. This may suggest that the water used by the respondents is safe enough for human consumption or safe enough to prepare the infants food and clean the utensils.

And whether the water was purified or not did not play a role in the causing of diarrhoea.

Table 4.26: Comparison between level of education and number of diarrhoeal attacks (Q4 and Q47) (n = 105)

NUMBER OF DIARRHOEA ATTACKS	NO FORMAL TRAINING		PRIMARY EDUCATION		HIGH SCHOOL		COLLEGE/ UNIVERSITY		AT SCHOOL		TOTAL	
	%	f	%	f	%	f	%	f	%	f	%	f
0-2	4,8	5	20,0	21	12,4	13	3,8	4	0,0	0	41,0	43
3-5	7,6	8	22,9	24	15,2	16	0,0	0	0,0	0	45,7	48
6+	2,9	3	7,6	8	1,9	2	0,0	0	0,9	1	13,3	14
TOTAL:	15,3	16	50,5	53	29,5	31	3,8	4	0,9	1	100,0	105

From the above table, it is evident that higher education (that is high school and college education) was associated with less diarrhoea attacks, namely 16,2 percent (n = 17) as compared to 24,8 percent (n = 26) with primary education or no formal education.

This finding was statistically confirmed by a strong association that could be found between higher education and the less incidence of diarrhoea as demonstrated by Cramer's Value 0,263.

Table 4.27: Comparison between non-human milk and diarrhoeal attacks (Q27 and Q47) (n = 105)

FREQUENCY OF DIARRHOEA	NON-HUMAN MILK GIVEN				TOTAL	
	YES		NO			
	%	f	%	f	%	f
0-2	35,2	37	5,8	6	40,9	43
3-5	40,0	42	5,7	6	45,7	48
6+	11,4	12	1,9	2	13,3	14

The above table show that early supplementation with non-human milk predisposes infants to diarrhoea. Those infants who receive non-human milk had more diarrhoeal attacks.

However, Cramer's Value of 0,023 does not show any association in number of diarrhoeal attacks and whether they received non-human milk or not. The reason for this could be that they also might have received breast milk (see item 26).

The following table indicates the association of diarrhoea incidence and the type of food given.

Table 4.28: Comparison between number of diarrhoeal attacks and type of infant feed (Q26 & Q47) (n = 105)

NUMBER OF DIARRHOEA ATTACKS	BREAST		BREAST BOTTLE AND SOLIDS		BREAST AND SOLIDS		BOTTLE AND SOLIDS		SOLIDS ONLY		TOTAL	
	%	f	%	f	%	f	%	f	%	f	%	f
0-2	1,9	2	7,6	8	26,7	28	3,8	4	0,9	1	41,0	43
3-5	0,0	0	8,6	9	17,1	18	9,5	10	10,5	11	45,7	48
6-15	0,0	0	3,8	4	6,7	7	0,9	1	1,9	2	13,3	14
TOTAL:	1,9	2	20,0	21	50,5	53	14,2	15	13,3	14	100,0	105

The highest number of diarrhoeal attacks occur in the group that receive breast milk and solids and the lowest number of diarrhoeal attacks occur in the group that are exclusively breast-fed.

Some association could be found between whether the infants received breast milk or not and the number of diarrhoeal attacks as confirmed by the Cramer's Value of 0,283. The reason for this is also most probably because the majority of infants did receive breast milk exclusively or at least in combination with other food.

Table 4.29: Comparison between number of diarrhoeal attacks and food given at night (Q34 and Q47) (n = 105)

DIARRHOEAL FREQUENCY	NO FOOD GIVEN		BREAST MILK		NON to HUMAN MILK		SOLIDS ONLY		TOTAL	
	%	f	%	f	%	f	%	f	%	f
0 to 2	0,0	0	39,1	41	0,0	0	1,9	2	41,0	43
3 to 5	6,7	7	33,3	35	3,8	4	1,9	2	45,7	48
6+	1,9	2	11,4	12	0,0	0	0,0	0	13,3	14
TOTAL:	8,6	9	83,8	88	3,8	4	3,8	4	100,0	105

The above table shows that exclusive breast-feeding at night protects infants from diarrhoea. For example 39,0 percent (n = 41) of infants on breast milk at night had nil to two attacks of diarrhoea (very minimal) compared to 50,0 percent (n = 2) infants who are fed exclusively on solids at night.

Some association could be found statistically between exclusive breast-feeding at night and no diarrhoeal attacks, as demonstrated by Cramer's Value of 0,249. So breast-feeding at night lessened the risk for developing diarrhoea in infants.

Item 48: The age (in months) the infant suffered from diarrhoea

The risk of contracting diarrhoea was higher in infants between one to three months of age as discussed in chapter 2 (see 2.3).

Table 4.30: Age of infant when diarrhoea occurred (N = 91)

NUMBER OF DIARRHOEAL ATTACKS	INFANTS WHO HAD NO DIARR to HOEA		1 to 3 MONTHS		4 to 6 MONTHS		7 to 9 MONTHS		10 to 12 MONTHS		TOTAL INFANTS WITH DIARRHOEA	
	%	f	%	f	%	f	%	f	%	f	%	f
1st attack	13,0	14	51,0	54	28,0	28	7,0	7	1,0	1	87,0	91
2nd attack	26,0	28	23,0	24	40,0	40	10,0	10	1,0	1	73,0	77
3rd attack	41,0	43	10,0	11	37,0	37	8,0	8	4,0	4	59,0	62
4th attack	57,0	60	4,0	4	28,0	28	9,0	9	2,0	2	43,0	45
5th attack	71,4	75	2,0	2	14,0	14	12,0	12	1,0	1	29,0	30

It is evident from the table that the majority of infants, 51,0 percent (N = 54) had their first attack of diarrhoea within the first three months of life. This is understandable in view of early introduction of food such as cereal and formula and fruit juices among this age group (see table 4.21).

