FACTORS ASSOCIATED WITH MALNUTRITION AMONGST CHILDREN SIX MONTHS TO FIVE YEARS OF AGE IN A SEMI-RURAL AREA OF THE WESTERN CAPE

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DECLARATION

I, Reginald Loots, declare that the contents represent my own unaided work, and that the dissertation has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

5 February 2020

Signed **Date**

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Dedication

I dedicate this writing to my daughter, Kelly Ann. I hope this serves as an inspiration to you that everything in life is possible if you put your mind to and heart into it.

To my late mother, Maria Loots, grandfather, Gabriel Loots, and aunt, Gertie Jantjies-Loots, your upbringing, love, prayers, inspiration and wisdom are deeply missed and cherished.

ABSTRACT

Malnutrition is a global concern and particularly in children. It impacts negatively on mortality, morbidity, educability and productivity, and it affects millions of children in South Africa. As part of our Millennium Development Goals set by the Department of Health and WHO, it is vital to combat malnutrition by eradicating extreme poverty and hunger. Malnutrition is regarded as a change in nutritional status that carries the penalty of illness, dysfunction or death. Child malnutrition poses one of the biggest challenges in South Africa according to the WHO and has been well documented over the past 20 years. A lack of knowledge from parents or caregivers on the nutritional needs of children and the levels of poverty contribute to childhood malnutrition; the extent of hunger has also been associated with low energy intake, low micronutrient intake and poor income levels. This affects growth patterns negatively. Thus, this study aims to examine the key factors that are causing malnutrition in children in a semi-rural community in the Western Cape. A combination of both qualitative and quantitative research approaches were used. Qualitative data were collected through group interviews and quantitative data were collected through a self-administered questionnaire from 105 parents and caregivers. Thematic content analysis was used for qualitative data analysis and SPSS was used to analyse the quantitative data.

The results revealed that the associated factors to malnutrition amongst children six months to five years of age included obesity, underweight, stunting, severe acute malnutrition and moderate acute malnutrition. The results further indicated that the majority of households were single mothers with low income and a poor educational background. This study recommended that health education and health promotion should be done at all heath facilities with regular intervals as well as within the community. Authorities should provide a platform for all clinicians to go for regular updates and to participate in continuous development programmes to combat malnutrition. The findings of this study could contribute to the existing body of knowledge with regard to the factors that contribute to malnutrition. The results could improve health care practices in the communities of the Western Cape and the South African context at large.

Keywords: Child, growth, health education, malnutrition, nursing practice.

GLOSSARY OF TERMS

Term	Definition
Toddler	A toddler is a child between the ages of one and three years. The toddler years is a time of great cognitive, emotional and social development.
Food taboos	Taboo foods and drinks are food and beverages which people abstain from consuming for religious, cultural or hygienic reasons.
Health status	The level of health of the individual, group or population as subjectively assessed by the individual or by more objective measures.
Behavioural change	It refers to the manner of behaving or conducting oneself or it could refer to the action, reaction or functioning of a system under normal or specific circumstances.
Famine	It is the extreme scarcity or shortage of food.
Child	A child is defined as a young human being below the age of puberty or below the legal age of majority.
Weaning	It is the transition of the human infant from breastfeeding or bottle feeding and the commencement of nourishment with other food.

ABBREVIATIONS

DoH	Department of Health
NDoH	National Department of Health
NPO	Non-Profit Organisation
BMI	Body Mass Index
NSP	Nutritional Supplementation Programme
INP	Integrated Nutrition Programme
MUAC	Mid-Upper Arm Circumference
RTHB	Road to Health Booklet
PEM	Protein-Energy Malnutrition
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization
SAM	Severe Acute Malnutrition
FBDG	Food-based Dietary Guidelines
GMP	Growth Monitoring Promotion
WMA	World Medical Association
SDG	Sustainable Development Goals
MDG	Millennium Development Goals
FTD	First Thousand Days

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CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

This chapter provides an overall orientation to the study. Malnutrition has a negative impact on mortality, educability, morbidity and productivity, and it affects millions of children in South Africa (Swart, Sanders & McLachlan, 2008: 129). Furthermore, according to Ewusie, Beyene, Ahiadeke and Hamid (2017:798), malnutrition is seen as one of the leading causes of mortality in children in developing countries. It is estimated to have contributed to more than half of childhood mortalities. According to the World Health Organization (WHO, 2017), 45% of all under-five mortalities with nutrition-related problems occur worldwide. The World Health Organization (2017) has identified malnutrition as a major health problem in South Africa. Hence, the National Department of Health (NDoH), (1995) has implemented the Nutritional Supplementation Plan (NSP) to target this vulnerable group. Thus, malnutrition is recognised as the key factor associated with poor health and death amongst children (Iversen, Marais, Du Plessis & Herselman, 2012:4).

This chapter includes a brief outline to the area of research, inspiration for conducting the study, background to the study, problem statement, research question, purpose of the study, research process, research design and methodology, significance of the study, structure of chapters and finally, the chapter summary. In addition, this chapter also describes the layout of the structure of the dissertation.

1.2 BACKGROUND

Malnutrition has a negative impact on mortality, educability, morbidity and productivity, and it affects millions of children in South Africa (Swart *et al.*, 2008:129). As part of the Millennium Development Goals (MDG's) set by the Department of Health and WHO (WHO, 2011b:1), it is vital to combat malnutrition by eradicating extreme insufficiency

and the lack of food shortages. The MDG's have expired in September 2015 and South Africa did not meet the outcomes of the MDG's, which were set by the World Health Assembly, to continue the fight against hunger. The Sustainable Development Goals (SDG) was put in place to address and eradicate poverty, to protect the environment and to ensure prosperity for all children.

Malnutrition can be categorised as follows:

- Over-nutrition and obesity
- Underweight
- Stunting
- Wasting
- Kwashiorkor
- Marasmus
- Severe acute malnutrition
- Iron deficiency (UNICEF, 2006).

"Malnutrition" is regarded as "a change in nutritional status that carries the penalty of illness, dysfunction or death" (WHO, 2011a & b: 1). According to UNICEF (2015), the the poorest 20% of the world's children are twice as likely as the richest 20% to be stunted by poor nutrition and to die before their fifth birthday. Thus, malnutrition is recognised as the key factor associated with poor health and death amongst children.

Andresen, Wandel, Eide, Herselman and Iverson (2009:1) state that malnutrition amongst infants and young children is a major health problem in South Africa. As a result, insufficient and unsecured foods lead to poor health and increased deaths amongst children. Indeed, parents and caregivers should attempt to improve the provision of nutritional food to children. However, socio-economic circumstances, for example, unemployment and single-parent households, do not always permit nutritional food to be available to children.

The Department of Health strives to meet the Millennium Development Goals by providing supplementary food such as peanut butter paste and powder milk, and ensuring that food reaches those categorised as 'malnourished'. The Nutritional

Supplementation Programme (NSP) is rendered at most clinics in the Western Cape, aims to help underweight and growth-stunted children gain weight, and also aims to empower parents to tackle malnutrition (Andresen *et al*., 2009:90). Despite the implementation of various policies and programmes such as the Protein Energy Malnutrition (PEM) scheme, the Integrated Nutrition Programme (INP), Nutrition Supplementation Programme (NSP) that was later renamed as the Nutrition Therapeutic Programme (NTP) and the Integrated Management of Childhood Illness (IMCI) that focuses on child well-being to indicate whether the child is still growing well, malnutrition still exists (Iversen *et al*., 2012). Educational programmes should be implemented in all health services in order to educate parents and caregivers to take responsibility for their children's health. State authority is obliged to help parents meet their responsibility.

Over the past 15 years, the researcher has worked as a clinical nurse practitioner in school health at the Day Hospital in Cape Town. Previously, the researcher worked in a semi-rural area where the research took place. He has dealt with malnourished children on a daily basis. In his current post as a school health nurse, he still deals with malnutrition amongst school children on a regular basis. The researcher's interest to research associated factors in malnourished children developed while he was working in a health facility in a semi-rural area in the Western Cape.

The community has a high unemployment rate and most people are pensioners, seasonal farm workers and working in the guest houses and restaurants in the town. Most families reside in low-cost housing and the local informal settlement. In some cases, three families live under one roof in a small structure. Many are single parents and dependent on children's grants. There is one clinic situated in this semi-rural area of the Western Cape. The two closest regional hospitals are 35 km away from this semi-rural district. Patient transport is always a problem, and poses a challenge to many parents and caregivers to access the health facilities in the area.

1.3 PROBLEM STATEMENT

According to UNICEF (2005), malnutrition in children remains one of the most common causes of ill health and death amongst children under the age of five throughout the world. A large percentage of children from weaning age within a semi-rural area in the Western Cape are classified as malnourished. The number of malnourished children under five years of age in the Western Cape was 2.8 per thousand population in 2012/2013 (NDoH, 2013; Provincial Treasury, 2013:18). The City of Cape Town recorded a number of 2.9 malnourished children less than five years per thousand of the population in the Cape Winelands District. Despite all the policies and interventions put in place by the Department of Health and the City of Cape Town, the problem of malnutrition still exists (NDoH, 2013; Provincial Treasury, 2013:18).

Although these malnourished children have attended the clinics for services and treatment, the factors that are associated with malnutrition amongst children under five years living in this area have not been examined yet. This lack of knowledge regarding the associated factors could pose a barrier to the local health care organisations in promoting nutritional education and empowering parents and caregivers with knowledge to improve the quality of life of children within this community.

1.4 AIM OF THE RESEARCH

The aim of the study was to examine the factors associated with malnutrition amongst children six months to five years of age in a semi-rural area of the Western Cape.

1.5 RESEARCH OBJECTIVES

The research objectives of this study were to:

- Identify the associated factors to malnutrition amongst children six months to five years of age;
- Determine the typical characteristics of households with children six months to five years of age living in the semi-rural area in the Western Cape; and
- Explore what healthcare organisations do to prevent malnutrition in this semi-rural area of the Western Cape.

1.6 RESEARCH QUESTION

Based on the background of the study, the primary research question is formulated as followed:

> *What are the key factors associated with malnutrition amongst children six months to five years of age living in a semi-rural area of the Western Cape?*

1.7 THEORETICAL FRAMEWORK

Two approaches were applied as the theoretical framework to this research project. These were an epidemiological and an economical approach. The epidemiological approach focused on the inputs on health. The epidemiological approach could be misleading, as researchers often do not consider the barriers relating to the health outcomes. Secondly, the economical approach focused on the relationship between the barriers that people experience when facing health challenges. This approach could also be followed to assist researchers in obtaining unbiased estimates of the determinants of children's health (Yusuke, 2009:8). Due to the diverse, multidimensional and interrelated nature of malnutrition amongst children under the age of five, a comprehensive framework focusing on all possible dimensions of the factors that had contributed to malnutrition was employed.

UNICEF (1998:11) has developed a theoretical framework in *The State of the World's Children 1998* that categorises the associated factors of malnutrition. These factors include a diet that does not consist of the necessary nutritional requirements, paired with illness as well as underlying causes which are described as not having access to sufficient food supply in a household; health care services that are not up to standard or are not within reach of the community; an unhealthy environment that includes poor drinking water, poor sanitation and the inaccessibility of health services and finally, inadequate care for children and women at household level.

The basic causes associated with malnutrition, according to this framework, are insufficient actual resources (socioeconomic and structural resources) as well as potential resources (societal, governmental and environmental) at community level. It

is, therefore, the intention of this study to utilise an integrated approach (Figure 1 below) to overcome the associated factors of malnutrition.

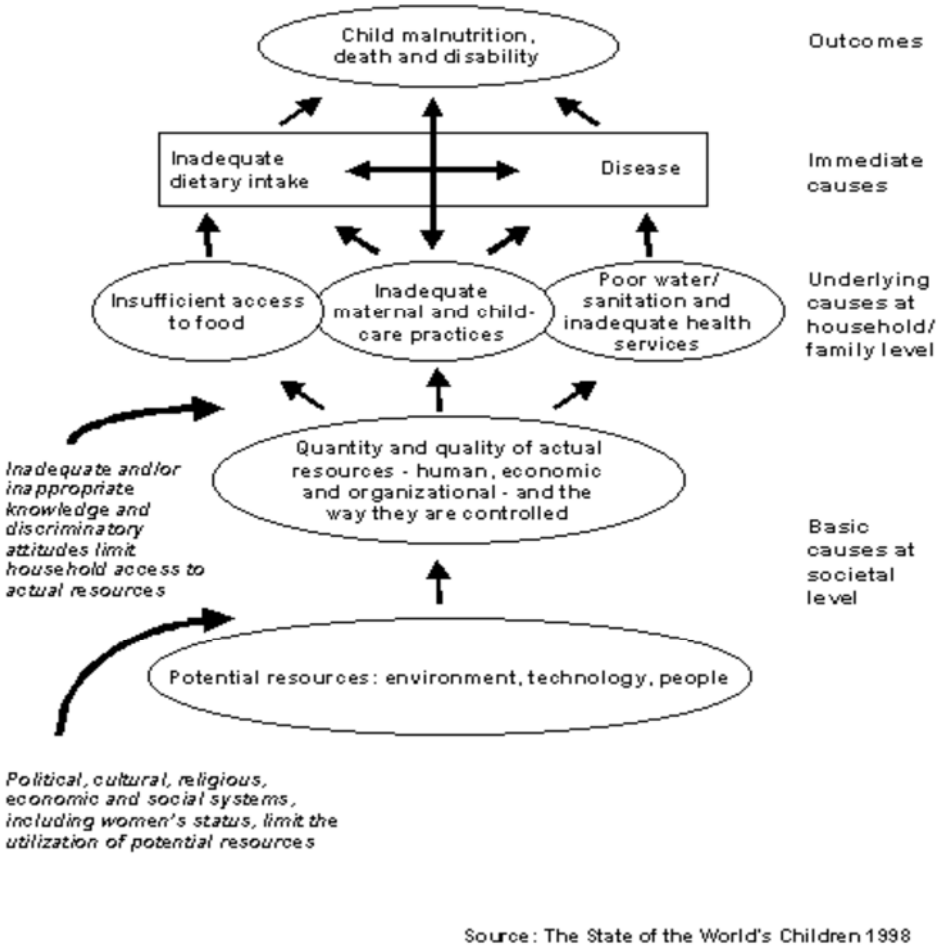

Figure 1: An integrated approach to overcome the causes of malnutrition

The UNICEF Conceptual Framework (1998) is a tool that can be used to lay out various causes that contribute to malnutrition. The causes of malnutrition are displayed at three levels, namely immediate, underlying and basic causes. Immediate causes contribute directly to the manifestation of malnutrition such as poor food intake or the presence of disease. Underlying causes contribute to the immediate causal factors. These usually relate to inadequate access to food, safety of the environment, access to health care and maternal education. The basic causes of malnutrition generally relate to the socioeconomic and/or political influences of a community that affect malnutrition.

