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Title:

A descriptive correlational survey of the infant feeding and the occurrence of diarrhoea and/or respiratory morbidities within the first fourteen weeks in the Amathole District of the Eastern Cape Province, South Africa.

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A Mini-thesis submitted in partial fulfilment of the requirements for the degree of Magister Curationis in Advanced Midwifery and Neonatology in the School of Nursing, University of the Western Cape

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Title

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Key Words

Exclusive Breastfeeding

Exclusive Formula feeding

Complementary feeds

Respiratory diseases

Diarrheal diseases

Infant feeding

Morbidity

Nutrition

Infant,

Well baby clinics

Declaration

I declare that the study entitled "A descriptive correlational survey of the infant feeding and the occurrence of diarrhoea and/or respiratory morbidities within the first fourteen weeks in the Amathole District of the Eastern Cape Province, South Africa" is my own work, and that it has not been submitted before for any examination in any other University, and that all sources used or quoted have been indicated and acknowledged by complete references.

Full name: Doreen Kainyu Mugendi **Date: .....**

Signed: ….....…….

Acknowledgement

"Have the determination of a mirror. It never loses its ability to reflect Even if it is broken into thousands of pieces"~ Author Unknown

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"Life is not a race, but a journey to be savoured each step of the way"~ Author Unknown.

Thank you Lord I will always love You.

Dedication

This mini-thesis is a special dedication to my late dad, Jeremy M'Kanga Njue**.** You taught me never to stop. When I slip and fall, I should get up and run. When my left hand is broken, I have the right one to use. Dad YOU are my hero, my dad and always my soul mate even in your grave.

Abstract

Background – Mothers of infants could choose to either exclusively breastfeed (EBF), exclusively formula feed (EFF), or mix feed infants. The mix fed infants could either be partially breastfed or predominantly breastfed. All these feeding practices are associated to infant growth, development and immunity through eminence of nutritional intake. A feeding practice thus will show relationship in morbidity, primarily related to compromised immunity, growth and development. Further, issues around PMTCT have an influence on infant feeding. For the purpose of the study, infant morbidity namely diarrhoea and respiratory infections will be described in relation to infant feeding of either EBF or EFF. Infants are said to have increased morbidity (diarrhoea or respiratory infections) and stunted growth by six months influenced by infant feeding. This study focuses on describing the correlation in occurrence of morbidity (diarrhoea and/or respiratory infections) in infants who are either EFF or EBF within the first fourteen weeks of age in the Amathole district in Eastern Cape district in the Eastern Cape.

Objective – The study proposed to conduct a descriptive study related to the correlation of infant feeding (EFF or EBF) and occurrence of morbidity diarrhoea and/or respiratory infections, in infants by 14 weeks of age.

Research Methodology - The study adopted a quantitative epistemological approach in seeking to describe the correlation of infant feeding and the occurrence of diarrhoea or respiratory infections by 14 weeks of age. The researcher embarked on a descriptive survey design and employed the

questionnaire method during the data collection process. The Amathole District of the Eastern Cape Province was selected due to the accessibility of the targeted population. The unique demographic profile and rural-urban setting allows for a potentially rich data source whilst simultaneously reducing the potential incidence of bias in the data collection. The study sample was drawn from routine immunization and growth monitoring clinics in the Amathole district.

Results- The results significantly described that 66.97%/109 infants were exclusively formula fed while 33.03%/109 of them were exclusively breast fed. The analysis of the results revealed that 16.67% of the EBF infants had diarrhoea while 46.58% of the EFF had diarrhoea. On the other hand 47.22% of the EBF had respiratory infections (RI) while 68.49%of the EFF had RI by 14 weeks of age. The data reflected a higher percentage of morbidity in EFF infants than EBF infants with a significant difference reflected by the P-value > 0.05.

Conclusions – The survey's results provide significant evidence on the occurrence of diarrhoea and respiratory infections within the first fourteen weeks of age related to the infant feeding. The occurrence was higher among exclusively formula fed infants. Further study with bigger scope on the occurrence of diarrhoeal and /or respiratory morbidities within the first fourteen weeks is needed. This will help to implement strategies that allow surveillance of morbidity associated with infant feeding. If surveillance is done at an early age there would be an improvement in the development of infants using low cost interventions.

List of Abbreviations

EBF – Exclusive breastfeeding

EFF - Exclusive Formula Feeding

PMTCT – Prevention of Mother to Child Transmission

DH - Diarrhoea

RI – Respiratory Infections

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Chapter One: Orientation to the study

1.1 Introduction

The first chapter provides an overview of the study. It covers the background of the research problem, the rationale of the study, problem statement, significance of the study, the research aim and objectives, the hypothesis, the limitations and definition of concepts.

1.2 Background to the research

The World Health Organization (WHO) views infant feeding as a global public health issue due to the nutritional significance of the infant feeding on the infant's growth and development. Infant feeding, whether breastfeeding or formula feeding, is related to the growth and development of infants. The nutritional value of either breast milk or formula milk controls the infant body's capability to develop a reliable immune system. A weak immune system may increase the diarrhoea and respiratory infections among infants and young children WHO (2003). In the first three months, infants still utilize the immunity they received in-utero (Harrison, 2008).

It means that infants who are breast fed continue to receive immunity through breast milk, while those who are formula fed do not enjoy the same privilege. It is importance to keep the breast feeding mother well-nourished and to guard infants who are formula fed against infections.

The Convention on 'Rights of the Child' asserts that, access to adequate nutrition is a right for every child. Governments around the world are urged to do everything in their capacities to ensure that every child receives the 'Gold standard' of nutrition where possible. It further requests policy makers to provide families with adequate evidence based information on infant feeding (WHO, 2003).

Authors Jones, Steketee, Black, Bhutta & Morris (2003) suggest that exclusive breast feeding (EBF) is one of the most effective ways of saving lives of millions of infants in developing countries. They estimated that exclusive breast feeding could save up to 15 million children over a period of 10 years. They further argued that exclusive breast feeding is cost effective, convenient and of good nutritional quality compared to formula feeding. It has the potential of protecting infants' from morbidity and mortality associated with infectious diseases such as diarrhoea and pneumonia.

In a systematic literature review conducted by Rice, Sacco, Hyder & Black (2000), it was shown that many studies associated increased malnutrition and death among infants were due to diarrhoea and acute respiratory infections. These authors found that informed decisions on infant feeding and support on those decisions were regarded as preventive measures of infant morbidity in the reviewed studies. These measures were seen as low cost measures to the cost of

treatment and rehabilitation that follow morbidity and malnutrition (Rice et al, 2000).

The World Health Organization guidelines on 'optimal infant and young child feeding practices' recommend that infants should be exclusively breast fed for the first six months of life to achieve optimal growth and development (WHO, 2003). The need to increase breastfeeding rates is due to the fact that it decreases the risk for many diseases in infants such as otitis media, nonspecific gastroenteritis, severe lower respiratory tract infections, atopic dermatitis, childhood leukaemia, and the sudden infant death syndrome. Also History of lactation has also been associated with a reduced risk for type-2 diabetes, breast and ovarian cancer among women (Chung, Raman, Trikalinos, Lau & Ip, 2008).

Interest on infant breast feeding research has increased with the HIV and AIDS endemic. Evidence suggests that an estimated 500,000 infants are infected with HIV-1 via MTCT every year in South Sahara Africa and breast feeding accounts for one-third to one-half of all these vertical transmissions cases. It is well known that maternal to child transmission (MTCT) of HIV-1 possess a significant challenge in developing countries (Tholandi, Wilkinson, Dabis, Madi, & Leroy, 2008).

However, interventions such as formula feeding, early weaning, exclusive breastfeeding, chemical or heat treatment of breast milk, antiretroviral

prophylaxis administered to breastfeeding children and antiretroviral therapy to HIV-1-infected women while breastfeeding are viewed most effective in reducing the incidence of MTCT of HIV-1 and HIV-related child mortality. These interventions offer women a wide selection of 'safe' practices according to their needs (Tholadi et al., 2008). The literature associates breastfeeding by women infected with HIV with high reduction in mortality among their children (Taha, Kumwenda, Hoover, Kafulafula, Fiscus, Shu Chen, & Broadhead, 2006).

The South African policy on the Prevention of Mother to Child HIV/AIDS Transmission policy (PMTCT) makes provision for infant feeding by mothers. The babies who are formula fed are discontinued from the PMTCT programme at six months. Complementary feeds are introduced and they are assessed within two to four weeks after the formula feeds are stopped to see if there is evidence on growth faltering. Follow up then occurs at seven months to check if they sustain their weight after introduction of the complementary feeds (South Africa PMTCT guidelines, 2008).

The literature reviewed suggests that breast milk is the 'gold standard' for infant feeding. However, the world today is faced with issues such as HIV infected mothers, working mothers and aesthetic issues. This brings about the dilemma of wanting to breastfeed and a challenge of either infecting their infant with the virus, or not being able to keep up with the breastfeeding. The mothers then opt to either exclusively formula feed (EFF) or mix feed.

1.3 Rationale

Evidence seems to suggest that formula feeding is associated with the occurrence of diarrhoea and respiratory infections, which in turn leads to growth faltering due to malnutrition or death of infants and children. It is also suggested that optimizing the nutritional value of the infants through proper nutrition of the mothers who are breast feeding would reduce the occurrence of diarrhoea and respiratory infections. It is within the above context that the researcher embarked on this study to describe the occurrence of morbidity within 14 weeks. As discussed in the previous section, infants who are breastfed continue to receive immunity, while the formula fed infants only rely on the previously passively acquired immunity. This means that the breast fed infants have the advantage of reduced morbidity within 14 weeks compared to formula fed infants.

1.4 Problem statement

Infant feeding practices may lead to malnutrition that could contribute to poor immune system development which eventually leads to increased morbidity and mortality among infants. Most studies in the area of infant feeding and the occurrence of morbidity looked at these occurrences from six months upward. However, this study looked at the infant feeding and the occurrence of diarrhoea and/or respiratory morbidities within fourteen weeks. Measuring occurrence of morbidity between birth and fourteen weeks as compared to six months will enable early identification of infants needing intervention with nutritional

supplements thus preventing recurrent infections caused by chronic malnutrition. As mentioned earlier the passive immunity attained through the placenta in utero could be sufficient up to three months after birth but needs sufficient nutritional supplementation.