The second attack, through to the fifth attack was more prevalent among the four to six months old infants. Generally, this is the stage where a variety of food was introduced by the majority of respondents (see table 4.21).

Weanling diarrhoea is common in third world countries due to either the reaction towards food used for the infant or the contamination of food/utensils. It is therefore important to educate mothers about weaning food: how to introduce them and when to introduce them to infants.

Also, hygiene must be taught, especially basic principles like hand washing, protecting food from contamination and proper storage of infants' food. Breast-feeding must also be prolonged (about two years) in order to provide the infant with the ideal immunoglobulins which protect infants from diarrhoeal diseases as advised by the WHO (1989).

Item 49: Type of feed mostly offered to infants during the diarrhoeal attack

From the 100,0 percent (n = 91) of the infants who had diarrhoea, the majority, 58,0 percent (n = 53) gave breast milk, sugar and salt solution. This feeding practice is consistent with the WHO protocol of the management of diarrhoea. Breast milk is still important for its nutritional value even in sickness since it is the most tolerable and more absorbable nutrient. It is encouraging that 6,5 percent (n = 6) respondents fed their infants exclusively on breast during diarrhoeal attacks.

A further 17,5 percent (n = 16) gave sugar and salt solution. This is a feeding protocol used in health institution as a first aid treatment for diarrhoeal cases before they are attended by health personnel. This management is aimed at preventing dehydration. However, this regime should not undermine the superiority of breast milk.

Other respondents, 24,0 percent (n = 22) gave soft porridge and margarine when their infants had diarrhoea. This feeding practice deserve special education by health professional, because porridge and margarine may be contaminated and further complicate the diarrhoea. Further, the nutritional value of these foods are questionable in terms of body building.

Infants with diarrhoea are likely to be undernourished, because of poor absorption of nutrients, hence they should be given breast milk which has the right nutritional values for the infant.

Item 50: Other illnesses suffered by the infants

The majority of infants, 60,0 percent (n = 63) had chest infections. This is understandable in view of early introduction of non-human milk (see item 30). Breast milk protects both the respiratory and the intestinal mucosa from infection. Early introduction of non to human milk thus predisposes infants to respiratory/chest infection. This was clearly demonstrated by Woolridge *et al* (1993:12).

Five percent (n = 5) of the respondents included in this study indicated that their infants also suffered from malnutrition. Lack of breast- feeding or early supplementation denies

the infant essential nutrients which promotes growth hence malnutrition occurs Woolridge *et al* (1993:12).

Ear infection was revealed by 4,0 percent ($n = 4$) mothers. Ear infection is common among artificially/bottle to fed infants, because the infants are laid down and left with the bottle in the mouth. The milk then runs via the eustachian tubes into the ear. Also the eustachian tubes in the ears are lined with the same mucus membrane as the respiratory tract which is protected from infection by breast to feeding. Lack of breast-feeding may have resulted to ear infections in this group.

Item 51: The opinion of mothers on the development of their infants with regard to the growth chart

The mothers that took part in this study feel that their infants are not on the "road to health" (74,0%, $n = 78$). Only 26,0 percent ($n = 27$) are on the "road to health" according to their view. During their visits to the well baby clinic the mothers are educated on the purpose of this chart and the progress of the infant indicated to them at each visit.

Item 52: The reason for growth failing of the infants, according to the mothers

According to the mothers the infants do not thrive (are not on the "road to health" because 24,4 percent ($n = 19$) were sick, 28,2 percent ($n = 22$) are recovering from sickness and 47,4 percent ($n = 37$) refuses food.

A sick infant or the one recovering from sickness usually refuses food. Breast milk, however, is usually tolerated well. Mothers should thus be encouraged to breast-feed their infants as breast milk is complete nutrients even in sickness.

4.9 CONCLUSION

In this chapter, the statistical analysis of data obtained from the interview was discussed.

Answers asked at the beginning of the chapter were answered by the statistical analysis of the data.

- An association could be found between the number of diarrhoeal attacks and breast-fed versus non to breast-fed infants.
- An association could be found between the use of colostrum as an initial feed and the incidence of diarrhoeal attacks.
- The level of education of the mother did play a role in infant feeding practices and the number of diarrhoeal attacks.
- Some cultural factors did influence the feeding practices of the infant.
- An association could be found between the place of delivery (home or hospital) of the infant and the feeding practices or diarrhoeal attacks.
- No difference could be found between feeding practices of infants who live in the urban, peri to urban or rural area of Mbabane, Swaziland.
- The prevailing feeding practices among mothers of infants from birth to 12 months in Mbabane, Swaziland were investigated.

The conclusion drawn from the study, the recommendations and the limitations that were identified will be discussed in the next chapter.

CHAPTER 5

Summary, conclusion, limitations and recommendations of the study

5.1 INTRODUCTION

This chapter presents the summary of the study, conclusion and recommendations based on the data analysed in the previous chapter.

Also, some limitations of the study will be identified.