The social determinants of health are interlinked with some of the underlying and basic causes of malnutrition mentioned in the UNICEF Conceptual Framework (1998). The social determinants relate to the socio-cultural factors as well as living and working conditions (all underlying causes) in addition to structural factors such as education and economic and ideological resources (which form the basic causes).

The social determinants of health include the broader set of elements and systems shaping the conditions of daily life and consist of economic policies and systems, development, social norms, social policies and governmental systems. All of these factors have an impact on childhood malnutrition. Addressing social, economic and political challenges has been proven to reduce the burden of disease on a health system and also the life cycle of an individual (WHO Commission on Social Determinants of Health, 2008).

1.8 LITERATURE REVIEW

The review of literature revealed that the basic, underlying and immediate causes of malnutrition such as diet, disease, insufficient access to food and environmental and technological factors is a major contribution factor to child malnutrition as illustrated in the UNICEF Conceptual Framework (1998). As the mothers and caregivers bear the responsibility of the children's nutritional status, they need the knowledge and health information from health care practitioners in order to provide their children with optimum nutrition (Taha, Hassan, Nazik & Musa ,2014:1).

The prevalence of malnutrition differs from province to province as indicated by a study conducted by Zere and McIntyre (2003) and it also highlights the importance of how these factors such as socioeconomic status, health status mortality and morbidity are intertwined/interlinked with one another. According to Taha *et al.* (2014:1), the most common causes of disease and death amongst children throughout the world are related to nutritional disorders. Furthermore, Taha *et al.* (2014:1) state that the most common associated factor worldwide is malnutrition, particularly in Third World countries. About 43 million children in developing countries are overweight, and 92 million are at risk of being overweight (De Onis & Blössner, 2010:92). This is a considerable increase since the implementation of the MGDs in 2000. Obesity has

increased dramatically since 1990. Furthermore, De Onis, Blossner, Borghi, Frongillo and Morris (2004) predict that this trend is expected to reach 9.1% (95% CI: 7.3%, 10.9%) or 60 million in 2020.

De Onis and Blössner (2010:92) claim that a similar situation of obesity amongst children is found in Africa (95%) and is expected to reach higher levels in 2020. In South Africa, according to the National Food Consumption Survey (NFCS) (2005), in 1999, 21.6% children were stunted and in 2005, a similar survey by the NFCS revealed that only 18% of children were stunted. This shows a decrease in stunted children within the South African context.

Malnutrition in South Africa constitutes marasmus, kwashiorkor, and similar causes of malnutrition. Children suffering from these effects of malnutrition are at higher risk of dying of malnutrition. The literature review is further explored in Chapter 2.

1.9 RESEARCH METHODOLOGY

1.9.1 Research design

A research design is a plan used by the researcher on how he or she intends to conduct the research (Mouton, 2014:55). The design also includes the process that the researcher follows in operating the study. In addition, Holloway and Galvin (2017:35-36) state that the design should be appropriate to the topic and the research question, as the entire topic is reliant on the research question. In this study, a mixed method design has been employed. This means that the researcher has used both a qualitative and quantitative approach to collect data. Hence, a descriptive and exploratory design is used. (Refer to Chapter 3 for an in-depth discussion.)

1.9.2 Methodology

Both a questionnaire and focus group interviews were used to collect data. A questionnaire was used to collect the quantitative data and the focus group interviews were done to collect the qualitative data.

1.9.3 Research setting

There are three common settings for conducting research, namely natural, partially controlled and highly controlled settings (Burns & Grove, 2015:373). A clinic in a semi-rural area in the Western Cape was the area where the research was conducted. Therefore, the researcher can conclude that the study was conducted in the natural setting where the participants came for normal routine and curative services.

1.9.4 Study population

The study population is the entire group of people with whom the researcher has engaged in this study. Boswell and Cannon (2017:278) define *population* as a total number of units from which data can potentially be collected that meet the specific criteria. The mother, child and baby wellness clinic in the semi-rural area in the Western Cape has a clientele of 300 per month who make use of the services at this health facility. For the purpose of this study, parents (150 in total) with their children aged between six months and five years old presenting with signs of malnutrition who attended the clinic formed part of the study population; however, only participants who had given written consent were allowed to complete the questionnaire. The clinic staff members participated in the focus group interviews.

1.9.5 Sampling

Purposive sampling is the conscious selection of certain subjects, elements, events or incidents to include in the study (Brink *et al.,* 2018:125). A purposive, convenience sampling method was used. There were about 150 parents or caregivers of children presenting with signs and symptoms of malnutrition between the ages of six months and five years who attended the clinic. These participants accounted for 50% of the target population that was selected to participate in this study. The minimum sample size was calculated to be 100 to enable quantitative analysis to take place (refer to Chapter 3 for sample size calculation). Three focus groups were interviewed which comprised the clinic staff. Each group consisted of four staff members.

1.10 INCLUSION AND EXCLUSION CRITERIA

The inclusion criteria refers to the characteristics that the prospective subjects must have to be included in the study, and the exclusion criteria refer to characteristics that disqualify prospective subjects from inclusion in the research study.

1.10.1 Inclusion criteria

- All parents and caregivers who accompanied with the children (between the ages of six months to five years) visiting the clinic were selected to participate in the study. The staff at the clinics was trained and obtain information from the mothers/caregivers as the children are not on the level of grade 8 literacy.
- The researcher sought permission from the clinic manager to review the client folders in order to identify children who were eligible to participate in the study. The researcher identified all children who had a history where there was an indication of malnutrition.
- All health care staff eligible to participate in the study.

1.10.2 Exclusion criteria

- Any caregiver or parent who did not provide full-time care to the child.
- Children younger than six months and older than five years.

1.11 RECRUITMENT OF PARTICIPANTS

According to Creswell and Poth (2018:148), the most vital steps in the data collection process are to discover people or places to study, and to gain access to and establish report with participants so that they will provide worthy data. The process includes determining a strategy for the sampling of individuals or sites. For the purpose of this study, the eligible participants were recruited by word of mouth. Clients with children from six months to five years old were referred to the researcher by the health care worker from the child health section.

1.12 DATA ANALYSIS

Qualitative data was analysed by using thematic content analysis. Quantitative data (questionnaire) was analysed by means of the Statistical Package for Social Sciences (SPSS), version 24. Tables, figures and descriptive results were generated in this manner (refer to Chapter 3 for an in-depth discussion).

1.13 RIGOUR IN MIXED METHODS RESEARCH

In quantitative research, validity and reliability are important and discussed below.

1.13.1 Validity

The validity of an instrument is the degree to which the instrument measures what it is supposed to measure (Polit & Beck, 2017:747). It refers to the accuracy and truthfulness of the findings (Brink *et al*., 2018:154). The associated factors contributing to malnutrition in children under five years old have been validated through previous studies by Lian, Muda, Zamh and Hock (2007). These factors were embedded into the statements that were included in the questionnaire.

1.13.2 Reliability

According to Burns and Grove (2015:287), reliability is concerned with the consistency of a measurement method. The philosophical underpinnings of mixed methodology for this project are to confirm the reliability of the study. The results of the mixed methodology are able to confirm the reliability of the study. In addition, the application of Cronbach's alpha is used to determine the reliability of the dataset. This ensures the stability or consistency of the quantitative dataset.

1.14 RIGOUR IN QUALITATIVE RESEARCH

Rigour is important in qualitative research. In this study, credibility, conformability, transferability and dependability have been considered in the qualitative data analysis. According to Brink *et al*. (2018:157), methodological studies focus on the progress,

testing and evaluation of research instruments and methods used in research investigations. According to Polit and Beck (2017:572-745), trustworthiness consists of the components discussed below. In depth discussion to follow in chapter 3.

1.14.1 Credibility

Credibility gives meaning to a study, as it refers to the confidence of the reader about the extent to which the researchers have produced results that reflect the views of the participants (Grove *et al.*, 2015:392).

1.14.2 Conformability

Conformability refers to the independence of the research findings, namely the potential for similarity between two or more independent characteristics of the study participants as well as the correctness, significance or meaning of the data (Polit & Beck, 2017:561-723).

1.14.3 Transferability

Transferability refers to the potential for extrapolation of data; that is, the extent to which findings can be transferred to or has applicability in other settings or groups (Polit & Beck, 2017:560- 745).

1.14.4 Dependability

Dependability forms part of the criteria to evaluate the integrity of the study and it refers to the reliability of data over a period of time and the conditions similar to reliability of a research study (Polit & Beck, 2017:559 -725).

1.15 ETHICAL CONSIDERATIONS

Ethical approval was sought from the Faculty of Health and Wellness Sciences Ethics Committee at the Cape Peninsula University of Technology. The Head of the district health services of the Cape Winelands and the Provincial Health District Officer were approached for support and permission to conduct the study. The clinic manager where the research took place also supported the research and gave permission to do

the study in this clinic. A support letter was also obtained from the local Department of Social Development which would be on standby for any counselling services that might be required (refer to Appendices G and H).

The ethical principles below were upheld throughout the duration of this study.

1.15.1 Anonymity

Burns *et al.* (2015:500) define *anonymity* as a condition in which a participant's identity cannot be linked, even by the researcher, with his or her individual responses. In terms of the protection of their identities, participants were informed by the researcher not to write anything on the questionnaire that could link them to the questionnaire such as their names, surnames, identity numbers, etc. The researcher ensured that all the participants remained anonymous. None of the questionnaires was tagged or numbered. The completed questionnaires will be strictly kept in a safe and secured place by the researcher.

1.15.2 Confidentiality

Confidentiality is the safe management of data or information that has been shared by subjects to ensure that the data or information is kept private from others (Grove, Gray & Burns, 2015:106). It is applicable to the condition in which the researcher knows the identity of the research subject, but takes steps to protect the identity from being discovered by others (Polit & Beck, 2017:398). An in-depth discussion on confidentiality to follow in chapter 3 (refer to Appendices D and E).

1.15.3 Non-maleficence and beneficence

By adopting sound ethical principles and scientific methods, the researcher has protected the participants from physical and psychological harm as well as exploitation (Polit & Beck, 2017:102). Sensitivity has been acknowledged in the study by the researcher. The local social worker provided her assistance to support any participant in case he or she experienced any emotional distress (refer to Appendix F).

1.16 STRUCTURE OF THE PROPOSED STUDY

The structure of the study comprises the following:

Chapter 1: Orientation of the study

In this chapter, the introduction to and motivation for the study as well as the background to the research problem, the research question and the aims and objectives of the study were discussed. Furthermore, the research design and method, validity and reliability and ethical considerations were discussed.

Chapter 2: Literature review

This chapter contains an extensive literature review of pertinent literature, discussing the issues regarding the associated factors contributing to malnutrition amongst children age six months to five years globally, nationally, regionally and locally.

Chapter 3: Research methodology

Chapter 3 describes the research design and methodology, the population, sampling techniques and the methods of data collection. Measures that the researcher used to ensure validity and reliability are also presented in this chapter.

Chapter 4: Results and findings

In this chapter, findings from the data analysis are discussed.

Chapter 5: Conclusions, limitations and recommendations

This chapter describes the conclusions and recommendations made from the study. The limitations are also highlighted.

1.17 SUMMARY

This chapter discussed the orientation to the study, the background, the research design and methodology as well as data collection and ethical principles upheld in this study.

Next, an extensive literature review is discussed in Chapter 2.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Literature reviews have different purposes and strategies, depending on the type of research method the researcher wishes to apply (De Vos, Strydom, Fouché & Delport, 2011: 133). Furthermore, Boswell and Cannon (2017:242) describe a literature review as a transcribed, logical summary of research findings on a research topic of interest. In many cases it guides the researcher on which route to take to address the research topic. It is a review and summary of current knowledge with regards to a specific topic/problem (Grove *et al.,* 2015:186). In addition, it should convey the scope of the problem, objectives, rationale of the study and its significance (De Vos *et al.,* 2011:288). A literature review guides the interest of the researcher about a specific subject and the lack of knowledge about the subject area (Boswell & Cannon, 2017:242).

The purpose of this chapter is to do an extensive literature review that focuses on the factors associated with malnutrition among children age six months to five years. Literature for this population within the South African population is scanty and rarely focused on.

2.2 GLOBAL PREVALENCE OF CHILD MALNUTRITION

Throughout the world the problem of malnutrition remains one of the greatest mutual causes of morbidity and mortality among children five years and younger. Over 10 million children worldwide younger than five years die annually from diseases that are preventable and treatable despite the availability of effective health care interventions, and at least 50 percent of these deaths are caused by malnutrition (Mengistu, Alemu & Destaw, 2013:1-2). Generally, malnourished children have a low resistance against illness and are easily susceptible to infections. Therefore, they are highly at risk to die from common childhood illnesses such as respiratory infections and diarrheal diseases. In addition, children who are malnourished and have survived, are at risk

and more likely to suffer from recurrent illnesses which adversely affect their nutritional status and expose them to a vicious cycle of recurrent sickness, reduced learning abilities and growth faltering (Mengistu *et al.*, 2013:1-2).