1.5 Significance of the study

The importance of infant feeding cannot be overemphasized. Caulfield, Stephanie, Richard, Juan, Rivera, Musgrove & Black (2003) argued that growth faltering in infants begins at six months of age as a result of persistent exposure to inadequate nutrition in quality and quantity which increases the infant's likelihood of infections. They also argued that 5 to 16 % of diarrhoea and pneumonia is associated with moderate and severe underweight; and childhood malnutrition reduces adult intellectual ability and work capacity. The reduced intellectual ability and work capacity may result to economic hardships for individuals and their families (Caulfield, et al., 2003).

The results of this study will enable health care providers to formulate interventions that will look at infant feeding from a perspective of future development of the infants and the community. The study will also contribute the existing body of knowledge on the relationship between infant feeding and the occurrence of diarrhoea and respiratory morbidities.

1.6 Research aim and Objectives

1.6.1 Aim of the Research

The aim of the study was to describe the influence of infant feeding on the occurrences of diarrhoea and/or respiratory morbidities within the first fourteen weeks in the Amathole District in the Eastern Cape.

1.6.2 Objectives of the research

The objectives of the study were to describe:

the occurrence of diarrhoeal and/or respiratory morbidities among infants within the first fourteen weeks of age;

the influence of infant feeding (exclusively breast feeding and exclusively formula feeding) on the occurrence of diarrhoea and/or respiratory morbidities within the first fourteen weeks of age.

1.7 Hypothesis

Morbidity (diarrhoea and/or Respiratory infections) caused by infant feeding (EBF or EFF) as reflected in the literature starts at six months. The hypothesis of this study was that morbidity associated with infant feeding (EBF or EFF) can start within the first fourteen weeks.

1.8 Limitations of the study

This study did not go into details to describe mixed feeding which is a infant feeding method or its correlation to morbidity. The researcher acknowledges that there are other socio-demographic factors that would influence the outcome which is morbidity but does not go into the detail of describing these factors. Feeding

practices such as preparation of feeds, socio-economic backgrounds and cultural practices which might all have an influence on the outcome are not described in this study.

1.9 Definition of concepts

Exclusive breastfeeding

This refers to 'feeding an infant with only breast milk and no other solids, not even water with the exception of drops or syrups consisting of vitamins mineral supplements or medicines' (WHO, 2003).

Exclusive formula feeding

It refers to feeding an infant breast milk substitute formulated industrially in accordance with applicable codex alimentarius standards in order to satisfy the nutritional requirements of infants with no complementary foods and no breast feeding (WHO, 2003).

Complementary feeding

This refers to feeding a child with either breast milk or a breast milk substitute and solid or semisolid food (WHO, 2003).

Respiratory diseases

These are diseases that affect the lungs, bronchial tubes, trachea and throat. They can be obstructive or restrictive and are anatomically classified into upper and lower respiratory tract infections (Mc Cance & Huether, 2002).

Diarrhoea

Diarrhoea is frequent loose watery stools that occurs more than three times per day and may cause dehydration. It is classified as mild moderate or severe depending on the amount of fluid loss and the severity of the change in child's condition (Mc Cance & Huether, 2002).

Infant Feeding

This means equipping a mother with adequate information that enables her to make an informed decision on whether to breastfeed or to formula feed (WHO, 2003).

Nutritional status

The state of a child's health in terms of the nutrients in his or her diet is referred to as nutritional status (WHO, 2003).

Morbidity

This refers to diseases or cases of diseases in a population, with specific features of the prevalence (rate at which they exist) and incidence of disease referring to inception or the rate at which the cases appear in a population (Van Rensburg, 2004).

Infant

This refers to a child from 28 days of life to 12 months or in other words one month to 1year (Fraser, Cooper & Nolte, 2007).

Well baby clinics

Well Baby Clinic provides a scheduled assessment of a child's nutritional and medical needs including immunization. These clinics provide routine immunizations, growth and development monitoring (WHO, 2000).

Chapter Two: Literature Review

2.1 Introduction

A literature review was conducted to investigate the available evidence on infant feeding and their influence on morbidity such as occurrence of diarrheal and/or respiratory infections by 14 weeks of age. The following databases were accessed: Cochrane Library, The National Library of Medicine (Medline), Pub Med, World Health Organization website, Health systems website, Department of Health website and other general and core journals including books associated with it. The literature review will focus on the setting of the study, issues around infant feeding (EBF and EFF) and occurrence of morbidity (diarrhoea and respiratory infections) influenced by infant feeding.

2.2 The setting - Amathole District

Amathole district is part of the Eastern Cape Province which is one of the provinces with the highest incidence of neonatal (24.7 %,), infant (61.2%) and under five (80.5%) mortality rates in the country (South Africa Demographic and Health Survey, 1998). Amathole district covers an area of 23,577 km² which extends to eight municipalities (Buffalo City, Mnquma, Mgqushwa, Great Kei, Amahlathi, Nkokobe, Mdantasane and Nxuba). The researcher collected data from the clinics in Mdantsane Municipality which is said to be the second largest township in South Africa with a population of 173, 783 people covering an area of 9,203 km² (Business Trust, 2007).

2.3 Infant Feeding

The global attention on the impact of feeding practices on nutritional status, growth and development of infants and children was rejuvenated by WHO global strategy for infant and young child feedings in 2003. The strategy was developed to respond to the challenge of the burden of diseases among children around the world. It was argued that 50 to 70 % of diarrhoeal disease, measles, malaria and lower respiratory infections were due to under nutrition. It was suggested that the 'lack of breastfeeding and especially lack of exclusive breastfeeding during the first six months of life is an important risk factor for infant morbidity and mortality mainly compounded by unsuitable complementary feeding of the non-breastfed infants (WHO, 2003).

Kuntal, Edward, Dewan, Shams, Lars and Kathleen (2008) argued that the implementation of WHO strategy for infant and young child feedings can improve conditions particularly in low income countries. These authors conducted a cohort study in Bangladesh using the recommendations of the above strategy. The cohort study included 1,343 infants who followed a programme based on the WHO recommendations with the main outcomes being weight, length, and anthropometric indexes and under nutrition. They measured the infant feeding practices from birth to 24 months of age and the results showed significant association the infant feeding practices and the outcomes measured.

Caulfield, Richard, Rivera, Musgrove & Black (2004) in their discussion on 'nature, causes and burden of under nutrition', highlight that childhood malnutrition diminishes adult intellectual ability and work capacity, thus causing economic hardships for individuals and their families. This emphasises the importance of focusing on child nutrition and feeding practices that improve the future of our society.

In a comparative systematic review of the literature on the optimal duration of breast feeding and the health outcomes of children from 3 months conducted by Kramer & Kakuma (2009), it was revealed that most studies in developing and developed countries showed no significant differences in the nutritional status of infants who were breast fed up to six months. However, they indicated that a study conducted in Nigeria showed a significant reduction in diarrhoea and respiratory infections and positive growth among infants who were breast fed for six months and more compared to those who were breast fed for three to four months.

2.3.1 Exclusive Breastfeeding

Lactation is known to be the best way of providing for 'dietary needs of young mammals' throughout the history. The mother's milk is actively protective, immune-modulator, and ideal for young mammals needs. After the birth of the baby the breast is filled with a high density, low volume feed known as colostrums. Many differences between cows' milk and breast milk such as structural qualitative differences in proteins, fats and minerals are important to

note. The main outstanding qualities of breast milk include protection against infection and allergies which are passed on to the infant during breastfeeding and are impossible to obtain from any other feeding regime (WHO, 1989).

Colostrum is high in immunoglobulin for prevention of infection by coating the immature gut lining of the infant which prevents adherence of bacterial, viral, parasitic and other pathogens. Breast milk moderates the infant growth and development and is compatible to the particular needs of the infant such as low volume, as the neonates' kidneys cannot handle large volumes of fluids without metabolic stress. In cases where food is readily available breastfeeding remains the most energy efficient way to provide for dietary needs of the young. However in low resource food areas humans have an incredible survival mechanism to optimize lactation's contribution to the development of the infants by effectively utilizing the available food supply (WHO, 1989).

Breast milk secretes immunoglobulin assay (IgA) which acts along the gastrointestinal, urinary and respiratory tracts inhibiting the adhesion of pathogenic microorganisms and enhancing their immune response. This is not predominantly found in formula milk. It is also known that the oligosaccharides mainly found in breast milk, favours the growth of the bifido-bacteria. Bifido-bacteria are useful in the suppression of the potentially pathogenic bacteria such as Escherichia Coli (McCance & Huther, 2002).

Sarker, (2004) highlights that live cells such as lactobacillus acidophilus and / or bifid bacterium naturally found in breast milk, are recently incorporated in most modified formula milk products. They exhibit antibacterial activity against undesirable flora although not as nutritionally adequate for infants as that in breast milk, and are mostly destroyed during preparation of feeds.

Authors Wilfert & Fowler (2007) argued that shortening the duration of breastfeeding would reduce the on-going cumulative effect of HIV transmission. On the other hand, in resource limited settings breastfeeding contributes significantly to energy requirements of infants into the second year of life. They estimate that 'approximately half of the energy requirements of 6 to 8 months infants, 44% of the requirements of 9 to11 months' infants, and a third of the requirements of 12 to 23 months infants are supplied by breast milk.' This explains why infants, if weaned early from EBF, require other high-energy and age-appropriate breast-milk substitutes. This is not the case in many inadequate resource settings thus increasing infant morbidity and mortality rates related to diarrhoea, respiratory infections and malnutrition (Wilfert & Fowler, 2007).

In South Africa, in spite of the evident advantages of breastfeeding such as convenience, low cost feeding and highly effective feeding practices; it is documented that breastfeeding rates remain shockingly low compared to both developed and developing countries. Only 10.4% of infants are exclusively breastfed up to three months and about 1.2% of infants are exclusively breast fed up to six months (Van Rensburg, 2004).

2.3.2 Exclusive formula feeding

Infants who are not breastfed should receive adequate attention from health and social welfare system due to their vulnerability to infections. WHO (2003) indicates that infant feeding formula should be prepared in accordance with Codex Alimentarius standards and that health workers should teach best practices to mothers who are using home prepared formula for supplements. In a study conducted in Botswana looking at the mortality rate at seven months among HIV positive infants and feeding practices, a large outbreak of infants with diarrhoea was reported among children who were on replacement feeds (Wilfert & Fowler, 2007).