5.2 SUMMARY

Poor feeding practices are the main causes of mortality and morbidity among non-breast-fed infants world-wide. This is especially true in Africa as well as in Swaziland. Diarrhoea is the most important infection identified among non-breast-fed infants. The **aim** of this study is to **describe** the prevailing feeding practices among infants between birth to 12 months of age in Mbabane, Swaziland. The **relationship between the**

feeding practices and diarrhoeal infections has also been described. The factors that also influence feeding practices for example level of **education** of the mother, **cultural factors**, **where the infant was born**, and **place of residence** have been indentified as research questions in chapter 1.

In chapter 2 a literature study was done on research already done in the field of infant feeding practices and as well as the causes and extent of morbidity and mortality of infants and the impact of feeding practices on infants world-wide and in Swaziland. The importance of breast-feeding and the protective properties (against diarrhoeal infections) of breast milk were also discussed. Factors which influence feeding practices were discussed.

In chapter 3 the geographical area where Mbabane is situated is discussed as well as the study population. The **sample** chosen was a **non-probable quota sample** of mothers who **attended the two government** health facilities in Mbabane, Swaziland. Certain criteria was set and discussed for a respondent to be included in the sample. The subjects formed more than **30 percent of the monthly registration rate** of infants in these two health facilities. A **descriptive survey** was undertaken, because it was felt most suitable for this study. The **interview method**, undertaken by the researcher herself, **with a compiled questionnaire** that focused on the feeding practices, research objectives and research questions was used because it was considered best suited for the circumstances of this study population.

In chapter 4 findings were presented from the statistical analysis done of the completed questionnaires, by the main frame computer system at Unisa. This chapter, chapter 5, will focus on a summary of the results, conclusions and recommendations.

The summary based on the results will now be discussed according to the research objectives and questions which were presented in chapter 1.

5.2.1 Is there any association between the number of diarrhoeal attacks and breast-fed versus non-breast-fed infants?

- The majority of the deceased infants were not exclusively breast-fed, and the majority died of diarrhoea (refer to table 4.5).
- Infants who were exclusively or partially breast-fed had very minimally or no diarrhoea at all, 1,9 percent compared to 11,4 percent who had six to 15 diarrhoeal attacks (refer to tables 4.26 and 4.27).
- The feeding of colostrum did play a role in the number of diarrhoeal attack experienced by the infants as already indicated. The infants who received colostrum had less diarrhoeal attacks than those who did not receive colostrum as an initial feed. This was confirmed by the Cramer's Value of 0,270 and the chi-square of 0,022 (refer to table 4.24).
- Some association was found between the infants who received breast milk or not and the number of diarrhoeal attacks. The least diarrhoeal attacks occurred in infants who were breast-fed (refer to table 4.28). A strong association and correlation could not be found because the majority of the infants did receive breast milk in combination with other food or at least at night (refer to table 4.29).

5.2.2 Is there any correlation between the use of colostrum as the initial food and the incidence of diarrhoeal attacks?

- There was an indication that infants who received colostrum had fewer diarrhoeal attacks than those who were not fed on colostrum. This was confirmed by the Cramer's Value of 0,270 that indicates a fair association and the chi-square of 2,022 that indicates that there is some correlation (refer to table 4.28).

5.2.3 Did the level of education of the mother play a role in infant-feeding practices and the number of diarrhoeal attacks?

- The majority (50,5%) of respondents had attained primary education and 15,2

percent had no formal education. Putting the infants at risk of developing diarrhoea according to Morse (1982:79) (refer to table 4.26).

- Diarrhoea was more prevalent in infants of mothers with only primary and no formal education group as opposed to the high school/college group and the one respondent still attending school (65,8% versus 34,2%) (refer to table 4.26).
- So higher education has a positive health outcome in terms of diarrhoeal infections in infants according to Cramer's Value of 0,263 (refer to table 4.26).
- These findings are in line with studies conducted by Ruuska (1992:27) and Siskind *et al* (1993:104) in chapter 2.

5.2.4 Did cultural factors play a role in the feeding practices of the infant?

Some of the cultural factors investigated in this study were the following:

- Place where infants were delivered.
- The relationship between gender and the length of breast-feeding.
- Type of food given to the infant (this will be discussed under feeding practices).
- Attitude of mothers to feeding practices.
- Support system in the community.
- Employment factors.
- Water sources.
- Hygiene.

A summary of the findings is as follows:

○ **Place where infants were delivered**

Only 16,2 percent of the infants were delivered at home. The majority, 67,6 percentage of infants were delivered in health institutions (refer to item 19). This is an indication of the influence modern health care delivery has over traditional practices.

○ **Gender**

There were 56,2 percent males and 43,8 percent female infants included in the study.

- The same number of male and female infants were breast-fed (exclusively or in combination with other food), and 1,9 percent of male infants were exclusively breast-fed and no female infants were exclusively breast-fed.
- The statistics indicated that in this study the female infants were breast-fed more often than the male infants as confirmed by the Cramer's Value of 0,250 and the chi-square of 0,162 (refer to table 4.13).

○ **Type of food given to the infant**

The majority of the infants were fed within the first hour of birth and is in line with the recommendations of the WHO (WHO 1989:1). Typical cultural food was also given to infants at an early age. Sorghum was given to 0,9 percent of the infants in less than one hour after the birth of the infant. Feeds via cup and spoon were given to 2,8 percent of the infants, and were advised to do so by the modern health services (refer to item 38).

○ **Attitude of mothers to feeding practices**

The majority of the infants, namely 82,9 percent of the infants in this study did receive colostrum. This finding is contradictory to documented evidence by SINAN (1992b) that mothers discard colostrum and only start to breast-feed when "clean" milk is expressed, although all the respondents that did not give colostrum to their infants felt that

colostrum was dirty milk, which when given to infants is capable of causing diseases (refer to items 21, 23 and 24).