Furthermore, Goudet, Kimani-Murage and Wekesa (2016:608) predict that by 2030, metropolitan populations living in informal dwellings in under-developed countries are expected to increase and almost double to two billion people. The combination of overcrowding and contributing factors such as living in poor environmental circumstances with an absence of access to clean drinking water, sanitation, safety, proper housing and health care will result in people being exposed to increased risk of contracting communicable diseases. Vulnerable groups like the elderly, women and children are the ones more at risk, and they are more likely to suffer from poor nutritional health, high mortality or morbidity rates and malnutrition, affecting several generations. Malnutrition does not only have an influence on human development but also on national fiscal growth, as it contribute to premature birth and increase mortality rate amongst the effected children. It leads to impaired mental and physical development in children, putting them at risk of chronic health conditions in adulthood that will increase the burden of disease. Children who suffer from any form of malnutrition are prone to suffer from impaired cognitive, intellectual and physical development that will permanently affect their adult lives (Goudet *et al*., 2016:608).

In developing countries, including Ethiopia, an inadequate diet among children younger than five years is a public health problem. Globally, the number of children diagnosed with either severe or moderate acute malnutrition is almost 60 million and 13 million respectively. As a result, between eight and 11 million children younger than five years of age die each year globally due to malnutrition. Therefore, more than 35% of these deaths are caused by a lack of proper nutrition which is preventable through public health interventions and economic development (Asfaw, Wondaferash, Taha & Dube, 2015:1).

According to Taha *et al.* (2014:1), the most significant causes of morbidity and mortality among children throughout the world are related to nutritional disorders. The most common associated factor worldwide is malnutrition, particularly in Third World countries. Taha *et al.* (2014:1) conducted a cross-sectional community-based

descriptive study in Khartoum state in Sudan, showing that socioeconomic factors, poor nutrition and the mothers' knowledge and feeding practices were associated factors that led to the increase and prevalence of malnutrition. The mid-upper arm circumference (MUAC) used as an indicator in the study by Taha *et al.* (2014:1) indicated that 20.9% of children suffered from severe malnutrition. In addition to the deprived economic condition, the study also found that 15.4% of children suffered from underweight, 8.8% were moderately underweight and 6.6% were severely malnourished. Furthermore, the study showed the occurrence of wasting was 21.1% (12.3% moderate and 8.8% severe). Lastly, the incidence of stunting was found to be 24.9% (15.1% moderate and 9.7% severe) (Taha *et al.,* 2014:1).

According to Taha *et al*. (2014:1), the occurrence of global malnutrition, moderate malnutrition (MAM) and severe malnutrition (SAM) was 12.8%, 8.0% and 13.6%, respectively. On the other hand, Taha *et al*. (2014:1) claimed that the National Centre of Health Statistics presented the prevalence of global malnutrition, moderate malnutrition and severe malnutrition as 23.1%, 10.25 % and 12.9% respectively.

In developing countries such as Bangladesh, child malnutrition still remains a public health problem (Das & Rahman. 2011:1). This is regarded as an associated factor towards child morbidity and mortality. A health survey done by the WHO in 2007 has revealed that 43% of children in Bangladesh are stunted and 41% are underweight. According to Das and Rahman (2011:1), the levels of stunting and underweight among children are regarded as very high, and two-thirds of childhood deaths occur due to malnutrition. Another study was done by Siddiqi, Haque and Goni (2011) in Bangladesh which revealed that the high prevalence of stunting and underweight constituted 42% and 40% respectively in children under five years of age.

A study conducted by Benyera and Hyera (2013) in Swaziland found that 179 (64.6%) of the children participants were severely malnourished and 98 (35.4%) suffered from moderate malnutrition. Out of the 227 children who took part in the study, 111 children died while being admitted to health facilities, giving an overall case fatality rate of 40.1%. Mortality was significantly higher among children diagnosed with SAM than children diagnosed with MAM (Benyera & Hyera, 2013). It was evident that the

mortality rate caused by childhood malnutrition remained elevated despite the adoption of the WHO treatment guidelines.

In Bule Hora, a district in Ethiopia, under-nutrition is very common in children under the age of five (Asfaw *et al,* 2015:1). Children dying due to diarrheal disease are associated with a lack of protein intake. Asfaw *et al*. (2015:1) claim that under-nutrition is still the most common factor contributing to death in children under five in Ethiopia. This can be ascribed to high levels of disease related to malnutrition in children under five years of age. Under-nutrition accounts for 57% of child mortality. According to the Ethiopian Demographic Health Survey data of 2011, among children under the age of five, 44%, 29% and 10% were stunted, underweight and wasted respectively (Asfaw *et al*., 2015:1).

Kandala, Madungu, Emina, Nzita and Cappuccio (2011:1-2) describe child malnutrition in sub-Saharan Africa (SSA) as one of the biggest contributing factors to under-five child mortality. It stands at approximately 60%. The Democratic Republic of Congo has been identified as one of the SSA countries which have the highest childhood diseases, resulting in high incidences of child mortality. This is due to extreme poverty and the lack of poor infrastructure. Seventy-five percent (75%) of children are malnourished and have died in the last 12 years. This can also be ascribed to continuous armed conflict and political instability since 1990 (Kandala *et al*., 2011:1-2).

There are about 43 million children in developing countries who are overweight with a further 92 million who at risk of being overweight (De Onis & Blössner, 2010:92). This is a considerable increase since the implementation of the MGDs in 2000. Obesity has increased dramatically since 1990. Furthermore, De Onis, Blössner, Borghi, Frongillo and Morris. (2004) predict that this trend is expected to reach 9.1% (95% CI: 7.3%, 10.9%) or 60 million in 2020. De Onis and Blössner (2010:92) claim that a similar situation of obesity among children is found in Africa (95%) and expected to reach even higher levels in 2020.

In a study done by Munthali, Jacobs, Sitali, Dambe and Michelo (2015) in Zambia, they found evidence of a decline in the mortality of children under five years old who

were affected by kwashiorkor and marasmus and admitted to a Zambian hospital. The findings were based on a five-year retrospective review of hospital-based records. According to the researchers the reason for this decline was unclear.

A cross-sectional study by Bhadoria, Kapil, Bansal, Pandey, Pant and Mohan (2017) conducted during 2012-2014 in Meerut, India, found that male children had a higher probability of being more at risk for SAM as compared to female children. Similar findings were observed by studies conducted by Ray, Haldar, Biswas, Misra and Kumar (2001) and Banerjee *et al.* (2005). Conversely, in other studies on malnutrition in children between the age group six to sixty months, female children were found to have more SAM. This difference could be as a result of discrimination towards the female children regarding the amount and nutritious content of their diet, and more attention given to the growth of male children in the community.

Beside the countries in Africa, a study conducted by Jiang, Su, Wang, Zhang, Zhang, Wang and Cui (2014) in some mid-western rural areas in China among children younger than three years of age, stated that low birth weight was a significant risk factor that contributed to stunted growth. Their study outcomes showed that malnutrition remained a major public health risk.

2.3 SOUTH AFRICAN PERSPECTIVES OF CHILD MALNUTRITION

South Africa has undergone economic, political and demographic transitions together with an epidemiological transition over the past 20 years. The South African population, like several other Sub-Saharan populations, face both under- and over-nutrition, as well as nutrition and lifestyle-related chronic diseases while the burden of infectious diseases remains high (Said-Mohamed, Micklesfield, Pettifor & Norris, 2015:1).

In addition, during the previous two decades the prevalence of stunting of more than 20% was reported in the provinces such as the Eastern Cape, Free State, Northern Cape, North West Province and Limpopo (Said-Mohamed *et al*., 2015). Comparing South Africa with other sub-Saharan countries, South Africa has a lengthy history of registering nutrition data through national surveys and studies as well as the advanced

stages of nutrition transitions associated with economic, political and demographic transitions. In South Africa, according to the National Food Consumption Survey (NFCS) (2005), in 1999, 21.6% children were stunted and in 2005, a similar survey by the NFCS revealed that only 18% of children were stunted. This showed a decrease in the South African context.

Malnutrition in South Africa constitutes marasmus, kwashiorkor and similar cases of malnutrition. Children with these diseases are at a higher risk of dying of malnutrition. According to the Department of Health Survey of 2010, the incidents of severe malnutrition in South Africa have decrease from 12.7% in 2001 to 4.9% in 2010. However, the survey also revealed a large disparity among the different provinces in the incidence rate of severe malnutrition in South Africa.

The implementation of a national feeding scheme in schools and health facilities was aimed at assisting in the elevation of malnutrition among under-five-year-old children and school going children. The focus was on the promotion of breast feeding and provision of nutrition in the form of milk formulas. This was all in line with the MDGs (United Nations, 2010:18). Approximately 9.3% of children were diagnosed as being underweight, indicating a reduction from 11% in children aged one to three years. In addition, the survey indicated that anaemia affected 27.9% of children due to an iron deficiency (DoH, 2010). The 2005 survey also estimated that 63.6% of children had a vitamin A deficiency and children who suffered from a zinc deficiency accounted for 45.3% of the population. Furthermore, Ojukwu, Okebe, Yahav and Paul (2009) indicated that iron supplementation for children diagnosed with a low haemoglobin (Hb) level and in need of replacement therapy, improved mental development and intelligence in children.

According to SANHANES-1 (2012) many households experience hunger, hence their status of being hungry remained at 28.3% which lead to a further increase food insecurity. A survey done by DoH (2014:1-2) agreed that there is an increase in food insecurity amongst poor populations. The SANHANES-1 report of 2012 showed that the prevalence of stunting in boys and girls 0-3 years was 26.9% and 25.9% respectively. Children younger than five years of age had the highest prevalence of stunting compared to the children 7-9 years.

The prevalence of under-nutrition decreased since 2005, except for stunting among the age group 0-3 years old (Shisana, Labadarios, Rehle, Simbayi, Zuma, Dhansay, Reddy and Parker (2013). Steenkamp and Lategan (2016) conducted a study that included 225 participants in three provinces, namely the Western Cape, Free State and the Northern Cape. Their study findings showed that 47% (n=106) of children included in the study presented with moderate stunting, followed by 32% (n=72) affected with severe stunting. Of the study participants who were found to be equally stunted and wasted, 20% (n=44) had MAM on both accounts and that only 1% (n=3) had SAM.

According to the latest findings of a survey conducted by Statistics South Africa (StatsSA) in 2016, nutritional support to children is an essential tool for them to be able to attain their optimum physical and intellectual capabilities as part of their developmental milestones (StatsSA, 2016). Good antenatal nutrition post-partum and throughout can control deprived health outcomes of a child. This nutrition can ultimately lead to improved educational outcomes for children. Among all children born alive in South Africa in 2016, the incidence rate of low birth weight of 2 500 g was at 13.3% with the highest rate observed in the Northern Cape (21.1%), followed by the Gauteng Province (14.9%).

Severe acute malnutrition among children younger than five years was 3.6%, with the highest percentages in the Free State and North- West Province with each at 6%, followed by the Gauteng Province with 2%. Severe acute malnutrition (SAM) was indicated as potentially the most fatal condition among children younger than five years of age. The Free State and the North West Province had the highest fatality rate of 8.8% and 11.6% respectively.

Acute malnutrition among children younger than five years of age had similarly high mortality rates in the Eastern Cape, Mpumalanga and Limpopo Province at 9.4%, 9.6% and 8.7% respectively (StatsSA, 2016:37). In addition, StatsSA (2016) indicated that severe acute malnutrition (SAM) among children could lead to a fatal condition. The incidence rate of children younger than five years known to suffer from SAM stood at 3.6% in 2016. The Free State had the highest rate whereas the North West Province

had a 6% incidence rate and the lowest rate documented at 2% was in the Gauteng Province (StatsSA, 2016).

Stunting in children, particularly during the first two years of life, should be highlighted as a public health crisis in South Africa. Stunting is a form of chronic malnutrition and the effects of it may be irreversible. Stunting does not only affect the physical growth of a child; it also impacts on the child's cognitive development which may have long-term effects on his or her educational and economic growth, and ultimately, the country. Stunted children also have a higher risk of developing chronic lifestyle diseases later in life (Victoria, Hanson, Bryce & Vaughan, 2008).

According to Oelofse *et al*. (2002:2) the Western Cape is relatively well off in the South African context. These researchers found that stunting and underweight in children were more prevalent in the coloured community (18%) and in the black community (8%) (Oelofse *et al*., 2002:2). The study mentions no other ethnic groups. In addition according to the recent StatsSA 2016 survey, the official unemployment rate indicated a decreased by 0.6 % each quarter of the year, and also shows an increase of 2.0 % points annually. However decreases in the official unemployment rate were observed every three months in four of the nine provinces in South Africa, the largest decrease in the unemployment rate occurred in North West with 4.0 % points, Limpopo with 2.6 % points, and lastly the Western Cape with a drop of 1.2 % points in the unemployment rate.

In addition Provincial Treasury within the Western Cape indicated in the year 2013 the unemployment rate decreased from 23.1 % to 19.7 %. As a result the average unemployed member within the household account for 0.99 possibilities to provide indirect access to the labour market to contribute income to the household. With the decrease in the unemployment rate within the Western Cape it causes lots of discouragement amongst the population. (WCG, 2018, Provincial Treasury, 2018:69)

2.4 FACTORS CONTRIBUTING TO CHILD MALNUTRITION

The associated factors contributing to malnutrition in children are numerous and multifaceted. Most of the underlined factors are influenced by socioeconomic conditions like unemployment, household food insecurity, lack of child care practices, lack of access to health facilities as well as an unhealthy environment (Mengistu *et al*., 2013:2). Other associated factors are undernutrition, the nutritional situation of parents/guardians, household income, level of education of parents/guardians, and access to clean water and sanitation. Access to primary health care services, together with the gender and age of the child, is a major contributing factor to malnutrition. This may differ among communities from province to province. It is important that the underlying associated factors of malnutrition in a particular community be identified in order to address the nutritional problems (Mengistu *et al*., 2013:2).