2.4 Infant Morbidity

Studies show that there is a relationship between the infant feeding and morbidity described as diarrhoea and/or respiratory infections. It is also indicated that early prevention of morbidity such as diarrhoea and/or respiratory infections reduces the chances of the occurrence of these infections.

De Onis, Frangillo, Blössner (2000) conducted a systematic review to find out whether child malnutrition is declining since 1980. They used cross sectional data from 214 nationally representative surveys to produce height for age stunting for regional and global trends 1980-2005. The results showed a fall in prevalence of stunting in developing countries from 47% in 1980 to 33% in 2000. Although this showed progress in reduction of child malnutrition, the results were uneven as some developing countries showed an increase in stunting.

In a systematic review conducted on infant by Amy, Rice, Sacco, Hyder and Black (2003) it was revealed that infants of zero months who were not breast fed had a seven fold increased risk of death from diarrhoea and pneumonia compared to fivefold increased risk of death among infants at five months who were exclusively breast fed. It was also revealed that the highest number of infant deaths due to malnutrition occurs in Sub-Saharan Africa; and 35% of all child deaths due to diarrhoea and /or pneumonia were linked to feeding practices of infants. The reviewers acknowledged that although the review focuses on feeding practices and morbidity as a risk factor, the method used for searching had unreliable methods and also the focus on the outcome was more on the mortality rather than detecting morbidity at an early age.

According to the South Africa Demographic and Health Survey (1998) the Eastern Cape province had the highest incidence of neonatal mortality (24.7%), infant mortality (61.2%) and under five mortality (80.5%) in the country. The survey highlighted the need to focus on describing the intricacies that indicate nutrition deficiency such as morbidity within 14 weeks of age rather than results of the deficiencies such as stunted growth at 6 months and morbidity as compared to other studies (South Africa Demographic and Health Survey, 1998).

2.5 Conclusion

This chapter reviewed the literature on infant morbidity influenced by infant feeding and infant nutrition in order to assert the connection between the infant feeding and morbidity described as diarrhoea and pneumonia. The literature review was aimed at sourcing supporting literature to describe the significant difference in the influence of infant feeding on occurrence of diarrhoea and respiratory infections within 14 weeks (approximately 3-4 months) when the infants still have the passive immunity apart from the fact that those EBF enjoy extra protection.

Chapter Three: Research Methodology

3.1 Introduction

This chapter focuses on the research methodology and includes the research design, study population, criteria for participation, sampling procedure, data collection and the data analysis procedure. It also includes ethical aspects of the study.

3.2 Research design

Burns & Groove, (2001) define research design as 'a blue print' from which a study is conducted while exercising control over aspects that have an influence on the results of the study. These include planning and implementing the study in a way that would improve the quality of findings while acting as a foundation for the activities taking place (Burns & Groove, 2001:247).

Three types of designs also referred to as selected strategies of inquiry are identified by Creswell (2009: 11-12) as qualitative, quantitative and mixed methods. The author defines both qualitative and quantitative design methods as 'representing two ends of a continuum' and mixed methods residing in the central point of this scale. The researcher embarked on quantitative strategy which is 'a means for testing objective theories by examining the relationship among variables'. The variables chosen in this case, the infant feeding and occurrence of diarrhoea can be measured and analysed using statistical procedures. The quantitative method has two approaches of inquiry the experimental and non-experimental designs such as survey design (Creswell, 2009: 11-12).

Surveys are the most widely used method of data collection from people as described by Maree & Pietersen (2007) as 'the assessment of current status, opinions, attitudes and believes by data collection sheets or interviews from a known population.' In other words, surveys are said to describe what exists. They involve big samples of a few hundreds to a few thousands. The researcher chooses survey design due to the economy of the design, the rapid turnaround in data collection and the ability to identify attributes of a large population from a sample. A cross sectional survey design was employed where data was collected at one point in time (Maree & Pietersen 2007).

Descriptive surveys are used to gain information about characteristics' in the field of study by providing a picture of situations as they occur. Correlation studies examine relationships among variables. The researcher choose the descriptive correlation design in order to examine the relationships that exist between infant feeding and morbidity in infants between zero and 14weeks of age. No attempt was made by the researcher to control or manipulate the situation (Burns & Groove, 2001: 248-257).

3.3 Variables

Neuman (2006: 160-161) defines a variable as a concept or its empirical measure that can take on multiple values or a concept that varies. An attribute on the other hand is defined as 'a category or level of a variable. The author further identifies three types of variables; the independent, dependent and intervening variable. The independent variable is seen as one that is the cause while the dependant variable

is seen as the outcome or seen as depending on the cause. The intervening variable appears in complex causal relations where it comes between the dependent and independent variables showing the link. This study describes the correlation in which infant feeding are the independent variable while the occurrence of morbidity is the dependent variable. The attributes identified for infant feeding variable include EBF and EFF while the attributes of morbidity include diarrhoea and respiratory infections (see Figure 1). The researcher describes the relationship between infant feeding and morbidity between birth and 14 weeks in the Amathole district in the Eastern Cape (Neuman, 2006: 160-161).

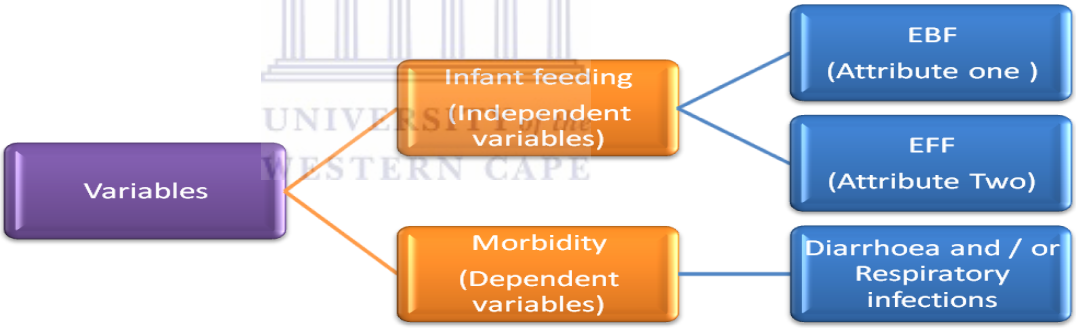

Figure one; Variables

3.4 Study population

A population or target population is defined as the entire set of 'elements or infants who meet the criteria of sampling for a study' (Burns & Groove, 2001:365-366). The study population consisted of all infants who are exclusively formula fed or exclusively breastfed for the first fourteen weeks of age in the Amathole District. The 14th week of age coincided with the Expanded Programme on Immunisation Initiative

3.5 Study Sample

Sampling is deciding on 'people, events, behaviours or other elements in which to conduct a study' within a target population. The main aim of the survey is to use a sample (subset of the population) to help the researcher learn about the target population by selecting a group of subjects who are a close representation of the population. The study sample was like the population thus making it representative. The infants selected in the study were those who were either exclusively breastfed or exclusively formula fed and those who were mixed fed in any way were excluded from the study (Burns & Groove, 2001:267).

Probability methods and non-probability methods are used as the major classes of sampling. Probability methods are based on randomness of selection, whereas the non-probability methods are not. This makes the probability methods more likely to be generalizable to the target population. Non-probability sampling methods according to Neuman (2006: 160-161) include convenience, quota, and purposive, snowballing, deviant case, sequential and theoretical sampling methods. For a quantitative researcher a planned approach is necessary based on mathematical

theory such as sample analysis calculations. The researcher selected convenience sampling method also known as haphazard or accidental sampling which involves getting cases in any manner that is convenient. The available subjects who meet the inclusion criteria are included in the study until the required sample size is attained. Although this method is known to produce deceiving samples and is not recommended, the researcher considered cost factors and time constraints while selecting the sampling method. This was because convenience sampling is inexpensive, requires less time and is acceptable for exploratory studies (Neuman, 2006: 220).

According to Burns & Groove, (2001) 'Power is the capacity of the study to detect differences or relationships that actually exist in the population.' In other words, power is the capacity to reject a null hypothesis in a study. The researcher aims at attaining the minimum acceptable power for a study as .80 by performing a power analysis to determine the sample size. A Chi square test is designed to test for significance differences between proportions in this study and is used to detect possible relationships. In order to have an 80% power for detecting a difference when the true proportion is 0.20 in one group and 0.45 in the other group using a two sided alternative and a chi square test for comparing proportions, a sample size of 110 was needed. It was anticipated that 20% of the infants who were exclusively breastfed would have incidences of diarrheal and respiratory infections while 45% - 50% of the exclusively formula feed infants

will have incidences of diarrheal and respiratory infections (Burns & Groove, 2001:377; Maree & Pietersen, 2007).

The selected clinics had an average of 40-60 infants seen in the clinic on heavy clinic days which are Monday and Thursday, although they had well baby clinics daily. Other days they assess an average of ±25 infants at 14 weeks of age. NU2, NU1 and NU3 clinics in Mdantsane were conveniently selected for the study due to their accessibility to the researcher and are within 5 kilometres of each other.

The range of the plus or minus 3 weeks from 14 weeks of age was given for reasons of trying to attain the required sample size within the given limited time and resources and also to be able to detect the ages at which infant feeding influence morbidity depending on whether it is earlier or later than 14 weeks. Most mothers also do not bring their children for immunization accurately at 14 weeks of age for the 14 week immunization. Therefore an allowance of early and late comers was given.

3.6 Data Collection Strategies

In this section the discussion involves the procedure followed during data collection, the instruments used for collecting the data and also the process followed to ensure data reliability and validity.

3.6.1 Data collection procedure

A structured data collection sheet was developed ensuring that information needed was comprehensively acquired. The researcher was introduced to mothers in the waiting room in each of the clinics who were informed briefly of the

research being carried out. Mothers of infants were requested for permission to be interviewed on infant feeding and those who consented were interviewed. The inclusion criteria included infants who were either EBF or EFF from birth to 14weeks. Those who were partially breastfed, predominantly breastfed or mixed fed in any way were excluded using a screening form at the beginning of the data collection. The infants who met the inclusion criteria, (either EBF or EFF) were enrolled into the survey. A detailed informed consent was obtained and the mothers of infants were given the original copy. The informed consent was explained to each of the participants in detail before they signed it. Those who could not read or write a witness were given the informed consent to discuss the contents with the participant's mother. The mothers of infants' who did not need assistance with answering the questions were given a data collection sheet with a unique number, a pen and pencil. When the survey was completed the researcher or the assistant checked the data, asked questions for clarification, and adjusted answers based on the patients' information.