The attitude of the majority of the mothers favoured breast-feeding (80,0%) (refer to items 12, 26 and 34).

The influence of westernisation was also evident in the findings. Non-human milk was offered to 3,8 percentage of the infants. The majority of the infants were delivered at health institutions and all the respondents made use of modern health services. Early supplementation of feeds were also found in this study as already discussed (refer to items 19, 21, 26, 29 and 43).

○ **Support system in the community**

Although all the respondents made use of modern health services they also made use of typical cultural health services. The traditional health services where the respondents received traditional herbs for the infants in combination with the modern health services were used by 43,0 percent of the respondents. Spiritual services where services in the form of prayer or the taking of water solutions in combination with modern health services were used in 34,0 percent of the respondents (refer to items 22, 38 and 44).

The majority of the mothers that were employed and could not take their infants with them to work made use of childminders (83,0%) to look after their children and 12 percent were looked after by a grandmother (refer to item 8).

The grandmother of the infant also fed the infant the first time in 1,9 percent of the cases. The majority of the respondents themselves (92,4%) fed the infants the first time (refer to item 22).

The majority of the respondents (61,0%) were advised by their mothers to introduce other food (refer to item 44). The traditional and spiritual services did not play a significant role in the advice on feeding practices (refer to item 38).

○ **Employment factors**

The majority of the respondents (71,4%) were unemployed. The majority of the employed respondents, namely 90,0 percent were involved in unskilled jobs. The majority of these mothers, namely 83,0 percent did not take their infants to work, and were mostly looked after by childminders (refer to items 5 and 8).

○ **Water sources**

Although the majority of the respondents lived in the peri-urban areas of Mbabane, Swaziland they had piped water to their disposal (61,9% of the respondents) (refer to item 35).

○ **Hygiene**

The majority of the respondents washed their hand prior to the preparation of the infants food and also took steps to protect the infants' food from contamination, even though they did not possess modern appliances, for instances fridges (refer to items 45 and 46).

5.2.5 Is there any association between the place of delivery (home or health institution) of the infants, the feeding practices and diarrhoeal attacks?

- The majority, 67,6 percentage of infants that were delivered in health institutions received colostrum as the initial food, compared to 7,6 percent of infants delivered at home (refer to table 4.10), though it was also encouraging to note that infants who were delivered at home were also using colostrum (7,6%) (refer to table 4.10). Statistically it was confirmed that there was a close association between the births that occurred in health institutions and the use of colostrum as the initial food as evident by Cramer's Value which measures 0,353. It is therefore clear that health professionals reinforce the use of colostrum.
- It was found in this study that infants born in health institutions tend to have less diarrhoeal attacks than those delivered at home. This was statistically confirmed.

A strong correlation and a strong association was found between the number of diarrhoeal attacks and where the infant was delivered (refer to table 4.22).

- No statistical evidence was found that the place where the infant was born played a role whether the water was purified or not for use for the infant (refer to table 19).
- Health services in general promoted exclusive breast-feeding in 41,0 percent of cases and breast-feeding and solids in 45,0 percent of the cases (refer to item 4.10).

5.2.6 Is there any difference between feeding practices of infants who live in the urban, peri-urban or rural area of Mbabane, Swaziland?

- The majority of respondents (87,6%) reside in the peri-urban area, while 10,5 percent live in a rural area and 1,9 percent live in an urban area (refer to item 3).
- The majority, namely 63,8% peri-urban residents feed their infants on breast and solids/bottle while 23,8% give solids/bottle without breast milk (refer to table 4.13)
- Urban residents feed their infants on breast (0,9%) and bottle and solids (0,9%) (refer to table 4.13).
- No statistical evidence could be found that there is any association between the residential area and the type of feeding for infants as shown by Cramer's Value of 0,129 (refer to table 4.14).

5.2.7 What are the prevailing feeding practices among mothers of infants from birth to 12 months in Mbabane, Swaziland?

- The majority of the infants in this study did receive **some** breast milk, during the day, at night, exclusively or in combination with other food, or colostrum, soon after birth. But it is also clear that early supplementation with other food also occurred (refer to table 4.21).

- Although infants in this study did receive breast milk (exclusively or in combination with other food) the majority were not exclusively breast-fed from birth to 12 months (refer to table 4.4). Only 1,9 percent of the infants in this study were exclusively breast-fed between six to eight months of age (refer to table 4.11). This practice could increase the risk of diarrhoea among infants.
- It is encouraging to note that the majority of the infants in this study, namely 75,3 percent received colostrum soon after birth although not necessarily within the first hour of birth (refer to table 4.9).
- Breast milk is routinely given to the majority 72,4 percent of infants at night (refer to table 4.17).
- An association between exclusive breast-feeding at night and no diarrhoeal attacks was demonstrated by Cramer's Value of 0,249 (refer to table 4.29).
- Supplementary feed in the form of formula (38,0%), soft porridge (39,0%), fruit juices (34,0%), eggs (19,0%) and vegetables (15,0%) are introduced within the first three months of life (refer to table 4.21).
- These foods may be poorly digested and poorly absorbed and could cause diarrhoea.
- Non-human milk is introduced within the first month of life (16,5%) and by the sixth month of life 98,0 percent of the infants are fed on it (refer to table 4.17).
- Non-human milk is often contaminated with bacteria, especially if infants are fed by a bottle as it was demonstrated in 34,3 percent of infants (refer to table 4.11). This could be **one** of the reasons why infants that recieved non-human milk did develop diarrhoea (refer to table 4.27).
- The most commonly used non-human milk is NAN, used by 46,2 percent of the infants. Cows milk (fresh or sour) is used by 21,9 percent of the infants (refer to table 4.15).