The promotion of healthy eating habits, hygienic practices and lifestyle changes during antenatal care of high-risk mothers can reduce low birth weight. Furthermore, reproductive health services can reduce low birth weight by enhancing birth spacing as well as reducing the number of teenage pregnancies. Maternal malnutrition, weight loss, no weight gain during pregnancy, long-term illnesses, smoking and substance abuse during pregnancy increase the risk of low birth weight (Tette, Sifah & Nartey, 2015:2).

2.4.1 The status of malnutrition among children

Children have been identified as the most vulnerable group with regard to malnutrition due to insufficient access to food, low dietary intake, inequitable distribution of food within their households as well as the lack of facilities for proper food preparation and storage. Child malnutrition can be alleviated through nutritional information campaigns, diverse and nutrient rich food, and access to affordable maternal and childcare practices (Degarege, Degarege & Animut, 2015:1).

The nutritional status of children living in informal settlements in the capital city of Kenya, Nairobi, was poor, according to a study conducted by Goudet *et al*. (2016:609). Poor infant feeding practices were been identified with an exclusive breastfeeding rate of 2% of children at the age of six months. In addition, the complementary feeding

practices were sub-optimal with regard to nutrient density foods fed to children younger than two years of age (Goudet *et al*., 2016:609).

2.4.2 Health promotion and educational programmes

Health promotion is defined by WHO (2002-2019) as “The process of empowering people to increase control, over and to improve their health. It moves beyond the focus of an individual behaviour towards a wide range of social and environmental interventions”. Health promotion and education improve physical wellness and prevent illnesses. In addition health promotion and educational programmes relating to nutrition of children may assist in reducing poverty (UNICEF, 2009).

According to Musvaire (2009:12), poverty, malnutrition and hunger in South Africa date back to apartheid policies (NDoA, 2002). Many black people were marginalized and forced to settle in the former homelands with restricted access to resources such as land and very few viable livelihood options. Homelands were typically marginal land, not well suited to agricultural production, and with no access to markets production was not profitable (Coovadia, Jewkes, Barron, Sanders, & McIntyre, 2009). When the farming industry among Africans did not take off any longer, a lot of wealth and assets were lost, resulting in the increase of food insecurity and poverty.

Black urban dwellers were not much better off due to limited job opportunities and poor education, health and social services. Thus, events prior to 1994 contributed to the current nutrition situation in South Africa (Coovadia *et al*., 2009). Due to socioeconomic inequalities (60% of the black population still face poverty compared to 5% in the white population) many sections of the predominantly black society are vulnerable to food insecurity (NDoA, 2002). In addition, the World Bank Report (2018:41) stated as a result of the apartheid legacy many rural areas still have the highest poverty concentration. The socioeconomic status of the families and its level of poverty are based on demographic characteristics of households, family size, structure, and race play an important role in the determination factor. Black South Africans consistently have the highest poverty rates, but the prevalence is of poverty but the rate is dropping.

In central Africa all of the above have led to malnutrition among children under the age of five living in the Democratic Republic of Congo (Kandala et al., 2011:2-3). Furthermore, The World Bank Report (2018:24) stated that malnutrition in children; stunting and household food insecurity remains a huge problem in South Africa and has deteriorated since 2012. In addition based on anthropometric data on child malnutrition, show little improvement and might have worsened in the past recent years.

2.4.3 Family financial income

Children who are brought up by single parents are more likely to suffer from underweight than children living with both parents (Mahgoub, Nnyepi, & Bandeke, 2006:1). Furthermore, according to Tette e*t al.* (2015:2), households with a low financial income, the single or unmarried parent and the types of child care available to them are some of the main social factors of malnutrition.

2.4.4 Maternal care and characteristics

Substance addiction, such as alcohol abuse, is a serious problem involving high costs of living for people, families and society in general including mothers who might suffer from chronic post-natal stress. As a result, it contributes to emotional suffering of these people as well as their family members. Children who are exposed to the excessive use of alcohol within the family are often also exposed to violence, emotional abuse and negligence. These circumstances may lead to parents not feeding their children properly. Therefore, children from families with alcohol problems exhibit lower height, body weight and reach puberty earlier (Tomasz, Szwed, Czapla & Durda, 2015:1- 4).

Parent alcoholism has often been related to the lower socio-economic status (SES) of the family. The association between SES and slower development, lower body weight and health has been demonstrated in many studies (Dube et al., 2001; Hanson et al., 2006 & Dubowitz et al., 2011). Parent alcoholism is also related to a higher risk of malnutrition, a poor nutritional diet and even worse, inadequate health care accessibility. Hence, it can be assumed that children who grow up in households affected by alcohol addiction leading to low SES will be shorter and will have lower

body weight than their peers from families living in households not affected by alcohol or any other substance abuse problems.

SES and alcohol-related problems of parents adversely affects their emotional condition and this contributes to chronic stress of children in the family (Tomasz *et al.,* 2015:4).

2.4.5 Environmental health conditions

Access and the right to basic services such as clean drinking water have been found to be risk factors that contribute to chronic malnutrition in children and directly associated with stunting in children. This may be attributed to the fact that clean drinking water prevents the spread of water-borne diseases that can negatively affect the health and nutrition of young children (Demissie & Worku, 2013:182). According to Martins and Rocha (2014), when preparing any food, the correct hygienic preparation methods and storage at the right temperature of the food prevent food-borne diseases. These methods are regarded as good food service practices in preventing childhood diseases.

2.5 CHARACTERISTICS OF HOUSEHOLDS WITH CHILDREN UNDER FIVE

Musvaire (2009) and (NDoA, 2002) states that poverty, malnutrition and hunger in South Africa date back to apartheid policies. Different communities have various cultural practices and in some communities, men are given priority when food is served. This could lead to children and women not receiving enough or nutritious food. This could be detrimental to both girls and women of reproductive age, as they lose iron during their menstruation period when they require more energy and proteins. Breastfeeding and weaning practices also affect child nutrition.

Approximately 1.4 billion people live in absolute poverty which accounts for about 40% compared to 50 years ago. So nearly one in every four people is affected by food insecurity, inadequate shelter and minimal health care besides basic education. Poverty can, therefore, be a huge contributing factor to obtain and procure food but

poverty also has multi-faceted causes combined with other socioeconomic and political problems which create a bulk of food insecurities around the world.

Childhood malnutrition is known to have important long-term effects on work and intellectual performances in adulthood. In the developing world, it is estimated that almost 30% of infants, children, adolescents, adults and the elderly suffer from one or more of the multiple forms of malnutrition. That accounts for 49% of 10 million deaths among children younger than five years old annually (Bain, Awah, Geraldine, Kindong, Sigal, Bernard & Tanjeko, 2013:3).

According to Demissie and Worku (2013:181), acute malnutrition is significantly associated with family or disposable household income, and it is also associated with the nutritional status of children under five years of age, specifically children with wasting. In addition, a similarly poor family household income has been found to be a risk factor for severe acute malnutrition (Demissie & Worku, 2013).

Investing in and improvement of parental education status, especially of mothers and caregivers, nutrition, sanitation and common disease prevention strategies should radically reduce malnutrition-related mortality and morbidity. In addition, the three most important ways in which ignorance and lack of education contribute to malnutrition are that people have little knowledge of vitamins and nutrients, fail to consume the cheap and available ones, as well as ignorance of disease and its consequences. Access to treatment and prevention of malnutrition may be cost-effective and accessible most of the time.

Poor hygienic conditions may contribute to an increase in intestinal parasites that may have a serious impact in competing for nutrients in the host which causes anaemia and poor appetite (Bain *et al.,* 2013:4). Furthermore, risk factors such as mothers' education, prolonged birth intervals and socioeconomic conditions have not adapted to the association between low birth weight and malnutrition (Rahman, Howlader, Masud, & Rahman, 2016:16).

According to Tette *et al.* (2015:3), the four main key factors that lead to childhood malnutrition are:

- household food insecurity;
- inadequate care;
- an unhealthy household environment; and
- the lack of health care services.

These aspects, in turn, make the child vulnerable to infections and further weight loss that will ultimately lead to severe acute malnutrition.

2.6 COMMON APPROACHES TO COMBAT MALNUTRITION

There were studies that addressed the popular approaches to combat malnutrition in developing countries. Ahmed, Roy, Alam & Hossain. (2012:823) investigated the causes of under-nutrition in under-two-year-old children by using complex and involving multiple factors. These factors focused on maternal nutrition and education during pregnancy, childhood interventions such as immunisation, and the use of hygienic latrines and improvement of the mothers' socioeconomic status to reduce the burden of childhood under-nutrition.

In particular, Lian *et al*. (2007) adopted a classical method to identify the associated factors that contribute to malnutrition among young children. These associated factors included socioeconomic and demographic data, child-caring practices, child characteristics, maternal caring and characteristics, and environmental health conditions.

In a study conducted by Demissie and Worku (2013:181) in Ethiopia, it was evident that the gender of a child had a significant relationship with the three different classifications of malnutrition, namely wasting, stunting and underweight. All three forms of malnutrition were more prevalent in boys than in girls, and this could be attributed to the fact that boys were more vulnerable to health inequalities than girls within the same age categories. More attention was being invested in girls than in boys as well as reduced care for and attention to older and weaned children (Demissie & Worku, 2013:181).

According to Tette *et al.* (2015:2), breastfeeding promotion, the correct complementary feeding, interventions such as deworming, vitamin A supplementation as well the case management of malnutrition are mostly effective in the prevention of malnutrition, while there is not enough evidence indicating the effectiveness of interventions such as growth monitoring. Interventions such as immunisation, health education and nutritional counselling at post-partum and child health services can prevent malnutrition. Repeat episodes of diarrhoea and other infections that can lead to weight loss and compromise a child's nutritional status make the child vulnerable to severe malnutrition unless the cycle is broken (Tette *et al.,* 2015:2).

Literature shows that health education and adult learning are two of the key elements in addressing child malnutrition. Due to lack of health education and adult learning malnutrition is exacerbated by poor nutritional information and knowledge, particularly maternal nutritional education (NDoH, 2003:8). Furthermore, maternal education has a significant connotation with wasting and underweight, as these forms of malnutrition are higher in children whose mothers are illiterate (Demissie & Worku, 2013:181).

Harris and Drimie (2012) have developed an integrated approach for addressing malnutrition in Zambia. The authors have brought together skills and knowledge from across sub-Saharan Africa in order to brainstorm recommendations for improved intersectoral implementation going forward, and how the assessed findings will apply, specifically within the Zambian context (Harris & Drimie, 2012). In addition, the Zambian government remains dedicated to the provision of high-impact services with a special focus on maternal and child health. In the Ndola region in Zambia, the Rainbow Project, working with the Pope John 23rd Association, is the only fully implemented programme with an integrated community-based approach for the management of child malnutrition that combines SAM, MAM and underweight treatment and prevention, operating through the SFPs since 1998 (Moramarco, Amerio, Chipoma, Nielsen-Saines, Palombi & Buonomo, 2018:1).

Pappas, Agha, Rafique, Khan, Badruddin and Peermohamed (2008) employed community-based health care, better known as community-oriented primary health care, to combat malnutrition and poor education among girls in resource-restricted settings. The authors collected data from interventions such as growth monitoring,

attendance records, pre- and post-intervention community-based surveys, focus group discussions and the use of other ethnographic methods (Pappas *et al*., 2008). Early identification and interventions are essential if strengthened by consistent monitoring and evaluation. The child health interventions, which need to be monitored and evaluated, are growth monitoring, nutrition and health promotion, as well as access to health care. The continuous technical support, specific training and refresher courses of the community helpers have resulted in significant improvements in the process and generated helpful outcomes with the consequent development of the performance of the programme (Moramarco *et al*., 2018:17).

Growth monitoring and promotion are part of a strategy that is applied worldwide to identify children early who are faltering in their growth and to share health promotion messages to mothers and caregivers. According to UNICEF (2007:5), Growth Monitoring and Promotion (GMP) is a prevention activity comprised of GM linked with promotion (usually counselling) that increases awareness about child growth; improves caring practices; increases demand for other services, as needed; and serves as the core activity in an integrated child health and nutrition, when appropriate.

In addition, Swart *et al.* (2008) have specified that the gaps in the implementation of growth monitoring and promotion still exist in South Africa. Many of our health care providers still fail to or are unable to:

- accurately take the measurements and weight of children;
- plot correctly in the Road-to-Health booklet;
- identify children who are nutritionally in danger to develop malnutrition; and
- effectively communicate and explain the outcomes of growth trends with caregivers.

The National Department of Health (NDoH) in South Africa has implemented a Road-to-Health booklet with age-specific health promotion messages to help health care workers to effectively assess and monitor the child's health and growth patterns. The aim is that health care workers should communicate these health promotion messages to parents and caregivers every time they visit the clinic to promote child health and care (Du Plessis, Blaauw, Koornhof & Marais, 2017:164).

The Side-by Side campaign focussing on the First Thousand Days (FTD) was launched by the NDoH in 2018 together with the new RTHB as part of the departmental strategies to combat malnutrition and to ensure that all children under five years old receive the nurturing care that they need to develop to the best of their abilities. The campaign covers five pillars, namely:

- Nutrition covers the importance of good nutrition for both mother and child to ensure good health.
- Love addresses brain development by responsive care, play and talk.
- Protection by protecting the child from childhood illnesses and injury is to make sure that the child receives all immunisations against communicable diseases, and the general safety of the child at home.
- Health care is available to children when they are sick.
- Extra care and support must be given to the mothers and caregivers on what to do and where to go to ensure that all children receive the best care to survive and thrive (NDoH, 2018).

All mothers who have given birth since September 2018 have received an information leaflet pertaining to all the relevant afore-mentioned information at discharge in addition to the new Road-to-Health booklet. The same leaflet has been distributed and shared with mothers in the child health areas in primary health care facilities (NDoH, 2018).