The road to health card was used to capture data on the birth weight. This information was then transcribed into the data collection sheets. If the mother or guardian needed assistance with completing the data collection sheet, the researcher or the research assistant would assist the participant. When the survey was completed, the researcher ensured that all questions were answered and if need be asked for clarification. Data was then captured from the road to health card. The researcher kept all data sheets and entered data for analysis first in the

excel sheet at the end of every day. The researcher aimed at collecting data from 30 to 40 participants per day on heavy clinic days and 20 to 30 on lighter clinic days.

3.6.2 Data collection instruments

In the research process, generation of data is the most crucial part of the process in order to avoid inaccurate or false data which leads to drawing false conclusions which may lead to policies that are drawn based on inaccurate data.

According to Burns & Groove (2001) a questionnaire is a 'printed self -report form' to obtain information from the subject although with less depth and less bias than in interviews. In this case the data collection sheets were designed for structured interviews in which the researcher would have to ask the questions precisely the way they are written in the data collection sheets and fill in other data as required into the data collection sheet. In designing the data collection sheet / data collection sheet the researcher paid great attention to the appearance of the data collection sheet to make them user friendly for the participants, the researcher and the research assistant. The sequence of questions was also was considered starting with more broad questions which might seem uninteresting then followed by narrower more specific questions and using sensitive questions at the end of the data collection sheet. Questions that required related responses were grouped together. Questions were made simple and precise in order to spend 20 to 30 minutes with each participant (Maree & Pietersen, 2007; Burns & Groove, 2001:427-435).

During the development of the data collection sheet for this study and tested for accuracy by doing a pilot study. The pilot study was important in order to establish content validity of the instrument and improve on the questions and format. The questions that were relevant were modified for accuracy while the irrelevant questions were deleted (Creswell, 2009:150).

During the data collection process the researcher identified those who could read and write and gave them the data collection sheet and a pencil to fill in the information. The researcher would read through the information and enquire on any clarification necessary before the mothers of the infant left. Those who could not write the researcher with the assistant helped them complete the sheets. (Burns & Groove, 2001:427)

3.6.3 Quality of data (reliability and validity)

The researcher should always form a vital part of the study. It is however important to realise that because the researcher is constantly involved with the process, it is important to keep bias, values and also personal interests in mind. In planning for the data collection process the researcher did her best to ensure standardisation of the process of data collection. This would ensure reliability and validity of the data.

3.6.3.1 Reliability

Data reliability can also be referred to as trustworthiness or dependability of the data collected. In ensuring reliability of the data, the instrument for measurement used in the study was consistent to all individuals in the population. The

structured data collection sheet used acquired the equivalent information repeatedly and consistently. The test retest reliability method was applied to the data collection sheet during the pilot study to evaluate the correlation between the answers given using the same kind of instrument and different phrasing of words to ensure clarity. Some of the questions were added in order to clarify infant feeding e.g. if a mother said she EFF and she answers that she indicates that she breastfeeds at night then this increases the possibility of inquiring if she understands what EFF is. Other questions were deleted to increase reliability and avoid confusing the client. During the planning for the data collection, the researcher did the best to ensure that the data was collected the same way by debriefing the research assistant who was aware of the proposal and the researcher's intentions. Also going through the data collection process with the research assistant who was a fellow master's student familiar with the process helped deal with issues of bias and standardization (Neuman, 2006:276-279).

3.6.3.2 Validity

Examining the abstract content that the researcher intends to measure requires an instrument that will measure exactly that. Literature describes validity in different ways primarily; content validity, predictive validity and construct validity. However, an instrument cannot be completely valid but only the degree of validity matters (Burns & Groove, 2001).

Content validity is described as reflections to whether the questions are representative of the concepts they are intended to measure. To ensure content

validity the data collection sheet was given to the supervisors and two experts in the field of nursing research for their judgment. They evaluated the questions to see if they represented the proposal which carried the researcher's intentions for the study and collected data that would address the specific objectives thus representing the aim of the study (Neuman, 2007:196).

During translation to the local language Nxosa the questionnaire was translated and back translated to ensure it reflected the objectives of the study and not lose the main content. The translation was done in the languages centre where language experts translated and back translated the questionnaire.

3.7 Data Analysis

In order for the researcher to measure cause and effect by describing significance differences, a sample calculation was done using statistics analysis software (SAS) with the help of a statistician. The data that was collected was entered into excel sheets from the data collection sheets. This data was then transferred unto the Statistics Package for Social Sciences (SPSS) which was used for analysis.

3.8 Ethical Aspects

The ethical aspects of the study include the approval for the study and informed consent for the participants. The proposal was presented to the School of Nursing Research and Scholarship Committee for comments and input. A formal consent to carry out the study was obtained from the Senate Higher Degrees Committee of the University of the Western Cape (UWC). Further consent was sought from the East London Complex Committee of the Eastern Cape, as well as the Amathole

District Municipality and a specific request for participation from the particular clinics. The change of topic from the previously accepted topic by the ethics committee, prompted the researcher to resubmit the change of topic to the ethics committee at UWC.

3.8.1 Ethics approval

The proposal was submitted to the School of Nursing, the Senate Higher Degrees Committee and the Ethics Committee of the University of the Western Cape. Further the ethics approval was sought from the Eastern Cape Department of Health and the quality assurance section of the Department of Health.

3.8.2 Informed consent details

There were no risks to the infant as the report involves collecting verbal information from the infants' mother. The information collected was used by the researcher only and kept confidential during the data analysis. There was no direct benefit for the participant at this stage of research though the results of the research could be used as ground work for further research which would benefit the infants in the near future.

It is possible that if others in the community were aware that the participant was involved in the study and would ask questions. However, the researcher did not share the identity of those participating in the research with anyone. The information which was collected from the survey was kept confidential. Information about participants collected during the research in the data collection sheets only had a study number with no name identification. The number on the

data collection sheet that matched the informed consent did not identify the participant in any way but was used in case the researcher needed to reach the participant for clarification during the data collection process.

The results were used for academic purposes only and to inform other researchers on the need to focus research in this area of study. The results will be published possibly in journals which the community would access. Feedback on the findings would also be given to health facilities in case there is need for intervention. The participation was voluntary and right to refuse or withdraw at any point in the study without affecting any services received in the clinics in future was allowed. The participant had the right to ask any questions during the data collection process. No incentives were offered for participation or compensation of any kind as the study was conducted during the participants visit to the clinic at their convenience.

Chapter four: Study Results

4.1 Introduction

Chapter four presents the results according the three objectives of the study which were to describe the occurrence of diarrhoeal and/or respiratory morbidities among infants within the first fourteen weeks of age; and the influence of infant feeding (exclusively breast feeding and exclusively formula feeding) and the occurrence of diarrhoeal and/or respiratory morbidities within the first fourteen weeks of age. It also gives a brief description of data.

4.2 General description

A total of 120 data sheets were handed out and 116 (96.7%) were returned. Out of the 116, 109 (90.8%) were fully completed and considered for analysis. Seven of the returned questionnaires were discarded from the analysis due to incomplete information. Participants were unwilling to be interviewed further and were therefore discontinued. Out of the 109 (100%) mothers who fully completed the questionnaires, 73 (66.97%) indicated exclusively formula feeding their infants, and 36 (33.03%) indicated exclusively breastfeeding their infants (Appendix three and four).

4.3 Occurrence of morbidities within the first fourteen weeks

The sample of 109 was used to describe occurrence of morbidities within the first 14 weeks of age. Out of 109 infants, 36.7% (n=40) presented with diarrhoea within the first fourteen weeks and 61.47% (n=67) of the infants presented with respiratory infections within the first 14 weeks. 63.30% (n=69) of the infants had no occurrence of diarrhoea within the first 14 weeks of age and

38.53% (n=42) of the infants had no occurrence of respiratory infections within the first 14 weeks of age.

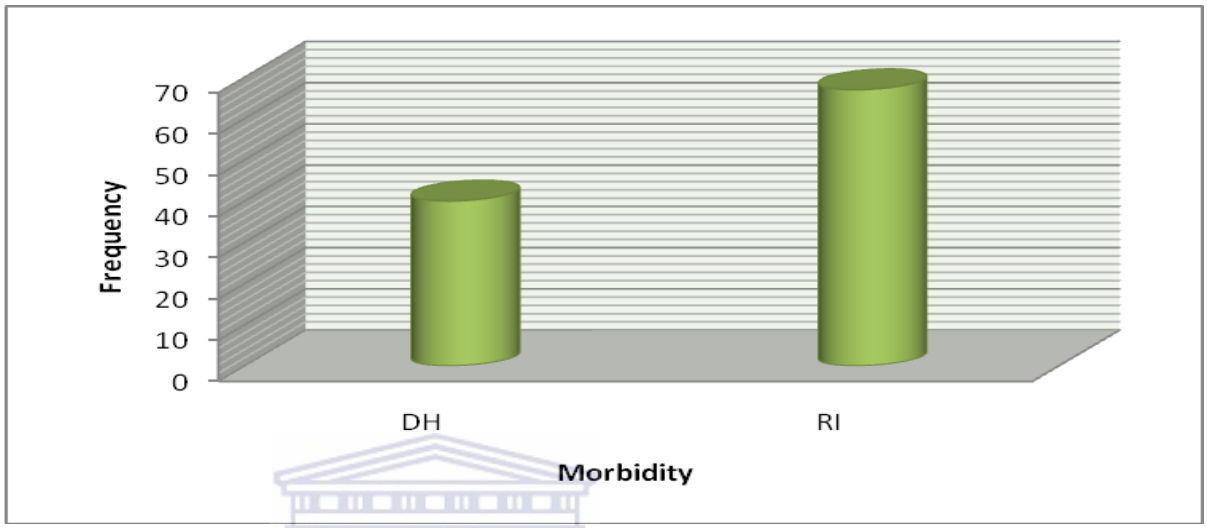

Figure two: Occurrence of morbidity

4.4 Occurrence of morbidity and Infant feeding

Out of the 36.7% (n=40) occurrences of diarrhoea within the first fourteen weeks, 15.00% (n=6) many were associated with EBF, and 85.00% (n=34) of those with occurrence of diarrhoea were associated with EFF. The results also indicated that out of the 63.30% (n=69) of the infants who had occurrence of respiratory infections 25.37% (n=17) were those infants who were exclusively breastfed while 74.63% (n=50) were those infants who were exclusively formula fed.