- The most important reason for introducing non-human milk was that the mothers felt that they did not have sufficient milk supply for the infant (refer to table 4.16). NAN is humanised formula which the majority of mothers thought, is as good as human milk (62,0%) (refer to item 31).
- However, NAN lacks the essential immunoglobulin which protects infants from diarrhoeal infections (Bergh 1991:40).
- It was clear that the majority of the deceased infants were not exclusively breast-fed. They did however also receive **some** breast-feeding (with or without supplementation with non-human milk) as was the case in the present infant (refer to tables 4.4 and 4.5). Diarrhoea was reported by the majority of the respondents as the cause of death of their deceased infants.
- It is also interesting to note that the mothers with more than one child tended not to breast-feed their older children as infants exclusively, but that this practice improved with the present infant (refer to table 4.4).
- Although the majority of the respondents did not purify the water before they prepared the infant's food or clean the babies utensils, it did not seem to play a significant role in the causation of diarrhoea in this study as indicated in table 4.25. It can therefore be deducted that the water used by the majority of the respondents **alone** did not cause diarrhoea and is probably safe enough for use to the infant.
- Mothers should thus be encouraged to breast-feed their infants as there is enough evidence that breast milk does play a prophylactic role against deaths from diarrhoeal diseases (De Zoysa *et al* 1991:371) as also indicated in this study.

5.3 CONCLUSION

The majority of the mothers breast-fed their infants, however early supplementation with formula, cereal and fruit juices within the first three months of life took place. Non-

human milk is introduced within the first month of life.

There is an association between the use of breast milk and fewer diarrhoeal attacks.

Infants who were fed on colostrum had fewer diarrhoeal attacks.

Generally breast-feeding was used by both highly educated and lower educated mothers. However, diarrhoea was more prevalent in the low-educated group.

Cultural factors did influence feeding practices although western influences could also be observed.

Infants who were delivered in health institutions were breast-fed more and had less diarrhoeal attacks than those infants who were delivered at home.

There is no statistical evidence that there is a difference between infants who lived in the peri-urban, urban or rural areas of Mbabane, Swaziland.

5.4 LIMITATIONS OF THE STUDY

During the course of the study, certain limitations were identified. Apart from the limitations which call for further research, the most prominent were the following:

- There was very little information on infant-feeding practices on Swazi infants, mainly overseas and WHO literature was used. Therefore, specific infant-feeding practices in Swaziland may not have been fully investigated in the questionnaire.
- The population was only focused on mothers and their infants who made use of the health services in Mbabane, Swaziland. The findings of the study can not be generalised to the entire population of Swaziland.
- Because the researcher made use of a quota sampling method the findings cannot be generalised to the population of other areas of Swaziland, and is only applicable to this sample

- A limitation of the study was the fact that feeding practices are very broad. Questions asked cannot include all the food mothers offer. Other feeding variations could exist that the researcher is unaware of.
- Mothers who did not possess a health card and those whose infants were between nil to five months old were not included in the study. Therefore, some aspects of feeding practices may have not been fully explored. Mothers also had to depend on their memory, for instance to remember feeding practices or diarrhoeal attacks and the data collected in these areas could be invalid, although the researcher did look at the records of the infants to confirm what the mother has said. This was not indicated in the findings.
- Only mothers with their infants that visited the health services rendered by the government of Swaziland were included in the study. Those mothers that only made use of private doctors were not included in the study.
- It is difficult to separate certain aspects for example economic factors into clear cut categories, because culture for instance also includes economic factors in that the traditional way of life in Africa also influences the income of the mother.
- Other methods and other samples on the same research topic could elicit other findings, for instance observation of mixing the formula for the infants.

5.5 RECOMMENDATIONS ARISING FROM THE RESEARCH PROJECT

5.5.1 Recommendations for nursing practice

- The findings of this study are useful to health care providers (in hospitals, community and primary health care workers). It is therefore recommended that the infant-feeding policy recommended by WHO (1989:1) should be adopted/put in practice.

Health care workers should

- educate mothers to put infants onto the breast as soon as possible after birth
- promote cultural behaviour that will improve the health status of the infant
- give attention to the cultural behaviour that are detrimental to the health of the infant
- help mothers to form breast-feeding mother-support groups
- motivate mothers to improve their education and attend literacy classes and stress the importance of educating their children
- also update their own knowledge with regard to breast-feeding

5.5.2 Recommendations for health education

- Nurses must provide more intensive support and education to mothers regarding the advantages of breast-feeding.
- exclusively breast-feed their infants for the first six months of life
- breast-feed exclusively at night for at least two years
- offer more breast milk when infants are having diarrhoea or any other illness
- gradually supplement feeds after six months of age but offer more breast milk

5.5.3 Recommendations for further research

Future exploration is recommended for the following questions:

- **WHAT** is the influence of culture, ethnicity and socio-economic status on infant-feeding practices?
- **HOW** do post-partum feeding practices of mothers compare with prenatal choice of infant-feeding method?
- **WHAT** is the duration of breast-feeding among the breast-feeding population?
- **WHAT** maternal/paternal attitudes and beliefs are associated with the choice of infant-feeding?

- **WHAT** other variables may predict a mother's choice of infant-feeding method?

A longitudinal study that includes prenatal and survey data may answer these questions.