2.7 ROLE OF SOUTH AFRICAN HEALTH CARE ORGANISATIONS

In South Africa, the home community-based care (HCBC), also known as community-based services in the Western Cape, is in partnership with the Department of Health, which focus on home based and community based care. The main role and focus of the community health workers (CHWs) are to recruit clients and to do social mobilisation when initiating new programmes and interventions at facilities and in the communities. CHWs are often the custodians of child and maternal health at community level. By continuously training them in growth monitoring and promotion a child who is malnourished in any form can be identified early.

The primary health care programme at nongovernmental organisations (NGOs) or nonprofit organisations (NPOs) has been contracted by the Western Cape Department of Health's community-based services to provide integrated home-based care along with the local health facilities and hospitals (DoH, 2015-2016). The home community-based care programme was previously known as the Community Integrated Management Childhood Illnesses (CIMCI) programme that focused on vertical programmes. In 2003, the home community-based care programme was formally implemented in the Western Cape that focused on holistic care.

The role of community-based services (CBSs) is not to replace the family as the primary caregiver but more to assist the family or caregiver. It is meant to be a complementary and supportive service to the community or family, and is the link between the community and primary health care services. Within the scope of practice of community-based caregivers it is required that their knowledge and skills be current and applicable, and that they are aware of the structure and the protocols within the primary health care system in order to ensure appropriate health services are rendered.

The primary health care facility refers all malnourished children to the NPO partner responsible for HCBS in the area and vice versa. This ensures that care is continued and that the children adhere to the regular follow-up dates at the health facility to monitor their progress (DoH, 2013:22).

Home community-based care (HCBC) promotes good health and the prevention of ill health while providing rehabilitative care and also empowering a community to take care of its health through education and training. The community health workers (CHWs) are employed by nongovernmental organisations and are usually residents of a community. CHWs are often recruited to do social mobilisation when initiating new programmes and interventions. As stated by Shrimpton (1996), community involvement is encouraged to empower members of a community who are most underprivileged. It has been shown to be effective in reducing infant mortality rates on a lesser scale. Additionally, Shrimpton (1996) also concludes that the success of a nutrition programme can be attributed to community participation.

2.8 SUMMARY

The review of literature has revealed the most basic causes of and also various contributing factors to malnutrition. It has been identified that the primary caregivers need to have access to the necessary knowledge and health information to ensure their children receive the optimal nutrition within their economical means. The prevalence of malnutrition differs from region to region and country to country, depending on the contributing or causative factors. The chapter has also highlighted the importance of how these factors are intertwined and interlinked.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter presents the research design and methodology that were used in this study and served as research guidelines during the entire research process. This is the process where researchers collect data to analyse, and to describe and explain the phenomenon under study (Maree, 2016). Research methods are specific research techniques that are used by a researcher to design a particular research, and to assemble and examine data. The aim of the research and the nature of the data, which is to be collected, need to be considered when these methods are employed (Schwandt, 2015:199; Denzin & Lincoln, 2018:809).

The methodology employed in this research is discussed below concerning qualitative and quantitative research, research design, population and sampling, method of data collection, validity, reliability, rigour and trustworthiness.

3.2 RESEARCH DESIGN

A research design is a plan as to how one intends to conduct research (Mouton, 2014:55). The design also includes the process that the researcher follows in executing the study. Furthermore, according to Brink *et al*. (2018:96), a research design is defined as “a set of logical steps taken by the researcher to answer the research question”.

According to Grove *et al.* (2015:243), as research methodologies continuously change, the use of mixed methods offers the researcher the ability to use the strengths of both the qualitative and quantitative research designs which is characterised by elements of both the quantitative and qualitative approaches. A mixed method design is beneficial to capture the best of both quantitative and qualitative approaches. Therefore, researchers who make use of mixed methods look at many approaches to collect and analyse data rather than to subscribe to only either a qualitative or quantitative approach in order to provide an understanding of the research problem.

The fundamental logic of making use of mixed methods is that neither the qualitative nor the quantitative method is sufficient in itself to capture the trends and details of the study topic. When making use of mixed methods data, it produces a more complete analysis. In conclusion, a researcher who makes use of mixed methods tends to base his or her knowledge claims on realistic grounds. It includes strategies of inquiry that involve the collection of data at once or consecutively to best understand the research problem. The data collection also involves gathering both numeric information as well as transcript information so that the final database represents both qualitative and quantitative methods used in the research study (Creswell, 2017:1-19).

In this study, the researcher has used a combination of both qualitative and quantitative research methods. The purpose of using mixed methods is to provide a better understanding of the research problem. Thus, this study uses this method in order firstly, to explore the experiences of the staff regarding malnutrition and to determine the facts that have occurred in the actual setting at a semi-rural area in the Western Cape regarding child malnutrition and secondly, to determine associated factors leading to malnutrition in children from six months to five years old.

Furthermore, contextual, explorative and descriptive research designs have been used to explore and describe the opinions and views of health care professionals and parents in the rural community regarding the factors that contribute to malnutrition among children aged six months to five years living in the semi-rural area of Franschhoek in the Western Cape.

3.2.1 Contextual research design

Contextual design is a well-defined, structured and user-centred process that offers methods to collect data, interpret and consolidate that data in a structured way. This data is used to generate prototype product and service concepts in order to evaluate and improve those concepts with the users. A contextual or specific data collection instrument is provided by a mixed method approach and allows for a better explanation of the research findings. Even though many researchers make use of a mixed method research approach, the weakness inherent in one approach is counterbalanced when mixed methods are used. However, discrepancies that arise from data interpretations may be too unclear to be resolved. Making use of a mixed method approach requires

specific skills and effort in order to study the phenomenon which is being considered (Terrell, 2012:254-280).

3.2.2 Explorative research design

According to De Vos *et al.* (2011:441), the use of an explorative design in mixed methods research allows the researcher to explore the phenomenon first by using a structured questionnaire for collecting qualitative data as a measuring tool for quantitative data. The results of the qualitative data support the researcher to develop or inform the quantitative data. In this study, the researcher explores the contributing factors to malnutrition in children aged six months to five years in a semi-rural area in the Western Cape by asking parents and caregivers to complete a questionnaire regarding the health and socioeconomic status of their children.

3.2.3 Descriptive research design

The use of a descriptive method in research is to report the distribution of a sample or population across a wide range of variables. The aim of using these methods is to produce the scope of characteristics of the distribution of numerical data through frequencies, measures of central tendency and measures of dispersion (De Vos *et al.*, 2011:251). This research study looks into the dietary patterns that contribute to malnutrition in children between the ages of six months and five years (Brink *et al.,* 2018:112). A descriptive research design also probes more intensively by allowing for in-depth description and exploration of dimensions of the phenomenon, including its manifestation and related factors (Brink *et al.*, 2018:96).

3.2.4 Qualitative approach

Qualitative research is a systemic subjective approach and is used to describe life experiences of participants in the real world (Brink *et al.*, 2018:9). Furthermore, Brink *et al.* (2018:10), state that one of the advantages of qualitative research is to understand a given human life experience in total rather than focusing on specific concepts. Furthermore, Brink *et al.* (2018:10, 11), assert that qualitative research has a few preconceived ideas but stress the importance of people's interpretation of events and circumstances rather than the researcher's understanding.

Qualitative research does not attempt to control the context of the research, but rather to capture the context in its entirety (Brink *et al.*, 2018:10-12). Data is collected in writing, the spoken language or in the form of observations that are recorded. The data is then analysed by identifying and categorising themes (Terre Blanche, Durrheim & Painter, and 2016:47). It is a way to ascribe significance to the subjective human experiences of the participants. Within a naturalistic holistic framework, qualitative research allows the researcher to investigate the depth, richness and complexity inherent in the lives of human beings. The insight from this process can promote an understanding of participants' needs and problems, guide emerging theories and build health professionals' knowledge. Although qualitative research is somewhat flexible, qualitative research uses rigorous and systematic processes that require conceptualisation, imaginative reasoning and elegant expression (Burns & Grove, 2017:57).

3.2.5 Quantitative approach

A quantitative research approach is a process in which numerical data is used to obtain information (Brink *et al*., 2015:11) and its focus is to measure aspects of human behaviour (Brink *et al.*, 2018:3). Quantitative researchers collect data in the form of numbers and make use of statistical data analysis. This can include descriptive, experimental, correlation and quasi-experimental research. The resolution for conducting scientific research, according to Brink *et al.* (2018:59), is to offer solid proof regarding the research problem that has been investigated. The advantages of this research design is that it is less expensive, permits anonymity and may result in more honest responses (Brink *et al.*, 2018:58, 59). A disadvantage of this method is that researchers can easily lose sight of the fact that the best theoretical design might be impractical or even impossible in any given situation (Brink *et al.*, 2018:59).

Thus, this study has chosen the mix methods approach in order to gain facts that will occur in the actual setting in a semi-rural area in the Western Cape. It will also determine associated factors leading to malnutrition in children from six months to five years old.

3.3 RESEARCH METHODOLOGY

The research methodology is the plan for conducting the specific steps of a study (Burns & Grove, 2017:707), while a research design is a plan of how one intends to conduct research (Mouton, 2014:55). In addition, a research design must be appropriate, as it depends entirely on the research topic and research question (Holloway & Galvin, 2017:35, 36). The design includes the process that the researcher follows in operating the study. In this study, a mixed methods research paradigm is used.

3.3.1 Research site

There are three common settings for conducting research, namely natural, partially controlled and highly controlled settings (Burns & Grove, 2017:276, 277). The research study has been conducted at a clinic in a semi-rural area in the Cape Winelands District in the Western Cape. Therefore, the researcher can conclude that the research has been conducted in the natural setting where the participants come for normal routine and curative services.

There are two health facilities in the area. The main clinic in the community is operational eight hours per day during the week and the other clinic is operational only on Mondays, Wednesdays and Fridays. This site is situated in town. On the other two (2) days, the satellite clinic sister does the mobile clinic outreach to the surrounding farms in Franschhoek area. However, accessibility is made difficult by the lack of money for public transport.

3.3.2 Study population

A population is “the entire aggregate of cases in which a researcher is interested” (Polit & Beck, 2017:249). It is the entire group of people whom the researcher has engaged within his study and it consists of both male and female participants. In addition, Babbie (2015) indicates that a research population refers to "an aggregation of elements from which the sample is actually selected”.

This study focuses on the areas of socioeconomic and geographic status, child caring practices, childhood developmental characteristics, maternal education and caring practices, environmental health conditions of children of the age group six months to five years who suffer from malnutrition who have attended the said health facility.

Boswell and Cannon (2011:278) define *population* as the total number of units from which data can potentially be collected that meet the specific criteria. The mother, child and baby wellness clinic in the semi-rural area in the Cape Winelands District of the Western Cape has a clientele of 300 per month who make use of the service. Not all the children attending the clinic form part of the study. For the purposes of this study, parents with their children aged between six months and five years old presenting with signs of malnutrition attending the clinic were selected to form part of the study population.

The clinic staff members were clustered into three different groups for the focus group interviews. These staff members consisted of six clinical nurse practitioners, including the facility manager, one registered nurse, three staff nurses and one assistant nurse as well as six community health care workers who work in this clinic. The rest of the community health workers are based in the community and are employed by the Hospice as the local NPO in the area.

3.3.3 Recruitment of participants

According to Grove *et al.* (2015:311), a research report is mandated to describe the recruitment process of participants for the study. All study participants or subjects may be recruited at the beginning of the data collection process or throughout the process of the data collection period. The study design determines how the researcher will select the participants for the study. The recruitment of the number of subjects is initially planned critically, based on data analysis and the interpretation of the findings reliant on an adequate sample size.

Field workers, who are the community health workers (CHWs), do the home visits and household assessments based on the ward-based support system. They work in the community to help with the referrals sent out by the health staff at the health facility to

trace all the eligible children who fit the criterion of malnourishment. All of these children are referred to the clinic where the researcher is based. Community health workers receive comprehensive health training in how to identify malnourished children and how to interpret the Road-to-Health Booklet (RTHB). The rest of the clients who visit the health facility for either sick or well-baby visits are referred to the researcher by the enrolled nurses as well as the clinicians who see the sick children. The nurses work in the wellness clinic, doing immunisation and wellness interventions such as nutritional and anthropometric screenings, Vitamin A supplementation and deworming administration.

The recruitment for the focus group discussions was done for the first group of six participants out of the CHWs by making his selection with the help of the nurse coordinator who supervises the CHWs. The second group of participants was clustered according to the health facility staff allocation. They consist of one professional nurse, three enrolled nurses and one assistant nurse. Unfortunately, due to unforeseen circumstances, one of the participants of the second group had to be excluded because of her nonavailability, as the participant was on leave. Therefore, the final group consists of six members of clinical nurse practitioners, including the operational manager of the facility.