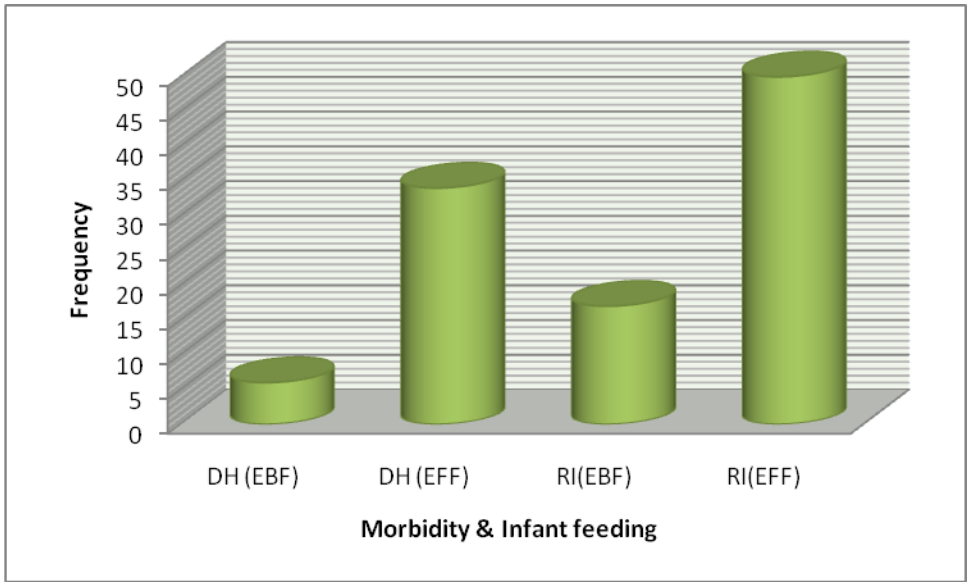

Figure Three: Occurrence of morbidity

4.4.1 Occurrence of diarrhoea associated with EBF

The infants who were exclusively breastfed 33.03% (n=36) from the 109 infants. The infants who were EBF 83.33% (n=30) were reported to have had no diarrhoea by 14 weeks while 16.67% (n=6) of these infants had occurrence of diarrhoea within the first 14 weeks.

4.4.2 Occurrence of diarrhoea associated with EFF

The infants who were exclusively formula fed were 66.97% (n=73) of the total sample within 14 weeks of age. Out of the infants who were EFF 53.42% (n=39) had no incidence of diarrhoea while 46.58% (n=34) had incidences of diarrhoea within the first 14 weeks of age.

	Exclusively Breast Fed and occurrence of diarrhoea		
	No diarrhoea	**Diarrhoea**	**Total**
Frequency	30	6	36
	(30/109)27.52%	(6/109)5.5%	(36/109) 33.03%
	(30/36) 83.33%	(6/36) 16.67%	
	Exclusively Formula fed and Occurrence of diarrhoea		
	No diarrhoea	**Diarrhoea**	**Total**
Frequency	39	34	73
	(39/109)35.78%	(34/109) 31.19%	(73/109) 66.97%
	(39/73) 53.42%	(34/73) 46.58%	

Table one: Occurrence of diarrhoea and infant feeding

4.4.3 Occurrence of respiratory infections associated with EBF

Out of the frequency of 36 exclusively breast fed infants 52.78% (n=19) were reported as having no history of respiratory infections within the first 14 weeks of age. Occurrence of respiratory infections within the first 14 weeks was 47.22% (n=17) of the EBF infants.

4.4.4 Occurrence of respiratory infections associated with EFF

The EFF infants 31.51% (n=23) had no occurrence of respiratory infections within the first 14 weeks of age while 68.49% of the EFF infants had occurrence of respiratory infections by 14 weeks of age as shown on table 2 below.

	Exclusively breast Fed and occurrence of respiratory infections		
	No Resp. infections	**Resp. Infections**	
Frequency	19	17	36
	(19/109) 17.43%	(17/109)15.60%	(36/109)33.03%
	(19/36) 52.78%	17/36))47.22%	
	Exclusively formula Fed and occurrence of respiratory infections		
	No Resp. infections	**Resp. Infections**	
Frequency	23	50	73
	(23/109)21.10%	(50/109)45.80%	(73/109)66.97%
	(23/73)31.51%	(50/73)68.49%	

Table Two: Occurrence of respiratory infections and infant feeding

4.5 Descriptive analysis of correlation in the occurrence of morbidity and infant feeding.

The results were analysed on the occurrence of morbidity and infant feeding. The outcome of the comparison of occurrence of morbidity and infant feeding (as shown in table above) shows a total of 63.30% (n=69) infants who had no diarrhoea by 14 weeks for both feeding methods. 43.48% (n=30) were those who were EBF and 56.52% (n=39) were those EFF. The results indicated that 36.70% (n =40) infants

developed diarrhoea. 15.00% (n=6) were those EBF and 85.00% (n=34) were the EFF infants.

4.5.1 Difference in occurrence of diarrhoeal infections and infant feeding

The use of Chi square statistic, for cross tabulated data, helps identify relationships or differences between cell values. It is mainly used by statisticians from a probability framework to detect possible relationships (Burns & Groove, 2001).

With a chi square analysis the degrees of freedom must be calculated which is used in the determination of the significance of the value. In this case the Chi-square (X^2) value was 9.2840. The degrees of freedom, *df* =1 and *p* was 0.0023 (if p<0.05 results show significance). The analysis of the infant feeding and the occurrence of diarrhoea showed that there was a significant relationship between infant feeding and the occurrence of diarrhoea by ± 14 weeks as the *P* value was 0.0023 which is < 0.05.

Comparison of outcomes for the infant feeding and diarrhoea			
Table of method by diarrhoea			
EBF	**No diarrhoea**	**Diarrhoea**	**Total**
Frequency	30	6	36
	(30/109)27.52%	(6/109)5.5%	(36/109) 33.03%
	(30/69)43.48%	(6/40)15.00%	
EFF	**No diarrhoea**	**Diarrhoea**	**Total**
Frequency	39	34	73
	(39/109)35.78%	(34/109) 31.19%	(73/109) 66.97%
	(39/69)56.52%	(34/40)85.00%	
Total	69	40	109
Total percentages	(69/109) 63.30%	(40/109)36.70%	

Table Three: Comparison of outcomes for diarrhoea and infant feeding

The significant difference showed reveals that the infant feeding of infants affects morbidity by the age of 14 weeks and not just affecting the infants but significant differences in the occurrence of diarrhoea.

Statistic	DF	Value	*P*-value
Chi-Square	1	9.2840	0.0023

Table Four: Statistics for Table of method by diarrhoeal infections

4.5.2 Difference in occurrence of respiratory infections and infant feeding

The data analysis shows that 38.53% (n=42) of the 109 infants had no respiratory infections, reported while 61.47% (n=67) of the infants had respiratory infections in both feeding methods. The analysis further shows that 45.24% (n=19) of the exclusively breastfed infants and 54.76% (n=23) of the EFF infants had no incidences of respiratory infections by 14 weeks. 25.37% (n=17) of the infants who developed respiratory infections were those who were EBF and 74.63% (n=50) of the EFF infants and had developed respiratory infections by 14 weeks of age.

Comparison of outcomes for infant feeding and respiratory infections			
Table of method for Resp. infections			
EBF	**No Resp. infections**	**Resp. Infections**	
Frequency	19	17	36
	(19/109) 17.43%	(17/109)15.60%	(36/109)33.03%
	19/42)45.24%	(17/67)25.37%	
EFF	**No Resp. infections**	**Resp. Infections**	
Frequency	23	50	73
	(23/109)21.10%	(50/109)45.8%7	(73/109)66.97
	(23/42)54.76%	(50/67)74.63%	
Total	42	67	109
Total percentages	(42/109) 38.53%	(67/109) 61.47%	

Table Five: Comparison of outcomes for infant feeding and respiratory infections

The significance here is shown by the Chi-square with a value of 4.6058 *df* =1 and *p*=0.0319. (if *P*-value is less or equal to 0.05 then there is a significant difference) and in this case the *p*=0.0319 which is less than 0.05 indicating a significant difference in the infant feeding and the occurrence of diarrhoea by±14 weeks of age.

Statistic	DF	Value	P-value
Chi-Square	1	4.6058	0.0319

Table six: Statistics for Table of method by respiratory infections

4.6 Conclusion

The analysis of the data was a challenging exciting experience which helped the researcher appreciates the need of having a sample analysis before data collection, and trying to maximize the number of participants needed if possible as this increases the power of the study.

Chapter Five:
Discussion and Recommendations

5.0 Introduction

In This chapter the researcher will discuss the main findings of the study which were aimed at describing the association between exclusive breastfeeding and exclusive formula feeding and the occurrences of diarrhoea and/or respiratory infections in the Amathole district in the Eastern Cape by 14 weeks of age. Following the discussion on the findings the researcher will suggest recommendations based on the findings of the study.

5.1 Occurrence of morbidity in exclusively breastfed infants by 14 weeks of age

The South African Demographic and Health Survey (SADHS) Preliminary Report (2003) highlighted that, only 11.9 % of infants aged 0-4 months were exclusively breastfed and 20.1% were never breastfed. From the target population in this study in the Amathole district, it shows that 33.03% (n=36) were exclusively formula fed by 14 weeks out of the 110 infants in the study. the statistics showed that 100% (n=36) infants who were said to exclusively breastfeed were breastfed during the day and at night indicating that these infants were not given any other feeds other than breast milk . Also the question indicating that the infants were not given any other liquids showed the likelihood of these infants being exclusively breastfed.

As described in the literature review by McCance & Huther (2002), breastfed infants enjoy continued passive immunity up after birth as long as they are breastfed which reduces the chances of these infant's morbidity. The results of the study indicated an occurrence of diarrhoea 16.67% (n=6) as compared to 27.52% (n=30) who had no incidences of diarrhoea. The large number of infants without incidences of diarrhoea could be attributed to the therapeutic aspects of breast milk as indicated by Sarker, (2004). McCance & Huther (2002) asserted that breast milk secretes IgA which inhibits adhesion of pathogenic microorganisms along the gastrointestinal tract and enhancing their immunity. On the other hand the results showed 15.60% (n=17) of the breastfed infants developed respiratory infections. Less infants developed the respiratory infections which could be attributed to the action of IgA assay acting along the respiratory tract as described by McCance & Huther (2002), thus inhibiting the adhesion of pathogenic microorganisms. This could be true for the 17.93% (n=19) who did not develop respiratory infections by 14 weeks of age meaning the protection enhanced immune responses adequately (Sarker, 2004, McCance & Huther 2002).