Table 5.1: Relationship of the research questions, conclusion and recommendations

OBJECTIVES AND RESEARCH QUESTIONS	CONCLUSION	RECOMMENDATIONS
IS there any association between the number of diarrhoeal attacks and breast-fed versus non-breast-fed infants?	Yes, the least diarrhoeal attacks occurred in infants who were breast-fed.	The WHO policy on breast-feeding should be adopted fully. Give health education to promote breast-feeding.
IS there any correlation between the use of colostrum as the initial food and the incidence of diarrhoea?	Yes, infants who received colostrum had fewer diarrhoeal attacks.	Infants should be put onto the breast as soon as possible after birth.
DID the level of education of the mother play a role in infant feeding practices and the number of diarrhoeal attacks?	Yes, higher education has a positive health outcome in terms of diarrhoeal infections in infants.	Mothers should be motivated to educate themselves and attend literacy classes and educate their children.
DID cultural factors play a role in the feeding practices of the infant?	Yes, but the influence of modern Westernised thinking was also found.	The cultural behaviour that will improve the health status of the infant should be promoted. Attention should be given to cultural practices that are detrimental to the health of the infant.
IS there any association between the place of delivery of the infant, feeding practices and diarrhoeal attacks?	Yes, infants born in health institutions were breast-fed more and had less diarrhoeal attacks.	Give health education to all involved with the mother and infant (antenatal and postnatal) to promote breast-feeding.
IS there any difference between feeding practices of infants who live in the urban, peri-urban or rural areas?	No.	Breast milk should be promoted to all these groups.

OBJECTIVES AND RESEARCH QUESTIONS	CONCLUSION	RECOMMENDATIONS
WHAT are the prevailing feeding practices among mother of infants from birth to 12 months in Mbabane, Swaziland?	The majority of the mothers breast-fed their infants. However, early supplementation with other food within the first three months took place.	Promote breast-feeding for at least six months of live and then gradually feeds after six months, but continue breast-feeding at least two years (at night especially).

In conclusion a statement by Grant (1991:4) which says:

... in poor communities death in childhood can be prevented by breast-feeding can be used to sum up this presentation.

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ANNEXURE A

Policy on breast-feeding

SUMMARY OF THE INFANT FEEDING POLICY

The routine use of breast milk substitutes, particularly for infants from birth to six months of age is discouraged. The use of these other milks particularly in association with bottle-feeding put a baby at risk from infectious illness and malnutrition, due to the cessation of breast-feeding which frequently occurs with such a practice. The risk greatly outweigh any benefits that may be derived from the additional nutrient intake of the breast milk substitute.

If formula or other breast milk substitutes are used, strong social or medical reason must exist and the mother must be warned of the risks and the cost associated with artificial feeding.

Every effort must be made to minimize the negative impact on breast-feeding and the mother must be warned of the risk and the cost associated with artificial feeding.

Every effort must be made to minimize the negative impact on breast-feeding and the mother given every encouragement and support to continue to breast-feed even if it is once or twice daily.

Infants fed in this manner must be monitored regularly since it is recognised that such infants are at additional risk.

Use of the feeding bottle is strongly discouraged since bottle-feeding seriously interferes with the suckle/lactation reflex and increases the risk of infection. All health institutions are expected to promote cup and spoon feeding and to exclude bottle teats and pacifiers in their feeding practices.

Health workers are prohibited from selling breast milk substitutes. Such products are already freely available in the market place and the practice of distributing them within health care facilities is likely to be viewed as an endorsement of their use by the general public which contravenes the guidelines of this policy.

When any health care facility uses breast milk substitutes as part of a nutritional support programme, this must be done with regard to the potential for misinterpretation of such use by other contact mothers.

Train all health care staff in the skills necessary to implement this policy.

Inform all pregnant women about the benefits and management of breast-feeding.

Help mothers how to breast-feed and how to maintain lactation even if they are separated from their families.

Give newborn infants no food (prelacteal feed) or drink other than breast milk unless medically indicated.

Practice rooming in-allowing mothers and infants to stay - 24 hours a day.

Encourage breast-feeding on demand (whenever the baby desires to feed). Give no artificial teats or pacifiers (also called dummies and soothers) to breast-feeding infants.

Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from hospital or clinic.

ANNEXURE B

**Letter for permission to conduct
the study**

Response to letter

**SWAZILAND INSTITUTE
OF
HEALTH SCIENCES**

P.O. Box 369
Mbabane, Swaziland
Telephone: 40171/2 or 46242
Fax: 46241

24th July 1996



The Marrons
Ministry of Health/Public Health Unit
PO Box 1119
Mbabane
SWAZILAND

Madam,

RE: REQUEST TO CONDUCT THE STUDY

May I have permission to conduct a study to mothers of infants in the Public Health Unit and (Mbabane Government Hospital).

The study forms part of the material for a Masters' Degree.

Responses to this study will be strictly confidential. Findings resulting from the study will be reported statistically, so that the identity of individuals or hospitals will not be revealed.

Thank you.

Yours Sincerely,

ISABELLA S ZIYANE

SWAZILAND GOVERNMENT

Public Health Unit
P.O. Box 1119
Mbabane

26th July, 1996

Sr Isabella Ziyane
P.O. Box 669
Mbabane

Dear Madam

RE: REQUEST TO CONDUCT A STUDY.

Thank you for your letter dated 24th July 1996 to conduct a study on mothers and infants in the Public Health Unit Mbabane. Permission has been granted to you to conduct the study.