Table 3.1: Health care staff included in the focus group discussion

Participant Group 1	**Category of health staff**	**Background information of staff member**
Participant number 1 female	Community health care worker (CHW) Hospice	Born in the Eastern Cape; 39 years old; married; has two children (a boy and a girl aged 20 and 12 years respectively); passed matric and home-based care course
Participant number 2 female	Community health care worker (CHW) Hospice	Born in the Eastern Cape; did not want to disclose her age; married; has two daughters; completed grade 11 and is trained in home-based care; has worked for the NPO for five years
Participant number 3 female	Community health care worker (CHW) Hospice	Born in Franschhoek; single; has two children aged 18 and 4 years respectively; currently lives with her mother; passed grade 12; studied information technology (IT) for two years; has worked at the NPO for two years
Participant number 4 female	Community health care worker (CHW) Hospice	Born in the Eastern Cape; single; did not disclose her age or level of education; has two children; has worked at the NPO for two years
Participant number 5 female	Community health care worker (CHW) Hospice	Born in Franschhoek; 49 years old; married; has three children; has worked as a community health worker for 22 years
Participant number 6 female	Community health care worker (CHW) Hospice	Born in Franschhoek; widow; has one daughter and four grandchildren; did not disclose her level of schooling; has completed her training in home-based care
Group 2	**Category of health staff**	**Background information of staff member**
Participant number 1 female	Trained assistant nurse (ENA)	Born in Stellenbosch; 55 years old; divorced; has two sons; has worked for the Department of Health for more than 30 years
Participant number 2 female	Registered nurse (RN)	Born in Worcester; 26 years old; has two children of whom the youngest is two years old; has worked for the DoH for three years
Participant number 3 female	Enrolled nurse (EN)	From Kraaifontein; 53 years old; married; has two sons; has worked in the child health wellness clinic; has more than 30 years' service in the DoH
Participant number 4 female	Enrolled nurse (EN)	From Franschhoek; 49 years old; has two children; divorced; in service for more than 20 years; is

		responsible for child health services and TB clinic for adults and children
Participant number 5 male	Enrolled nurse (EN)	From Kuilsriver; 54 years old; married; did not disclose whether he has any children; has worked for the DoH for more than 30 years; on sick leave and could not participate
Group 3	**Category of health staff**	**Background information of staff member**
Participant number 1 female	Clinical nurse practitioner	From Paarl; 53 years old; divorced; has three children, all older than 20 years of age; has worked for the DoH for over 30 years; is responsible for child and adult curative care
Participant number 2 female	Clinical nurse practitioner	From Paarl; 39 years old; has four children; did not disclose the gender or age of children; has worked at the clinic for the past two years; is responsible for child and adult curative care
Participant number 3 female	Clinical nurse practitioner	From Stellenbosch; 51 years old; married; has three 3 sons; has worked for the DoH for over 33 years; is responsible for child and adult curative care
Participant number 4 female	Clinical nurse practitioner	From Stellenbosch; 62 years old; married; has two children (a son and a daughter aged 40 and 30 years respectively; has an 8-month-old grandchild; facility manager
Participant number 5 female	Clinical nurse practitioner	From Paarl; 31 years old; married; has a 3-year-old son; is responsible for the child and adult curative and outreach health services to the surrounding farms; has more than 10 years of service in the DoH
Participant number 6 female	Clinical nurse practitioner	From Worcester; 34 years old; married; has two children aged nine and three years; is responsible for child and adult curative care; has worked for the DoH for more than 10 years

3.3.4 Sampling procedure

According to Keele (2011:24) and Brink *et al.* (2018:119), there are two key forms of sampling procedures, namely probability and non-probability sampling. The main

difference between the dual sampling methods is that probability sampling is done through random sampling techniques and non-probability sampling is not. Non-probability sampling is non-random sampling of the complete sample of the participants of the overall population.

Participants for this study have been selected, based on convenience sampling or word-of-mouth sampling. Convenience sampling is one of the most common forms of non-probability sampling. It is easy to obtain a convenience sample because it allows the use of any available group of research participants. All children between the age group of six months and five years who attended the clinic during the period of the survey formed part of the study. A criteria was use in the selection of the study participant and will be discussed later in this study. Only children who were diagnosed with any signs and symptoms of malnutrition were included in the study. The nurse working in the baby room identified all eligible children, and children with no signs and symptoms of malnutrition were excluded from the study.

3.3.5 Sampling technique

Purposive sampling is the conscious selection of certain subjects, elements, events or incidents to include in a study (Brink *et al.*, 2018:124, 125). A purposive convenience sampling method was used in this study. There were 150 parents or caregivers of children presenting with signs and symptoms of malnutrition between the ages of six months and five years attending the clinic over the period of data collection. These participants accounted for 50% of the target population that was selected to participate in this study. The minimum sample size consisted of 100 participants to enable quantitative analysis to take place.

Three focus groups were employed to interview the clinic staff. Each group consisted of between five and six staff members, based on the clinic staff ratio. The first group was the community health workers. The participants were selected by their clinical supervisor, based on their knowledge of and experience in child health care. The second group consisted of the nursing assistant and the enrolled nurses while the last group included all the registered nurses working at the clinic. The researcher planned

to start with three groups and interviewed all the staff members until no new information was forthcoming or until data saturation had occurred.

3.3.5.1 Data saturation

According to Burns and Grove (2015:512), data saturation is when no new information emerges from the discussion in the focus groups. According to Holloway and Galvin (2017:152), data saturation occurs when a ceiling is reached in terms of the data collection. This means that no more new information or themes are distinguished from the sampling. It also refers to the quantity and quality of information in a research study or topic (Holloway & Galvin, 2017:152).

Saturation of data occurs when additional sampling provides no additional information, but only redundancy of previous collected data (Brink *et al.*, 2018:126, 127). Data saturation is reached when sufficient information is gathered to duplicate the study, when the ability to obtain additional information has been attained and/or when further coding is not feasible any longer. How and when the levels of data saturation are reached varies from one study design to another. The hint of data saturation in studies is helpful. However, it does not provide any pragmatic guidelines for when data saturation has been reached (Fusch & Ness, 2015:1).

3.3.5.2 Role of the moderator

According to Burns and Grove (2015:515), the role of the moderator is to inspire the participants to form a dialogue about the topic and to ensure that participants are at ease and comfortable throughout the interview. Part of the moderator's obligations is ensuring a relaxed atmosphere for the interview to take place. In addition, Polit and Beck (2017:511) state that the role of the moderator is to lead the discussion in a direction according to a written set of questions or topics to be covered as in a semi-structured interview (Polit & Beck, 2017:511). The moderator should remain neutral and not be judgmental. If the topic is sensitive, the moderator should be able to put participants at ease (Polit & Beck, 2017:511). In this study, the researcher has made use of an external moderator, who is an experienced lecturer and facilitator, to monitor the process.

3.3.6 Inclusion and exclusion criteria

3.3.6.1 Inclusion criteria

- All parents and caregivers who visited the clinic with children between the ages of six months to five years who had a history or where there was an indication of malnutrition were approached to participate. This meant that the child had either had a history where one or more of the growth indicators displayed suspicious abnormalities or where deviations were present on the normal growth patterns and curves.
- All parents and caregivers accompanying children with a mid-upper arm circumference of less than 13.5 cm, which indicated that there was an indication of malnourishment, were approached to participate.

3.3.6.2 Exclusion criteria

- Any caregiver or parent who did not provide full-time care to the child was not approached to participate. The reason why the researcher did not consider the aforementioned was that they did not have the necessary insight with regard to the history and circumstances surrounding the upbringing of the child.
- Parents and caregivers with children younger than six months and older than five years were excluded from the study.

3.4 METHOD OF DATA COLLECTION

According to Burns and Grove (2015:20), data collection is the precise and systemic gathering of information relevant to the research purpose or the specific research objective, question or hypothesis of the study. In qualitative research, the life experiences of participants are explored. Therefore, the researcher has conducted focus group interviews with the clinic staff members in order to explore their life experiences with their clients.

Only parents and caregivers with children identified or diagnosed with malnutrition, together with the health care providers, were included in the study. The information

letter was given to all relevant parents and caregivers prior to asking them to complete the questionnaire (Refer Appendix C - Information Letter). The research process and the information needed for this study were explained to them. Consent was obtained from all respondents first by means of the consent forms which were available in three languages, namely Afrikaans, English and isiXhosa.

3.4.1 Focus group discussions (FDGs)

Focus group interviews, according to Creswell and Poth (2018:163), are considered social interactions, based on conversations within a group discussion. The advantages of these focus groups are useful in obtaining respondents' articulated opinions, views, interests, attitudes, beliefs and experiences on a given situation (Brink *et al*., 2018:143, 144). Focus group discussions (FGDs) are means of gathering qualitative data from participants and the recruited focus group generally consists of a group of five to ten people.

The session is a specific style of a group interview where a researcher or a facilitator asks specific questions to yield different views about a particular matter. During the focus group discussions, participants have discussions among themselves and with the interviewer about the particular issue at hand. As the interview progresses, the conversations become more free-flowing because participants express their experiences and their feelings.

In commercial market research, as well as social science research, focus group discussions are used as a major tool to collect data. Adherence to all standard ethical procedures was maintained throughout the current research process (Silverman, 2016:85). In this specific research study, the researcher conducted three focus group discussions in English. The number of research participants in each focus group discussion was between five and six participants. They were approximately sixty to seventy minutes each, recorded with a digital recorder and transcribed afterwards. Interaction was well-managed between the researcher and the participants. The researcher did not offer any participant remuneration at any stage of the research study. This was clearly stated on the consent form and explained to all the participants.

Clinic staff was divided into three groups for the focus group interviews. A private room was secured and an Olympus voice recorder was used during the interview. The interview schedule (refer to Appendix B), which was used in the study, was developed by the researcher, based on the objectives and literature review. It was evaluated by both the researcher's supervisors for recommendations.

The interview schedule contained the following eight key aspects:

- Understanding of clinic staff members on malnutrition.
- How often the staff members do health promotion regarding malnutrition.
- The measurements of combating malnutrition in the facility.
- The way of addressing child malnutrition.
- Ways of improving service of community care.
- Training on breastfeeding.
- Identifying the major conditions when the mother/guardian opt to exclusively bottle feed.
- Options of offerings to the mother/guardian.

All participants gave written consent prior to the interviews for being recorded and for participating in the interviews. The researcher made use of an external moderator to oversee the process of the focus group discussions. Even though qualitative research is slightly flexible, qualitative research uses rigorous and systematic processes that entail conceptualisation, imaginative reasoning and elegant expression (Burns *et al*., 2015:57).

3.4.2 Advantages of focus group discussions

Focus group discussions are gatherings where individuals are sharing their experiences, beliefs and cultural values. Focus group discussions can be used even if the researcher has minimum resources. One of the most important advantages of focus groups is that they are well-organised (Polit & Beck, 2017:511). FGDs do not depend on the thoughts of the researcher or of the individual. In addition, everyone is entitled to his or her opinion (Holloway & Galvin, 2017:125-127).

Numerous authors from the same publication (Nyumba, Wilson, Derrick & Mukherjee, 2018), have confirmed that a focus group is a popular data collection method in social, health and assessment research. Furthermore, according to Schwandt (2015:122), Steward and Shandasani (2015:3-6), focus groups have been used for nearly a hundred years for influential communication studies. In as many behavioural science disciplines, the researchers have depended on focus groups to gather key data. FGDs can be used as a method on its own to collect data or they can be mixed with other methods (Schwandt, 2015:122; Steward & Shandasani, 2015:3-6).

According to Polit and Beck (2017:511), focus group discussions are carefully planned discussions that take advantage of group dynamics for assessing rich information in an economical manner. A major advantage of focus group discussions is that people feel more at ease expressing their views when they share a similar background with other group members. Another advantage of a group format is that it is efficient and reaches the viewpoint of many people in a short time. It is usually also stimulating to the participants (Polit & Beck, 2017:511).

In this research, the researcher used the focus group discussions as his primary data collection method. The researcher was thus able to acquire an understanding of the topic which made the participants feel comfortable enough to tell their stories. The questions and answers were established through verbal interaction.

3.4.3 Disadvantages of focus groups

One disadvantage of focus groups is that some participants may become quiet and uncomfortable to express their opinions in front of others (Polit & Beck, 2017:511). Another disadvantage of focus groups is that the researcher may be bias and ask leading questions to the participants in the form of probing (Jooste, 2018:344). A third disadvantage is that the dynamics of the session may foster group culture together with “group thinking” that may influence persons with a different culture within the group. This could have a negative effect on individuals who might not be comfortable to express themselves (Polit & Beck, 2017:511).

3.4.4 Probing questions and interview schedule

Probing questions are asked by the researcher to obtain more evidence from the participants about a particular interview question (Grove *et al*., 2015:83). Interview questions can range from semi-structured to unstructured questions. With reference to unstructured or open-ended interviews, the researcher's initial statement or question will be something like, "Tell me more about your childs feeding practices or a question like "After your child was classified or diagnosed as malnourished , how did you obtain more information about the disease that your child have been diagnosed with?" Although the researcher defines the focus of the discussion, it may result in no fixed sequence of the questions asked to the participants during the interview.

During interviews, the questions tend to change as the researcher gains insight from previous observations. Respondents are allowed and encouraged by the researcher to raise important issues that may not have been addressed by the researcher. The researcher's aim is to gain authentic insight into the participants' experiences (Grove *et al.*, 2015:83).

Interviews were held with the health care staff who were categorised into Group 1 (FGG 1). They were all the community health workers. Group 2 (FGG 2) were the one professional nurse, three enrolled nurses and one assistant nurse, while Group 3 (FGG 3) consisted of the clinical nurse practitioners. Each of the three groups consisted of five to six members each, depending on the clinic staff ratio.

Complete privacy was ensured throughout this process (Brink *et al.*, 2018:145). The interviews were conducted in a private office at the clinic and audio-taped with the consent of the participants for forty-five to sixty minutes. As backup, the researcher brought along another recorder and additional batteries to cater for any technical challenges that might arise. Additional field notes were made by the researcher to supplement the recordings.

Three separate interviews were scheduled with the different categories of staff due to their availability and keeping in mind the operational needs of the clinic. Focus group interviews were held with the health facility staff in order not to hinder allocated

operational time. Unfortunately the researcher had to reschedule the interviews with some of the clinic staff due to various challenges, ranging from operational needs as the clinic was busy or staff being on sick leave or on planned annual leave. The interview schedule was then used to collect data for this study (refer to Appendix B).

The participants were asked the following questions during the interviews:

1. In your understanding, how would you define malnutrition?
2. How often does the staff do health promotion/talks regarding malnutrition in this facility?
3. What measures do you have in place to combat malnutrition in your facility, and what would be the way forward to address child malnutrition?
4. In the light of combatting malnutrition, in your opinion as a health care provider, how can the service of the community care worker be improved?
5. When last did you attend any breastfeeding course?
6. What are the major conditions that you, as a clinic staff member, have to focus on when the mother/guardian opts to exclusively bottle feed? What advice would you offer the mother/guardian?

3.5 QUESTIONNAIRE

According to Keele (2011:28), data collection for quantitative studies is numerical in order to measure the study variables. The instruments used to collect data during quantitative research studies vary from questionnaires to rating scales, performance checklists or very refined physiologic measures such as observations, vital signs, blood tests, weight, etc.