5.2 Occurrence of Morbidity in exclusively formula fed infants by 14 weeks of age

As described in the data results 66.97% (n=73) of the infants were exclusively formula fed. The infants who presented with diarrhoea were 31.19% (n=34). While those infants who did not present with any incidence of diarrhoea at 14 weeks were 35.78% (n=39). The infants who presented with respiratory infections were 45.87% (n=50) while those who had no respiratory infections 21.10%

(n=23). Most of the infants 75.9% (n=60) we fed on pelargon which was the formula milk offered by the government in this region for HIV exposed infants whose mothers wanted to formula feed all the other types of formula such as Nan 8.9%9 (n=7), Pre-nan 12.7% (n=10), S26 2.5% (n=2.5%) were those provided by the mothers of infants themselves.

As discussed in literature review Sarker, (2004) asserts that most formula milk companies have recently incorporated live cells found in breast milk into modified formula such as lactobacillus acidophilus although they are destroyed during preparation of feeds. The feeds that most of the mothers use might be modified to meet the infant's needs but mostly destroyed during preparation of feeds as compared to breast milk which does not need preparation.

The study did not go into details of establishing how the feeds were acquired. The increased numbers of exclusive formula infant feeding hypothetically could be due to the fact that the mothers are working and opted for the assumed easy way out, or choose these feeds as per the policy on PMTCT. Only 3.8%(n=3) of these mothers who exclusively formula fed gave their babies any type of multivitamin supplementation which is proven could assist with prevention of occurrence of diarrhoea and respiratory infection during formula feeding.

As discussed earlier in the literature review formula milk does not have diverse physiological variation as breast milk, nor does it have diverse changes in milk consistencies especially in the composition of digestive and protective bacteria

necessary for infant growth, and boosting of their immunity. This therefore contributes to the likelihood of deficiencies in the levels of nutrients, carbohydrates, lipids and proteins necessary for growth and development of the infants leading to an increase of morbidity as indicated by the study data by 14 weeks of age (McCance & Huther, 2002).

5.3 Occurrence of diarrhoea and/or respiratory infections between exclusively breastfed and exclusively formula fed infants by 14 weeks of age.

The results from the study indicating 31.19% (n=34) of infants with diarrhoea who are exclusively formula fed as compared to 5.5% (n=6) of infants exclusively breast fed indicates clearly a reduction in the protective factors against infective gastrointestinal mucosa pathogenic factors in EFF infants noticeable as early as 14 weeks. On the other hand similar morbidity happens with respiratory infections in which 45.87%(n=50) of exclusively formula fed infants seem to have had respiratory infections by 14 weeks of their lives as compared to 15.60% (n=17) of the exclusively breastfed infants indicating noticeable differences in the quality of breast milk and formula milk influencing the occurrence of respiratory infections (McCance & Huther, 2002*).*

As described in table 4 (table of statistics on diarrhoea), the chi squared test (X^2) was used in the analysis where the degrees of freedom must be calculated which is used in the determination of the significance of the value. In this case the Chi-squared test statistic (X^2) was 9.2840. The degrees of freedom for this test df

=1(2-1)x(2-1) and the corresponding p-value was 0.0023.There is consequently clear evidence of an association between morbidity and infant feeding by 14 weeks of age in this population (since the p-value is less than 0.05).

Table 5(table of statistics on respiratory infections) in the results section describe the value of the Chi- squared test statistic as 4.6058 and the degrees of freedom df for this test 1((2-1)x(2-1)) with the corresponding p-value of 0.0319.There is clear evidence of the association between respiratory infections and infant feeding (since the p-value is less than 0.05).

The hypothesis statements for the test included;

Null hypothesis (H_o): there is no association between morbidity and infant feeding

Alternative Hypothesis (H_a): there is an association between morbidity and infant feeding

The chi-squared test as described earlier is used to test for independence by testing whether two nominal variables in this case diarrhoea and/or respiratory infections are independent or dependent.

In this case the researcher rejected the null hypothesis as the results showed an association. The alternative hypothesis was not rejected indicating an association between morbidity (diarrhoea and/or respiratory infections) and infant feeding. The researcher acknowledges the possibility of Type II and Type II Errors but did not focus on controlling the same in the analysis.

5.5 Indicators for further research

Although formula preparation and feeding is affected by socioeconomic and demographic factors leading to increased occurrence of diarrhoea and/or respiratory infections, the researcher did not integrate factors these factors that may have an effect on infant feeding as part of the study objectives. The researcher is aware that these factors could have influenced the outcome of morbidity in the formula fed infants. The absence of protection and risk associated with formula feeding practices act synergistically with each aggravating the effects of the other therefore still remains a matter of concern (WHO, 2003; 1989).

The increased levels of morbidity among the infants who are exclusively formula fed as compared to those who are exclusively breastfed has been reviewed in many studies in the literature review showing an increase in stunting of growth, and development by 6 months to one year. The researcher attained the goal of describing the fact that infants who enjoy passive immunity from their mother which was passed onto them in-utero which could last up to 3 to 4 months. This means that the all infants will have this immunity for up to 3-4 months. However the infants who are breastfed will continue to receive the passive immunity from breast milk. This places the breastfed infants at an advantage of reduced morbidity as described by the significance difference attributed in the results which showed a p value of less than 0.05 in both diarrhoea and respiratory infections (WHO, 1989:2003&2007).

The focus of 14 weeks described that there is increased morbidity of diarrhoea and or respiratory infections in infants who are EFF as compared to infants who are EBF. The morbidity occurs as early as 14 weeks of age. It is easier at this age for mothers to EBF because most of them are on maternity leave for the working mothers and traditionally by 14 weeks they would be at home recuperating.

5.6 Recommendations

5.6.1 Implications on infant feeding

This survey although at a small scale was able to raise the awareness morbidity related to infant feeding noticeable as early as 14 weeks. Bigger surveys which would specifically carry out research on specific age feeding problems from birth and draw specific conclusions would enable possible intervention measures would reduce incidences of malnutrition which is a global burden.

The governments have a responsibility to see that the flow of information to the grassroots of mothers of infants on infant feeding and the information disseminated adequately and effectively at the grassroots. This would require frequent monitoring and evaluations of the processes. Dealing with the infant feeding from birth is a low cost intervention rather than dealing with the issues of morbidity and further rehabilitation for children with stunting of growth and slow development as shown in literature by 14 weeks.

The society has expectations from its government for provision of adequate reliable services. Whether a mother decides to exclusively formula feed or to

exclusively breast feed the services should be in a place to provide her with adequate backup on the decision made reducing the disadvantages caused by one feeding practice over another. Proving formula feeds with adequate nutrients and supplementation of the lacking nutrients in the milk as early as possible without waiting until six months when they get complimentary feeds, would reduce morbidity caused by reduced nutrients.

5.6.2 Implications to policies

In South Africa, most health facilities have implemented the policies on Breastfeeding friendly hospital initiatives (BFHI) including the centres that the researcher visited. This implementation encourages the caregivers on better breastfeeding practices. As indicated earlier in literature it is recommended that infant feeding should emphasize the fact that the vast majority of mothers can and should breastfeed only under exceptional circumstances. Alternatives to the best feeding practice (EBF) include expressed breast milk by the infants own mother especially for working mothers, a healthy wet nurse or human milk bank (WHO, 2003).

5.6.3 Implications for health information

Raising awareness, improving the knowledge base and capacity for action programming among decision-makers at all levels is important at every step in order to keep the process moving. This increases accountability, ensuring that action is taken once a national strategy is developed. Being able to create a network of stakeholders or partners who will campaign for good feeding practices

will begin with influencing health workers and policy makers to make this a mission and with their conviction the society will follow through (WHO, 2007).

5.6.4 Implications for Research

More research is necessary on the by mothers of infants. This would enlighten the policy makers on the type of informed decisions and what needs to be improved in order to make these decisions grander ensuring infants as early as birth have all nutrients incorporated in whichever type of feeding method the mother is ready to use for her infant. Longitudinal studies on influence of infant feeding, exclusive breastfeeding verses exclusive formula feeding from birth until 6 months when complementary feeds are implemented are necessary on a larger scale. This would inform health services on gaps in health information and the need to more assertively help mothers make decide whereas supporting their decisions early thus reducing the occurrence of morbidity related to feeding infant feeding.

5.7 Conclusion

This was a challenging yet a great learning process as I worked on the research project from proposal writing to data collection and analysis and finally, trying to make sense of the whole journey. I feel enlightened and even more not discouraged but challenged to get more involved in research as a way of life in helping give our future generations a chance at a better life.

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Appendices

One: Informed Consent

UNIVERSITY OF THE WESTERN CAPE

Faculty of Community and Health Sciences

INFORMED CONSENT

Title: *Diarrhoea and Respiratory Morbidities associated with infant feeding in the Amathole district in the Easter Cape Province within 14 weeks of age.*

Student Name*:* *Doreen Kainyu Mugendi*

Student Number: *2651655*

Type of Thesis*:* *Mini thesis as partial fulfilment for a Masters Degree in Advanced Midwifery and Neonatology*

Department: *School of Nursing*

Supervisor: *Prof. Mbombo*

Co- Supervisor*:* *Prof. Khanyile*

Date: *December 2009*

This informed consent form has two parts:

Information sheet, where we share the information with you.

Certificate of consent, where you sign that you agree to participate.

Part 1 Information sheet

Introduction

Dear

Ms……

This study is part of Doreen K Mugendi's research that leads toward her Master's degree in Nursing. She is studying at the University of the Western Cape and is currently doing this survey as a partial fulfilment of her studies. I would like to share some information with you and invite you to participate in this research study. Before you decide to participate you can talk to anyone you feel comfortable with about the research, including your family if you wish to do so. There may be some words in this form that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have any questions later, you can ask me or any other member in the research team.

Purpose

The purpose of the study is to embark on diarrhoea and/or respiratory infections associated with infant feeding in the Amathole district in the Easter Cape Province within 14 weeks of age.