Thank you

Yours sincerely

L. Dhlamini
L. Dhlamini
Regional Matron (HHOHHO)



ANNEXURE C

Questionnaire

ANNEXURE C

INTERVIEW TO MOTHERS OF INFANTS

Instruction: Use the key provided next to the response that applies to the mother, and fill the block provided.

NUMBER OF QUESTIONNAIRE 1-3

INFORMATION ON MOTHERS PERSONAL FACTORS

QUESTION 1

Age of mother Q 1 4-5

QUESTION 2

Marital status Q 2 6

Key

Single	=	1
Married	=	2
Divorced	=	3
Widowed	=	4
Live together	=	5

QUESTION 3

Where do you live? Q 3 7

Key

Rural area	=	1
Urban area	=	2
Peri-urban area	=	3
Other (specify)	=	4

QUESTION 4

What is your educational background?

Q 4 ☐ 8

Key

No formal education	=	1
Completed primary education	=	2
Completed high school	=	3
College/university education	=	4

QUESTION 5

Are you employed?

Q 5 ☐ 9

Key

Yes	=	1
No	=	2

QUESTION 6

If your response to question 6 is "**yes**", what type of work do you do?

_____ Q 6 ☐ 10

QUESTION 7

Do you take this baby with you to work?

Q 7 ☐ 11

Key

Yes	=	1
No	=	2

QUESTION 8

If your response to question 7 is "**no**", who looks after the baby when you are at work?

_____ Q 8 ☐ 12

QUESTION 9

If employed, did you have maternity leave when you expected this baby?

Q 9 ☐ 13

Key

Yes = 1
No = 2

QUESTION 10

If your answer to question 9 is “yes”, how long was your leave?

Q 10 ☐ 14

Key

Less than: One month = 1
One to two months = 2
Three + months = 3
N/A = 4

INFORMATION ON LIVING CHILDREN**QUESTION 11**

Number of living children

Q 11 ☐☐ 15-16

QUESTION 12

Feeding practices during early (0-4 months) infancy on living children.

Child number	Feeding practice
1	
2	
3	
4	
5	
6	

Q12 17
18
19
20
21
22

> PLEASE TURN OVER

Key

Breast-feeding	=	1
Breast and non-human milk	=	2
Non-human milk	=	3
Solids	=	4

INFORMATION ON DECEASED CHILDREN**QUESTION 13**

Number of deceased children.

Q 13 ☐ ☐ 23-24

QUESTION 14

Cause of death?

_____ Q 14 ☐ 25

QUESTION 15

Feeding practice used in early (0-4 months) infancy on dead children.

Child number	Feeding practice
1	
2	
3	
4	
5	

Q 15 26
27
28
29
30

Key

Breast-feeding = 1
 Non-human milk = 2
 Breast and non-human milk = 3
 Solids (specify) = 4

N/A = 5

QUESTION 16

Gender and age of children.

Child number	Gender	Age in months	
1			
2			
3			
4			
5			

Q 16

31-33

34-36

37-39

40-42

43-45

Key

Male = 1
 Female = 2
 N/a = 3

INFORMATION ON PRESENT INFANT PERSONAL FACTORS**QUESTION 17**

Age of infant (in months).

Q 17 ☐☐ 46-47

QUESTION 18

Gender of infant.

Q 18 ☐ 48**Key**

Male = 1
 Female = 2

CULTURAL FACTORS**QUESTION 19**

Where was the infant delivered?

Q 19 ☐ 49**Key**

Home = 1
 Health institution = 2
 Other (specify) = 3

QUESTION 20

How soon after birth was the infant fed?

Q 20 ☐ 50**Key**

Less than one hour = 1
 One to two hours = 2
 Three + hours = 3

QUESTION 21

What was the initial food given to the infant?

Q 21 ☐ 51**Key**

Water = 1
 Colostrum = 2
 Formula = 3
 Sorghum = 4
 Other (specify) = 5

QUESTION 22

Who gave the initial food?

Q 22 ☐ 52**Key**

Nurse	=	1
Mother/in law	=	2
Self	=	3
Other (specify)	=	4

QUESTION 23

Did you feed your infant on colostrum?

Q 23 ☐ 53**Key**

Yes	=	1
No	=	2

QUESTION 24

If the answer to question 24 if "no", why did you not offer colostrum to your infant?

 Q 24 ☐ 54
QUESTION 25

How often do you feed your infant?

Q 25 ☐ 55**Key**

On demand	=	1
One to two hours	=	2
Three + hours	=	3

QUESTION 26

How are you presently feeding your infant during the day?

Q 26 ☐ 56**Key**

Exclusive breast-feeding	=	1
Breast, bottle & solids	=	2
Breast and solids	=	3
Bottle and solids	=	4
Solids only	=	5
Breast and bottle	=	6
Bottle only	=	7
Other (specify)	=	8

QUESTION 27

Do you give non-human milk to your infant?

Q 27 ☐ 57**Key**

Yes	=	1
No	=	2

QUESTION 28

If non-human milk is given, which type do you give?

Q 28 ☐ 58**Key**

Cows milk	=	1
Goats milk	=	2
Nespray	=	3
NAN	=	4
Other (specify)	=	5

N/A	=	6
-----	---	---

QUESTION 29

What was your reason for introducing non-human milk?

Q 29 ☐ 59**Key**

Work	=	1
Inadequate milk	=	2
Baby refused breast	=	3
Mother sick	=	4
Baby sick	=	5
Other (specify)	=	6

N/A	=	7
-----	---	---

QUESTION 30

How old was the infant when non-human milk was introduced?