The advantages of questionnaires are that it is simple and relatively inexpensive. It also provides information from large numbers of subjects (De Vos *et al.*, 2011:186). Disadvantages of a questionnaire is that all wording must be clear and simple for all participants to understand, based on their educational level or status. In addition, questionnaires are economical but might not be appropriate to surveying certain population groups such as children and the elderly (Polit and Beck 2017:243).

For this study, the researcher made use of a structured questionnaire to collect a broad spectrum of personal quantitative data from the participants (refer to Appendix A). It was developed and validated, based on associated factors that might contribute to malnutrition in young children (Lian *et al*., 2007). These factors were grouped and the value of Cronbach's alpha coefficient was determined. The coefficient values are greater than 0.7 indicate high internal consistency reliability for the measure. These associated factors include:

- socioeconomic and demographic data;
- child care practices;
- child characteristics;
- maternal caring and characteristics; and
- environmental health conditions.

The parents/caregivers who had accompanied the children to the clinic completed the questionnaires.

3.5.1 Process of questionnaire development

According to Polit and Beck (2017:276), it can be challenging to assemble a high-quality structured, self-report instrument. The researcher needs to consider that related constructs should be clustered into modules or areas of questioning. In order to design a useful instrument, the researcher must carefully analyse the research requirements and attend to minute details.

The questionnaire that was used in the study was developed by the researcher, based on the research objectives and literature review. It was evaluated by both his supervisors for their recommendations.

3.5.2 Official patient records

The HPCSA (2008:1-6) defines *a medical record* as "any relevant record made by a health care practitioner at the time of, or subsequent to, a consultation and/or examination or the application of health management". Medical records cover a range

of documents that are generated as a result of patient care. Furthermore, De Vos et al., (2011:379) state that official and non-official documents are compiled and maintained continuously by government institutions. Access to official records can be problematic due to legislation on the confidentiality of the information they contain, and the researcher should always be mindful of these facts.

The researcher made use of unique patient identifiers such as the Road-to-Health Booklet of the children, and in some cases, patient records as secondary data for the purpose of this study. The researcher use the patients file to confirm the patients' identity and diagnosis and also to check the information in the file to see whether it correlate with the information on the child RTHB. Permission was granted by the facility manager to use the patient records. According to Brink *et al.* (2018:146, 147), records aid or assist as cost-effective sources of information. Additionally, records permit an examination of trends over time and they eradicate the need for the researcher to seek cooperation from the study participants (Brink et al., 2018:146, 147). The use of records may be open to numerous sources of error or inaccuracies (Brink et al., 2018:146, 147) or they may contain institutional prejudices. Facts may be distorted or some of the facts may even be omitted. Record-keeping may be inconsistent, the collection of data may have been stopped for political reasons and some data may not be freely available due to their confidentiality nature.

3.5.3 Process of data collection

The data collections were collected during a period of five months (started at the end of September 2016 till mid-February 2017). The researcher was the person who collected the data with the permission of the facility manager and assistance of the nurse who work in the wellness clinic or baby room whilst the mediator oversees the process. The health staff working at the clinic helped to identify the malnourished children.

The questionnaire was issued to the study participants who gave voluntary consent to take part in the study. The researcher explained the purpose and aim of the study to the participants before the consent forms were signed. An information letter that gave a detailed account of the study was given to all participants prior to data collection

(refer to Appendix C). With the consent form that the participants had completed, privacy and confidentiality were ensured. The study participants were allowed to complete the questionnaire in an enclosed office space. The participants were allowed as much time as they required to complete the questionnaire on the same day. Some participants took 60 to 70 minutes to complete the questionnaire.

3.5.4 Data analysis

Qualitative data was analysed by using thematic content analysis. Qualitative content analysis and thematic analysis are classified under the qualitative descriptive design (Vaismoradi, Jones, Turunen & Snelgrove, 2016:100). These are sets of techniques used to analyse textual data and elucidate themes (Forman & Damschroder, 2008). In this study, voice recordings were transcribed which the researcher had coded, and themes were developed. Additional notes were made by the researcher to supplement the recordings in case of any technical challenges such as electronic malfunctioning of the device. The researcher had also made use of an external moderator to validate the process and member-checking was done with participants.

The steps below were followed by the researcher to aid in the coding and thematic analysis.

3.5.4.1 Step 1: Listening to the voice recordings

After obtaining informed consent from all the participants, the interviews were audio-taped. The researcher listened and re-listened to the voice recordings to ensure that the interviews were interpreted accurately during the process of analysing each interview.

3.5.4.2 Step 2: Transcribing the audio-recordings

In this phase of the process, the researcher had already listened to the voice recordings of the interviews. Next, he transcribed the recordings and then read through them to form an idea of the structure of the interviews. The researcher also needed to verify that the transcripts corresponded with the voice recordings. The researcher attempted to fill the participants' shoes, linking his own opinions to relive the

experience in order to understand the meaning that the participants had expressed precisely as they had intended. The researcher then entered the transcripts into the electronic system, using thematic content analysis. This step was completed by perusal of and re-reading the interview transcripts.

3.5.4.3 Step 3: Colour coding

The researcher read the data again and marked those places in the description where there were similar descriptions and important comments and reflections observed that were relevant to the overall themes identified. Colour coding was used for each identified similar description by using the same colour for each interview.

3.5.4.4 Step 4: Categorising the codes

After the themes had been identified and colour coded, they were categorised into structure for each interview in order to formulate themes. Each of the transcripts was proofread multiple times and related with the others. The themes were compiled into a final list of themes for the individual interviews.

3.5.4.5 Step 5: Final themes and key matters

All the relevant extracts from each transcript were placed under the appropriate heading on the list of themes to form the key matters. The final list of themes with related extracts formed the basis of the final results. The themes were described and illustrated with extracts from the participants' explanations. Lastly, to report the results accurately, all quotes were written up in the report.

Quantitative data was analysed by implementing the Statistical Package for Social Sciences (SPSS) Version 24. Tables, figures and descriptive results were generated in this manner. The associated factors (socioeconomic and demographic data, child care practices, child characteristics, maternal caring and characteristics, and environmental health conditions) were coded as variables and entered into the SPSS program for data analysis. The relationship of these variables was then analysed. The intention of this process was to scientifically determine the most significant factors that had contributed to malnutrition among children from the community. Next, an ANOVA analysis was conducted to obtain the probability and consistency of these variables.

In addition, Cronbach's alpha was used to determine the reliability of the associated factors. The remaining four post-test questions…were fairly reliable, α = 0.70" (Shemwell, Chase & Schwartz, 2015: 68).

3.5.5 Data management

The completed questionnaires were collected by the researcher as soon as they had been completed by the participants on the same day, and they were stored in a secured locked safe to which only the researcher had access. All interview recordings were saved on a password-protected access file on the researcher's personal computer. The transcripts of the interviews were done by the researcher himself and stored with all the questionnaires in a secured locked safe. The researcher was the only person who had access to the raw data. All patient information and the recordings and transcripts of the interviews are in safe keeping at the University for five years and. What happen to all the transcripts and recording afterwards.

Permission to use the participants' Road-to-Health Booklets (RTHBs) was granted by the clinic/facility manager at the Winelands District Health Services Offices (refer to Appendix J). To ensure anonymity and confidentiality, the researcher did not add any names to the questionnaires and no reference was made to the participants' names.

3.6 VALIDITY AND RELIABILITY OF MEASURING INSTRUMENT

3.6.1 Validity

The validity of an instrument is the degree to which the instrument measures what it is supposed to measure (Polit & Beck, 2017:747). It also refers to the accuracy and truthfulness of the findings (Brink *et al*., 2018:154). The associated factors of this study have been validated through previous studies by Lian *et al*. (2007).

3.6.2 Reliability

The philosophical underpinnings of a mixed methodology for this project are to confirm the reliability of the study. *Reliability* is defined by Polit and Beck (2017:742) as the extent to which the measurement is broad and clear from any errors so that repeated

measurements may remain the same statistically. All the variances in a set are attributable to true differences among those variants that have been measured.

In this study, it included two groups of participants, namely parents/caregivers of the children (quantitative approach) and clinic staff members (qualitative approach). The quantitative approach was able to determine the malnutrition status of the children and the impact of the knowledge of the parent/caregiver on the level of malnutrition in the children. On the other hand, the qualitative approach was able to find out how health care facilities combatted malnutrition and the ways in which they promoted the knowledge to the community.

The results of this mixed methods approach confirmed the reliability of the study. In addition, the application of Cronbach's alpha was used to determine the reliability of the dataset. This ensured the stability or consistency of the quantitative dataset. The application of this approach ensured that all variables and values were measured under the same conditions.

3.6.3 Rigour in qualitative research

According to Burns and Grove (2015:69), rigour is associated with openness, relevance (including clarity of the research question and its significance to this research study), epistemological and methodological congruence, scrupulous adherence to a philosophical perspective (methodological rigour), thoroughness in collecting data, consideration of all the data in the analysis process, and finally, the researcher's self-understanding. The fact that scientific rigour is valued lets the findings of rigorous studies be regarded as more credible and of greater worth. Rigour is assessed in relation to the details built into the design of the study method, carefulness of data collection and the thoroughness of the analysis (Burns & Grove, 2015:69).

3.6.4 Trustworthiness of the data

According to Brink *et al*., (2018:157, 158), methodological studies focus on the development, testing and evaluation of research instruments and methods used in research investigations. The goal is to improve the trustworthiness (reliability) of data

collection tools. Furthermore, Polit and Beck (2017:572) state that trustworthiness consists of the components discussed below.

3.6.4.1 Credibility

Credibility gives meaning to the study in terms of the trustworthiness of data through attributes of prolonged engagement, persistent observation, triangulation, referential adequacy, peer briefings and member checks (Shenton, 2004:1). According to Polit and Beck (2017:572), credibility refers to the confidence in the facts of the study findings.

In this study, the researcher made use of an external moderator to be present during the interviews and this allowed the external moderator to verify the correctness of the transcriptions. Member-checking also ensured that the participants were allowed to check the transcriptions to ensure that these correctly documented what they had said. This enhanced the credibility of the data dramatically.

3.6.4.2 Transferability

Transferability is the generalisation of the study findings to other situations and contexts. Polit and Beck (2017:164) postulate that transferability can be described as the extent to which qualitative findings can be transferred to other settings as an aspect of the trustworthiness of any study. In addition to Lincoln and Guba (1985), as cited by Bazeley (2013:410), transferability is the substituting of generalisation. They directed this term precisely to be able to transfer knowledge from incident to incident.

In this study, health education to participants ensured that parents and caregivers would be educated regarding the topic of malnutrition. Staff would also become knowledgeable about how to deal with this issue. This meant that knowledge would be transferred to all participants. The context within which qualitative data collection had occurred, defined the data and contributed to the interpretation of the data (Shenton, 2004:1).

The purpose of this study was not to generalise the findings but only to describe the experiences of the participants. However, the fact that the researcher utilised a

purposive, convenience sampling method with inclusion and exclusion criteria ensured that the findings might be transferred to another population with the same characteristics.

3.6.4.3 Dependability

Dependability refers to the criteria to establish the trustworthiness of the study, and it requires an audit. The enquiry auditor – generally a peer- follows a process and procedures used by the researcher in the study and determines whether they are acceptable, that is dependable (Brink et al., 2018:111; Shenton, 2004). The research is based on qualitative research paradigm and the relevant qualitative methods were utilized to ensure the rigor of the study methods. A data audit was also be used. The researcher then asked the supervisors to audit the analysed data to ensure the validity of the findings.

3.6.4.4 Confirmability

Confirmability refers to the objectivity of the interview schedule used in the study (Shenton, 2004). Confirmability guarantees that the findings, conclusions and recommendations are supported by the data, and that there is internal agreement between the investigator's interpretation and the actual evidence (Brink et al., 2018:111). The researcher used a structured interview schedule to guide and structure each and every interview. These structured interviews were used to ensure that all the interviews conducted followed the same format; it thus ensured that the study adhered to confirmability.

3.7 ETHICAL CONSIDERATIONS

Ethics is crucial in every research study. Before any researcher can commence with any research project, it should be approved by the respective departments. According to Polit and Beck (2017:727), ethics is referred to as a structure with honest values concerned with the grade to which research procedures adhere to legal, professional and social responsibilities towards the study participants.

The Head of the District Health Services of the Cape Winelands District and the Provincial Health Department were approached for support and permission to conduct the study (refer to Appendices G and H). Permission was obtained from the clinic management to conduct the study at the site as well. Ethical approval was sought from the Faculty of Health and Wellness Sciences Ethics Committee at the Cape Peninsula University of Technology. Informed consent was obtained from the prospective participants of this study (refer to Appendix D).

The ethical principles indicated below were upheld throughout this study.

3.7.1 Anonymity

Anonymity is the most secure means of protecting the confidentiality of a research participant. This is done when a researcher cannot link participants to their data. Participants have the right to expect that the data they have provided be kept in strict confidence and that the participants' privacy is protected throughout the various confidentiality procedures (Polit & Beck, 2017:147).

In terms of the protection of their identities, participants were informed by the researcher not to write anything such as their names, surnames, identity number, etc. on the questionnaire that could link them to the questionnaire. The researcher ensured all participants that they would remain anonymous. None of the questionnaires was tagged or numbered. The completed questionnaires were strictly kept in a safe and secured place.

3.7.2 Confidentiality

According to Grove *et al.* (2015:107), confidentiality refers to the researcher's safekeeping or management of data or information that has been shared with the researcher to keep the information private from others. Because the researchers know the identity of their participants, they have to reassure the participants that their identities will be kept anonymous and that the researchers will not share any information without their authorisation. Numbers and codes are also used to ensure confidentiality and not the actual names of participants. Every participant has the right

to confidentiality, fair treatment and no victimisation as well as the right to protection from discomfort and harm.