Choosing breast feeding or formula feeding has in many studies been seen to be associated with morbidity, growth and development of infants before the age of one year. This happens mostly when the infants suffer from reduced or lack of nutrients necessary to prevent illnesses thus causing diarrhoea and respiratory infections among other illnesses.

Type of intervention

This is a survey and will conduct an interview with you that will last for about 15 - 20 minutes. If you agree to participate in the survey your role will be to answer the questions in the data collection sheet by writing them down or answering them as the researcher and co researcher inquire from you.

Participant selection, Procedure and Protocol

The population will be all infants attending well-baby clinics in the Amathole district. The study population will consist of 110 infants at 14 weeks plus or minus 3 weeks when they come for the immunization to the well-baby clinics. The procedure will include the completion of a data collection sheet conducted by the researcher or and the co researcher who is also a master's student at the

university. The researcher will ask questions and the answers will be written down on the data collect sheet

Duration

Collection of data will be over a two to three day period but you will only have to participate once (today) by answering the questions and allowing us to weigh your baby.

Benefits Risks & Discomforts

There are no risks to your baby and the information collected will be used by the researcher only and kept confidential during the data analysis. There is no direct benefit for you but your participation is likely to help us find the answer to the research question as described above. There may not be any benefit to society at this stage of the research, but the results of this survey may help us to determine if there are ways in which we could help infants in future.

Confidentiality

It is possible that if others in the community are aware that you are participating in this research, they may ask you questions. The researcher will not be sharing the identity of those participating in the research with anyone. The information that is collected from this survey will be kept confidential. Information about you that will be collected during the research will not be identified by your name. They data collection sheets will be kept safely and your name will only be on the

informed consent form. There will be an identifying number on the data collection sheet to match the informed consent with the data collection sheet. This is only for research purposes. No information gathered from you will be shared with or given to anyone other than the research team.

Sharing the Results

The knowledge that we get from doing this research will be shared with you before it is made widely available to the public. The results will also be used for academic purposes and inform other researcher on the need to focus research in this area of study.

Voluntary participation and Right to Refuse or Withdraw

Your participation in this research is entirely voluntary. It is your decision whether to participate or not and whether you allow your infant to participate or not. Whether you choose to participate or not, all the services you receive at this clinic will continue and nothing will change. You may change your mind later and stop participating even if you agreed to participate earlier. It is your decision to participate or not and all of your rights will still be respected.

Alternatives to Participating

You may choose not to participate in the study but it will not affect you or your infant future as this is just a survey.

Ethical clearance

This proposal has been reviewed and approved by the University of the Western Cape Senate Ethics Committee. The purpose of this committee is to ensure that research participants are protected. If you wish to find about more about this please contact the UWC senate ethics committee. You may contact them at any time if you have any questions related to this survey. You may also contact me in during the survey or in future on 021 959 3470. Before I ask you to sign this consent form, may I please ask you to explain to me in your own words what you have just read or what I have just explained to you? I would like to ensure that you understand that you agree to participate in research.

PART II: Certificate of Consent

I have been invited to participate in a study on the infant feeding and the occurrence of diarrhoea and/or respiratory infections in the Amatole district, Eastern Cape. I am aware that there may be no benefit to me personally and that I will not be compensated. I have been provided with the name of the researcher who can be contacted easily using the number and address I was given for that person.

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this survey and understand that I have the right to withdraw from

the research at any time without in any way affecting my or my infant's future health care.

Print Name of Participant_____ Signature of Participant _____

Date _____ Day/month/year

If illiterate complete this as well:

A literate witness must sign (if possible, this person should be selected by the participant and should have no connection to the research team). I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print name of witness_____ AND Signature of witness _____

Thumb print of participant Date _____ Day/month/year

Two: Tables of Frequency data as per questionnaire

Tables of frequency data as per questionnaire

Data collection date		Frequency	Percent	Valid Percent	Cumulative Percent
	25.3.09	28	25.5	25.7	25.7
	26.3.09	31	28.2	28.4	54.1
	27.3.09	50	45.5	45.9	100.0
	Total	109	99.1	100.0	
Total		110	100.0		

Data collector's initial	Frequency	Percent	Valid Percent	Cumulative Percent
DG	32	29.1	29.1	29.1
DKM	78	70.9	70.9	100.0
Total	110	100.0	100.0	

Do you have a road to health card?		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	110	100.0	100.0	100.0

Birth date recorded	Frequency	Percent	Valid Percent	Cumulative Percent
26.1.01	1	.9	.9	.9
09.9.08	2	1.8	1.8	2.8
21.9.08	1	.9	.9	3.7
22.9.08	1	.9	.9	4.6
23.10.08	1	.9	.9	5.5
08.11.08	1	.9	.9	6.4
20.11.08	1	.9	.9	7.3
21.11.08	1	.9	.9	8.3

25.11.08	1	.9	.9	9.2
26.11.08	2	1.8	1.8	11.0
27.11.08	4	3.6	3.7	14.7
28.11.08	4	3.6	3.7	18.3
29.11.08	5	4.5	4.6	22.9
01.12.08	3	2.7	2.8	25.7
04.12.08	1	.9	.9	26.6
05.12.08	2	1.8	1.8	28.4
09.12.08	1	.9	.9	29.4
10.12.08	5	4.5	4.6	33.9
11.12.08	3	2.7	2.8	36.7
12.12.08	8	7.3	7.3	44.0
13.12.08	2	1.8	1.8	45.9
14.12.08	1	.9	.9	46.8
15.12.08	4	3.6	3.7	50.5
16.12.08	1	.9	.9	51.4
17.12.08	3	2.7	2.8	54.1
18.12.08	1	.9	.9	55.0
20.12.08	9	8.2	8.3	63.3
21.12.08	2	1.8	1.8	65.1
22.12.08	2	1.8	1.8	67.0
23.12.08	2	1.8	1.8	68.8
24.12.08	1	.9	.9	69.7
26.12.08	1	.9	.9	70.6
28.12.08	1	.9	.9	71.6
31.12.08	1	.9	.9	72.5
02.1.09	1	.9	.9	73.4
05.1.09	1	.9	.9	74.3
06.1.09	1	.9	.9	75.2
07.1.09	1	.9	.9	76.1
08.1.09	2	1.8	1.8	78.0
10.1.09	2	1.8	1.8	79.8
13.1.09	3	2.7	2.8	82.6
14.1.09	2	1.8	1.8	84.4

	16.1.09	2	1.8	1.8	86.2
	20.1.09	2	1.8	1.8	88.1
	24.1.09	2	1.8	1.8	89.9
	28.1.09	1	.9	.9	90.8
	29.1.09	1	.9	.9	91.7
	09.2.09	2	1.8	1.8	93.6
	10.2.09	2	1.8	1.8	95.4
	16.2.09	1	.9	.9	96.3
	24.2.09	1	.9	.9	97.2
	21.3.09	1	.9	.9	98.2
	07.12.09	1	.9	.9	99.1
	08.12.09	1	.9	.9	100.0
	Total	109	99.1	100.0	
Missing	System	1	.9		
Total		110	100.0		

Birth weight recorded (g)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1098	1	.9	.9	.9
	1780	1	.9	.9	1.8
	1800	1	.9	.9	2.8
	1890	1	.9	.9	3.7
	1900	2	1.8	1.8	5.5
	1995	1	.9	.9	6.4
	2000	1	.9	.9	7.3
	2079	1	.9	.9	8.3
	2091	1	.9	.9	9.2
	2100	1	.9	.9	10.1
	2200	1	.9	.9	11.0
	2320	1	.9	.9	11.9
	2400	1	.9	.9	12.8
	2460	1	.9	.9	13.8

2500	1	.9	.9	14.7
2520	1	.9	.9	15.6
2560	1	.9	.9	16.5
2600	2	1.8	1.8	18.3
2610	2	1.8	1.8	20.2
2630	3	2.7	2.8	22.9
2640	1	.9	.9	23.9
2650	2	1.8	1.8	25.7
2670	1	.9	.9	26.6
2680	1	.9	.9	27.5
2700	1	.9	.9	28.4
2730	1	.9	.9	29.4
2740	1	.9	.9	30.3
2780	2	1.8	1.8	32.1
2800	2	1.8	1.8	33.9
2820	1	.9	.9	34.9
2840	2	1.8	1.8	36.7
2870	1	.9	.9	37.6
2880	1	.9	.9	38.5
2890	1	.9	.9	39.4
2900	2	1.8	1.8	41.3
2930	2	1.8	1.8	43.1
3000	5	4.5	4.6	47.7
3002	1	.9	.9	48.6
3010	5	4.5	4.6	53.2
3015	1	.9	.9	54.1
3020	1	.9	.9	55.0
3030	1	.9	.9	56.0
3040	2	1.8	1.8	57.8
3044	1	.9	.9	58.7
3050	1	.9	.9	59.6
3070	3	2.7	2.8	62.4
3100	4	3.6	3.7	66.1
3110	1	.9	.9	67.0

	3120	2	1.8	1.8	68.8
	3200	6	5.5	5.5	74.3
	3210	2	1.8	1.8	76.1
	3220	1	.9	.9	77.1
	3250	1	.9	.9	78.0
	3266	1	.9	.9	78.9
	3300	3	2.7	2.8	81.7
	3320	4	3.6	3.7	85.3
	3400	2	1.8	1.8	87.2
	3420	3	2.7	2.8	89.9
	3500	3	2.7	2.8	92.7
	3610	1	.9	.9	93.6
	3620	1	.9	.9	94.5
	3680	1	.9	.9	95.4
	3720	1	.9	.9	96.3
	3800	1	.9	.9	97.2
	3820	1	.9	.9	98.2
	3900	2	1.8	1.8	100.0
	Total	109	99.1	100.0	
Missing	System	1	.9		
Total		110	100.0		

Head circumference (cm)	Frequency	Percent	Valid Percent	Cumulative Percent
30	1	.9	.9	.9
31	2	1.8	1.9	2.8
32	21	19.1	19.6	22.4
33	30	27.3	28.0	50.5
34	28	25.5	26.2	76.6
35	21	19.1	19.6	96.3
36	3	2.7	2.8	99.1
38	1	.9	.9	100.0
Total	107	97.3	100.0	