Q 30 ☐ 60**Key**

Below one months	=	1
One to two months	=	2
Three to four months	=	3
Five to six months	=	4
Seven + months	=	5
N/A	=	6

QUESTION 31

What is your opinion on giving infants non-human milk?

 Q 31 ☐ 61
☐ 62**QUESTION 32**

What is your opinion on giving infants human milk?

 Q 32 ☐ 63
☐ 64

QUESTION 33

What is your opinion on the quality of your breast milk?

Q 33 ☐ 65

☐ 66

QUESTION 34

What feed do you offer to your infant at night?

Q 34 ☐ 67

Key

None	=	1
Breast milk	=	2
Non-human milk (specify)	=	3

Water	=	4
Other (specify)	=	5

QUESTION 35

Which type of water source do you use for the infants food/utensils? Q 35 ☐ 68

Key

Stream water	=	1
Spring water	=	2
Piped water	=	3
Other (specify)	=	4

QUESTION 36

How is the water made safe for the use to an infant?

Q 36 ☐ 69**Key**

Boiling	=	1
Storing	=	2
Adding Jik solution	=	3
Not purified	=	4
Other (specify)	=	5

SERVICE FACTORS**QUESTION 37**

Which health service are you using?

Key

Yes	=	1
No	=	2
N/A	=	0

Modern health

Q 37 ☐ 70

Traditional

☐ 71

Spiritual

☐ 72

Other (specify)

☐ 73**QUESTION 38**

What infant-feeding advice was given by these services in early infancy (0-4 months)?

M	=	Modern
T	=	Traditional
S	=	Spiritual
O	=	Other

Key

Advice given = 1
 No advice = 0

Breast-feeding

Bottle-feeding

Cup and spoon

Breast and bottle

Breast, bottle, solids

Other (specify)

M	T	S	O

Q 38 74-77

78-81

82-85

86-89

90-93

94-97

98-101

QUESTION 39

Is there free non-human milk distributed in your health service?

Q 39 ☐ 102**Key**

Always = 1
 Sometimes = 2
 Never = 3

QUESTION 40

If non-human milk is distributed, did this influence the choice of your feed?

Q 40 ☐ 103**Key**

Yes = 1
 No = 2
 N/A = 3

QUESTION 41

If your answer to question 40 is "yes", give a reason.

Q 41 ☐ 104

> PLEASE TURN OVER

QUESTION 42

What feed is advised when an infant has diarrhoea in your health service?

Q 42 ☐ 105

Key

Breast milk	=	1
Sugar and salt solution	=	2
Glucose water	=	3
No advice	=	4
Other (specify)	=	5

QUESTION 43

At what age were the following foods introduced to your infant (age in months)?

Food

Q 43

Cereal	<input type="checkbox"/> <input type="checkbox"/>	106-107
Formula	<input type="checkbox"/> <input type="checkbox"/>	108-109
Cows milk	<input type="checkbox"/> <input type="checkbox"/>	110-111
Eggs	<input type="checkbox"/> <input type="checkbox"/>	112-113
Fruit juices	<input type="checkbox"/> <input type="checkbox"/>	114-115
Vegetables	<input type="checkbox"/> <input type="checkbox"/>	116-117
Soft porridge	<input type="checkbox"/> <input type="checkbox"/>	118-119
Glucose water	<input type="checkbox"/> <input type="checkbox"/>	120-121
Meat/soup	<input type="checkbox"/> <input type="checkbox"/>	122-123
Milk powder	<input type="checkbox"/> <input type="checkbox"/>	124-125
Other (specify)	<input type="checkbox"/> <input type="checkbox"/>	126-127

QUESTION 44

Who advised you to introduce these foods?

Nurse	Q 44 <input type="checkbox"/>	128
Doctor	<input type="checkbox"/>	129
My mother	<input type="checkbox"/>	130
My husband	<input type="checkbox"/>	131
Friend	<input type="checkbox"/>	132
Other (specify)	<input type="checkbox"/>	133

Key

Yes = 1
No = 2

QUESTION 45

Do you wash your hands before preparing the infant's food? Q 45 ☐ 134

Key

Yes = 1
No = 2

QUESTION 46

How do you keep infant's food clean?

Cover it	Q 46 <input type="checkbox"/>	135
Keep in refrigerator	<input type="checkbox"/>	136
Kill flies	<input type="checkbox"/>	137
Other (specify)	<input type="checkbox"/>	138

Key

Yes = 1
No = 2

DISEASE PROFILE OF INFANT**QUESTION 47**

How many attacks of diarrhoea has the infant had?

Q 47 ☐☐ 139-140

QUESTION 48

At what age (in months) has the infant had diarrhoea?

Q 48

Diarrhoeal attacks

First attack

☐☐ 141-142

Second

☐☐ 143-144

Third

☐☐ 145-146

Fourth

☐☐ 147-148

Fifth and over

☐☐ 149-150

Age in months**QUESTION 49**

What food is most often offered to your infants during the diarrhoeal attack?

Q 49 ☐ 151

Key

Nothing = 1
Breast milk = 2
Breast, sugar and salt solution = 3
Sugar and salt solution = 4
Other (specify) = 5

QUESTION 50

What other illnesses has your infant suffered from?

_____ Q 50 ☐ 152

QUESTION 51

Is your infant on the "road to health" according to the growth chart? Q 51 ☐ 153

Key

Yes = 1
No = 2

QUESTION 52

If the answer to question 51 is "no", what is the reason for growth failing?

Q 52 ☐ 154

Key

Infant sick	=	1
Recovering from sickness	=	2
Infant refuses feeds	=	3
Other (specify)	=	4
N/A	=	5