Missing	System	3	2.7		
Total		110	100.0		

Is it a boy or a girl?	Frequency	Percent	Valid Percent	Cumulative Percent
Boy	55	50.0	50.0	50.0
Girl	55	50.0	50.0	100.0
Total	110	100.0	100.0	

Have you ever breastfed your child?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	38	34.5	34.5	34.5
No	72	65.5	65.5	100.0
Total	110	100.0	100.0	

Did you give the first milk (colostrum)?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	37	33.6	33.6	33.6
No	73	66.4	66.4	100.0
Total	110	100.0	100.0	

When did you put your baby on the breast for the first time?	Frequency	Percent	Valid Percent	Cumulative Percent
Immediately after birth	20	18.2	18.2	18.2
Within one hour	15	13.6	13.6	31.8
Within 6 hours	5	4.5	4.5	36.4
Within 2 days	3	2.7	2.7	39.1
Not applicable	67	60.9	60.9	100.0
Total	110	100.0	100.0	

Breast milk during the day?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	36	32.7	100.0	100.0
No	74	67.3		
Total	110	100.0		

Breast milk during the night?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	36	32.7	100.0	100.0
No	74	67.3		
Total	110	100.0		

water (plain)	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	25	22.7	100.0	100.0
No	85	77.3		
Total	110	100.0		

Water with sugar, salt, rice?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	13	11.8	100.0	100.0
No	97	88.2		
Total	110	100.0		

Tea and Juice?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	1	.9	100.0	100.0
No	109	99.1		
Total	110	100.0		

Infant formula during the day?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	73	66.4	100.0	100.0
No	37	33.6		
Total	110	100.0		

Infant formula during the night?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	73	66.4	100.0	100.0
Missing	37	33.6		
Total	110	100.0		

Cow's milk?	Frequency	Percent
No	110	100.0

Gripe water?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	52	47.3	100.0	100.0
No	58	52.7		
Total	110	100.0		

Alcohol?	Frequency	Percent
No	110	100.0

Prescribed Medications?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	28	25.5	100.0	100.0
No	82	74.5		
Total	110	100.0		

Herbal / traditional medication?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	2	1.8	100.0	100.0
No	108	98.2		
Total	110	100.0		

Oral Rehydration Salt?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	3	2.7	100.0	100.0
No	107	97.3		
Total	110	100.0		

Micronutrient supplement?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	3	2.7	100.0	100.0
No	107	97.3		
Total	110	100.0		

What type of powder milk do you use to feed your baby?		Frequency	Percent	Valid Percent	Cumulative Percent
	Pelargon	60	54.5	75.9	75.9
	Nan	7	6.4	8.9	84.8
	S26	2	1.8	2.5	87.3
	5	10	9.1	12.7	100.0
	Total	79	71.8	100.0	
Missing		31	28.2		
Total		110	100.0		

How many tins of milk powder do you use per week?		Frequency	Percent	Valid Percent	Cumulative Percent
	Quarter	11	10.0	10.1	10.1
	Half	2	1.8	1.8	11.9
	Three-quarters	5	4.5	4.6	16.5
	One	47	42.7	43.1	59.6
	5	44	40.0	40.4	100.0
	Total	109	99.1	100.0	
Missing		1	.9		
Total		110	100.0		

Other?	Frequency	Percent	Valid Percent	Cumulative Percent
None	71	64.5	64.5	64.5
None	2	1.8	1.8	66.4
NA	22	20.0	20.0	86.4
THREE	2	1.8	1.8	88.2
TWO	13	11.8	11.8	100.0
Total	110	100.0	100.0	

How many times in a day do you feed your baby?	Frequency	Percent	Valid Percent	Cumulative Percent
Eight times	3	2.7	2.7	2.7
Six Times	26	23.6	23.6	26.4
Four times	58	52.7	52.7	79.1
Twice	10	9.1	9.1	88.2
Five	13	11.8	11.8	100.0
Total	110	100.0	100.0	

Other	Frequency	Percent	Valid Percent	Cumulative Percent
FIVE	1	.9	.9	89.1
NA	2	1.8	1.8	90.9
SEVEN	2	1.8	1.8	92.7
TEN	3	2.7	2.7	95.5
THREE	1	.9	.9	96.4
THREE	4	3.6	3.6	100.0
Total	110	100.0	100.0	

Has your baby ever been hospitalized?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	17	15.5	15.5	15.5
No	93	84.5	84.5	100.0
Total	110	100.0	100.0	

What was the baby's age at admission in the hospital?	Frequency	Percent	Valid Percent	Cumulative Percent
0 - 6 weeks	7	6.4	6.4	6.4
0 - 10 weeks	5	4.5	4.5	10.9
0 - 14 weeks	5	4.5	4.5	15.5
Not Applicable	93	84.5	84.5	100.0
Total	110	100.0	100.0	

Diarrhoea	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	11	10.0	100.0	100.0
No	99	90.0		
Total	110	100.0		

Cough	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	11	10.0	100.0	100.0
No	99	90.0		
Total	110	100.0		

Fever	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	11	10.0	100.0	100.0
No	99	90.0		
Total	110	100.0		

Difficulty in breathing?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	7	6.4	100.0	100.0
No	103	93.6		
Total	110	100.0		

Other causes	Frequency	Percent	Valid Percent	Cumulative Percent
INFECTION	1	.9	.9	99.1
JAUNDICE INFECTION	1	.9	.9	100.0
Total	110	100.0	100.0	

Has your baby been ill with fever the last two weeks?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	68	61.8	61.8	61.8
No	41	37.3	37.3	99.1
Don't know	1	.9	.9	100.0
Total	110	100.0	100.0	

Has your baby been ill with cough the at any time in the last two weeks?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	67	60.9	60.9	60.9
No	42	38.2	38.2	99.1
Don't know	1	.9	.9	100.0
Total	110	100.0	100.0	

Has your baby been ill with cough did she breath faster with short rapid breaths?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	56	50.9	50.9	50.9
No	53	48.2	48.2	99.1
Don't know	1	.9	.9	100.0
Total	110	100.0	100.0	

Has your baby has diarrhoea in the last two weeks?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	40	36.4	36.4	36.4
No	70	63.6	63.6	100.0
Total	110	100.0	100.0	

If yes how many diaper changes with loose stools in a day?	Frequency	Percent	Valid Percent	Cumulative Percent
One	1	.9	.9	.9
Two	2	1.8	1.8	2.7
Three	11	10.0	10.0	12.7
More than three	28	25.5	25.5	38.2
None	68	61.8	61.8	100.0
Total	110	100.0	100.0	

Has your baby had any other stomach problem?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	23	20.9	20.9	20.9
No	87	79.1	79.1	100.0
Total	110	100.0	100.0	

If yes what was the problem?	Frequency	Percent	Valid Percent	Cumulative Percent
COLIC	15	13.6	13.6	13.6
CONSTIPATION	4	3.6	3.6	17.3
DIAORRHOEA	2	1.8	1.8	19.1
NA	89	80.9	80.9	100.0
Total	110	100.0	100.0	

Clinic name	Frequency	Percent	Valid Percent	Cumulative Percent
NU1	11	9.1	9.1	10.0
NU2	92	83.6	83.6	93.6
NU3	7	6.4	6.4	100.0
Total	110	100.0	100.0	

Three: Table of Descriptive Statistics

Question No.	Question	N	Minimum	Maximum	Sum	Mean	Std. Deviation
1	Site number	109	1	3	133	1.22	.550
2	Study Number	110	1	110	6105	55.50	31.898
4	Do you have a road to health card	110	1	1	110	1.00	.000
5	Birth date recorded	109	26.1.01	08.12.09	16964652 00:00:00	28.11.08	282 10:39:11.364
6	Birth weight recorded	109	1098	3900	318720	2924.04	492.915
7	Head circumference	107	30	38	3587	33.52	1.276
8	Is it a boy or a girl?	110	1	2	165	1.50	.502
9	Have you ever breastfed your child?	110	1	2	182	1.65	.478
10	Did you give the first milk (colostrum)?	110	1	2	183	1.66	.475
11	When did you put your baby on the breast for the first time?	110	1	6	482	4.38	2.142
12	Breast milk during the day?	36	1	1	36	1.00	.000
13	Breast milk during the night?	36	1	1	36	1.00	.000
14	water (plain)	25	1	1	25	1.00	.000
15	water with suger, salt, rice?	13	1	1	13	1.00	.000
16	Tea and Juice?	1	1	1	1	1.00	.
17	Infant formula during the day?	73	1	1	73	1.00	.000
18	infant formula during the night?	73	1	1	73	1.00	.000
19	cows milk?	0					
20	Gripe water?	52	1	1	52	1.00	.000
21	Alcohol?	0					
22	Prescribed Medications?	28	1	1	28	1.00	.000
23	Herbal / traditional medication?	2	1	1	2	1.00	.000
24	Oral Rehydration Salt?	3	1	1	3	1.00	.000
25	Micronutrient suppliment?	3	1	1	3	1.00	.000

26	Has your baby revieved any replacement feeds during birth?	110	1	2	146	1.33	.471
27	Has your baby ever been hospitalized?	110	1	2	203	1.85	.363
28	What was the baby's age at admission in the hospital?	110	1	4	404	3.67	.836
29	Diaorhhea	11	1	1	11	1.00	.000
30	Cough	11	1	1	11	1.00	.000
31	Fever	11	1	1	11	1.00	.000
32	Diffficulty in breathing?	7	1	1	7	1.00	.000
33	Has your baby been ill with fever the last two weeks?	110	1	3	153	1.39	.509
34	Has your baby been ill with cough the at any time in the last two weeks?	110	1	3	154	1.40	.510
35	Has your baby been ill with cough did she breath faster with short rapid breaths?	110	1	3	165	1.50	.520
36	Has your baby has diarrhoea in the last two weeks?	110	1	2	180	1.64	.483
37	If yes how many diaper changes with loose stools in a day?	110	1	5	490	4.45	.820
38	Has your baby had any other stomach problem?	110	1	2	197	1.79	.409
39	Has your baby had any other throat or chest problems since birth?	110	1	2	208	1.89	.313
40	What type of powder milk do you use to feed your baby?	79	1	5	139	1.76	1.434
41	How many tins of milk powder do you use per week?	109	1	5	438	4.02	1.202
42	How many times in a day do you feed your baby?	110	1	5	334	3.04	.957
	Valid N (listwise)	0					

Four: Ethics approval

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Five: Questionnaire