3.7.3 Non-maleficence and beneficence

By adopting sound ethical principles and scientific methods the researcher protects the participants from physical and psychological harm and exploitation (Polit & Beck, 2017:139). In this study, sensitivity was acknowledged throughout the study by the researcher. The local social worker provided her assistance to support any participant in case he or she should experience any emotional distress (refer to Appendix F). All the participants were informed that their participation was voluntary and there were no risks involved. They could also withdraw from the research process at any stage (refer to Appendices A and B).

3.7.4 Informed consent

According to Polit and Beck (2017:143), informed consent forces the researcher to provide participants with adequate information regarding the research process. Furthermore, all participants should have the power to freely participate in the study; therefore, the researcher should enable the participants to consent to participate voluntarily in the research or to decline their participation (Polit & Beck, 2017:143).

Therefore, the nature of this study, including the purpose and intended data collection methods, was explained to all the participants before the study commenced. The participants had the right to freely choose whether they should give consent for the study, or to decline participating in the study as well as to withdraw from the study unconditionally at any stage. Informed written consent was obtained from each participant after they had received an explanation of the purpose of the study methodology.

3.7.5 Justice

The principle of justice includes the respondent's right to fair selection and privacy. In this study, the selection of the sample was conducted according to eligible criteria

(Polit & Beck 2017:141). The information gathered was remain private and will be ensured through anonymity and confidentiality.

3.8 Constraints and Limitations during Data Collection

All research studies are inconsistent, which means they have inherent strengths and limitations. Collective limitations make it more difficult to obtain a sample size that is sufficient enough and representative of the target population. Conducting a true randomised controlled trial is expensive and time consuming. In addition, sourcing adequate numbers of participants in order to select a sample may be problematic, depending on the requirements of the research study (Keele, 2011:31).

Since the study population was limited to a small semi-rural area in Franschhoek in the Cape Winelands district in the Western Cape, it only included children aged six months to five years affected by malnutrition and who needed the clinic's services. Therefore, the sample population was small and homogenous.

3.9 SUMMARY

This chapter presented an in-depth account of the methodology used in the study. The methodology consisted of both quantitative and qualitative methods, as well as a descriptive survey design. A purposive convenience sample was used in this study. Data was collected through a number of interviews and self-administered questionnaires. The sample size in this study was 100 participants who had completed the questionnaires. Three focus group discussions were held with the clinic staff and the community health workers after informed written consent were obtained from each participant. Data analysis was conducted by using thematic content analysis for qualitative data and SPSS for analysing the quantitative data. The results are presented and discussed in Chapter 4.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents and interprets the results of the analysed data obtained from the sampled eligible participants. The study has utilised a mixed methods approach as well as purposive convenience sampling. The results of the study are based on the responses obtained from the 100 respondents who have completed the questionnaire and the clinic staff who have been interviewed.

The study findings are presented to answer the following three study research questions:

- What are the associated factors to malnutrition among children from six months to five year old in the Western Cape?
- What are the characteristics of households with children from six months to five year old in the Western Cape?
- How do health organisations prevent malnutrition in the identified semi-rural area of the Western Cape?

The first two research questions were answered using quantitative data and the third research question was answered using qualitative data.

4.2 Quantitative Results

Quantitative data was imported from Microsoft Excel and analysed, using SPSS Version 24. Socio-demographic and socio-economic characteristics, health-related characteristics, complementary feeding indicators and the nutritional status of children six months to five years old were first analysed by using descriptive statistics. After this, a bivariate analysis was done, using Chi square (X^2) to examine the associations between independent and dependent categorical variables. Then a multivariate logistic regression, employing a forward step-wise method, was done to model a relationship between predictor variables and nutritional status indicators of the

children. After controlling for confounders, statistical significance was determined at $p < 0.05$. Following traditional usage, a p value of less than .05 was binned as significant, whereas p values ranging from .10 to .05 were binned as marginally significant; any p values larger than .10 were binned as non-significant (Valentine, Buchanan, Scofield & Beauchamp, 2019:131).

4.2.1 Demographic factors

4.2.1.1 Gender

Figure 4.1 shows the gender of the children. Of the 100 children included in the study, 54% were male and 46% were female.

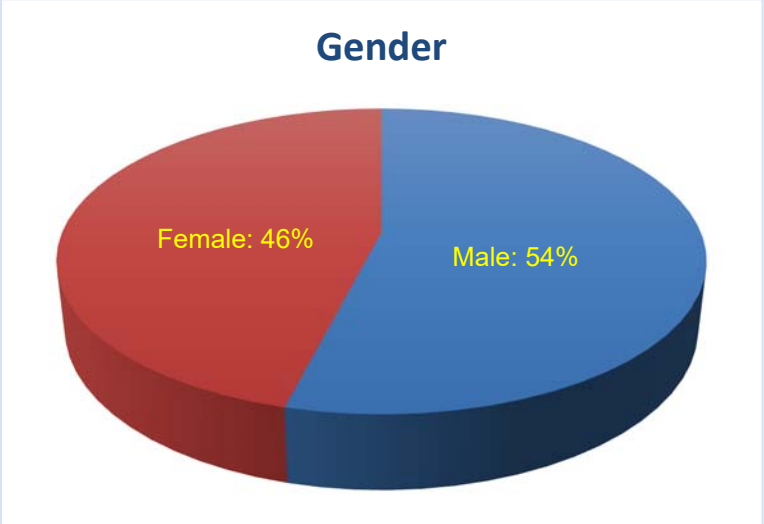

Figure 4.1: Gender of the children

4.2.1.2 Age

Table 4.1 below shows the age frequency distribution of the children included in the study. One hundred (100) children aged six months to five years were sampled. Of these 100 study participants, 28% were between six and 12 months old, followed by 32% between the ages of 13 and 25 months, with 28% between the ages of 26 and 48 months and finally, 12% were more than 49 months old. The mean age of all the children in the study was 3.54 [3.435723 – 3.650697] at a 95% confidence interval.

Table 4.1: Age frequency distribution for the children

Age Category	Frequency	Percentage
6 – 12months	28	28%
13 – 25months	32	32%
26 – 48 months	28	28%
Over 49 months	12	12%
Mean age	Standard Error	95% Confidence Interval
3.54321	0546359	[3.435723 - 3.650697]

4.2.1.3 Birth weight of the child

From the study results showed in Figure 4.2, it is clear that 23% of the 100 participants included in the study had a birth weight of less than 2 500 g and 77% children had a birth weight of more than 2 500 g. The low birth weights included premature births. This information was copied from the patient records.

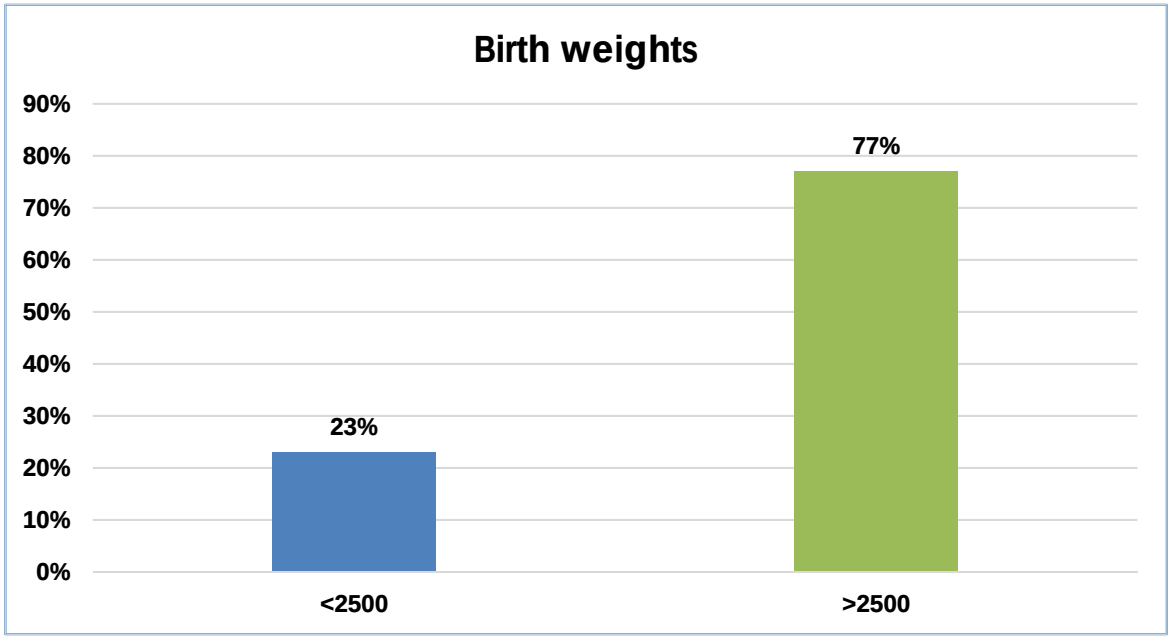

Figure 4.2: Birth weight of the participants

4.2.1.4 Number of family members

The number of family members in a household is showed in Figure 4.3. Out of the 100 participants, three households had two members staying together (3%), 18 households had three family members (18%), 55 households had 4-6 members in the household (55%) and lastly, 24 households had more than six members staying in the same house (24%).

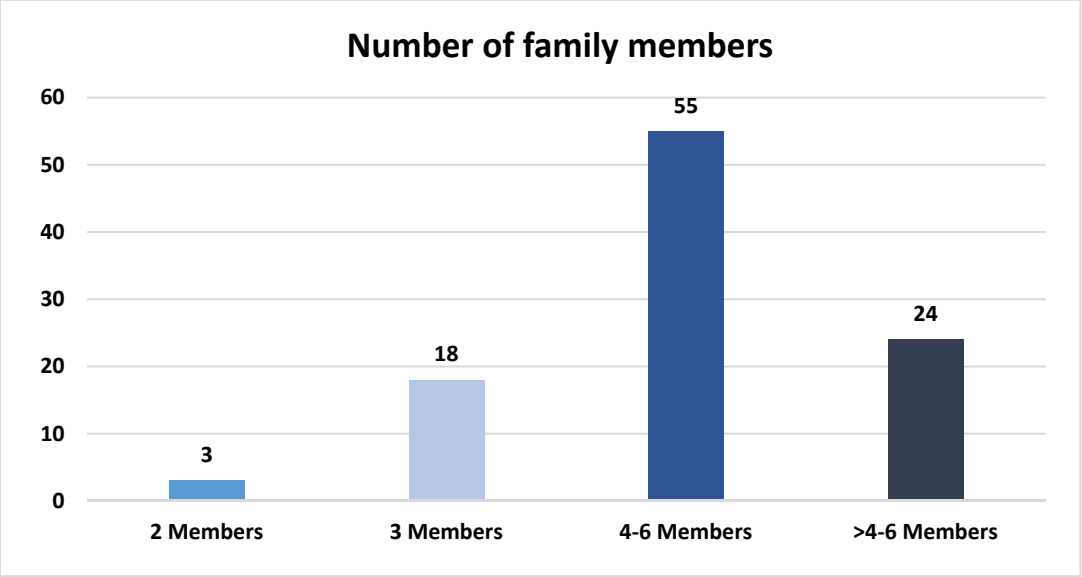

Figure 4.3: The number of family members in a household

4.2.1.5 Marital status of the mother, parents or care givers

Figure 4.4 shows the marital status of the mothers, fathers and care givers. It indicates that out of the 100 respondents who took part in the study, most mothers were single parents. Exactly 65% of them were single mothers, 28% were married, 6% were divorced and only 1% were widowed. There was no significant association between parent marital status and malnutrition.

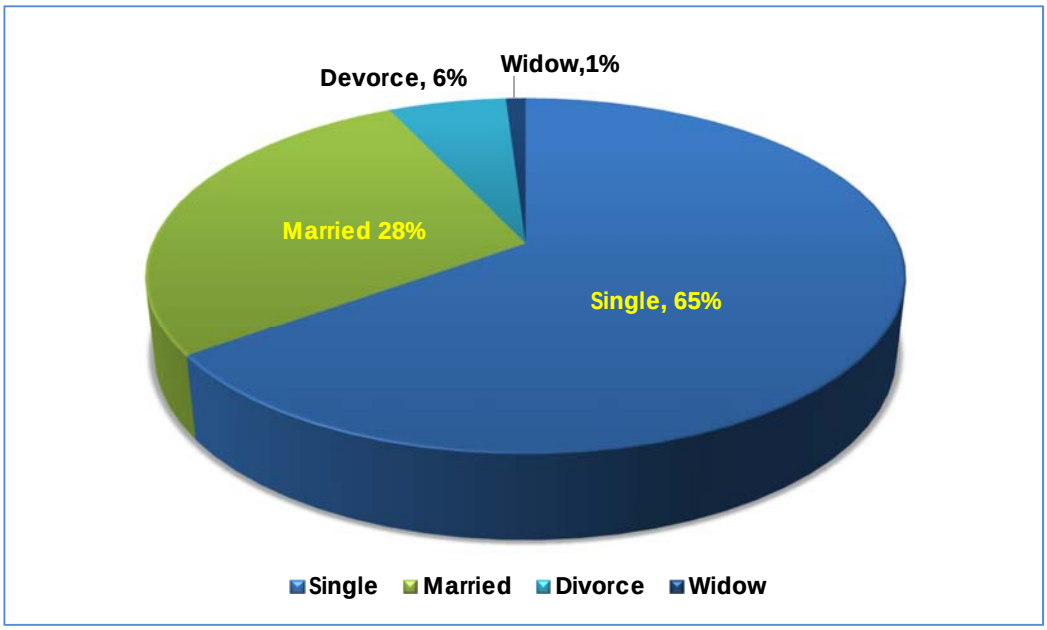

Figure 4.4: Marital status of the mothers

4.2.1.6 Monthly income of the family

A greater proportion of the families (51%) in the study in Figure 4.5 below had income levels of between R2 000 and R5 000 per month, followed by 30% of families who had income levels of less than R2 000 per month. While 11% of the families had income levels of between R5 001 and R10 000 per month, only 8% of the families had income levels of R10 001 and R20 000 per month.

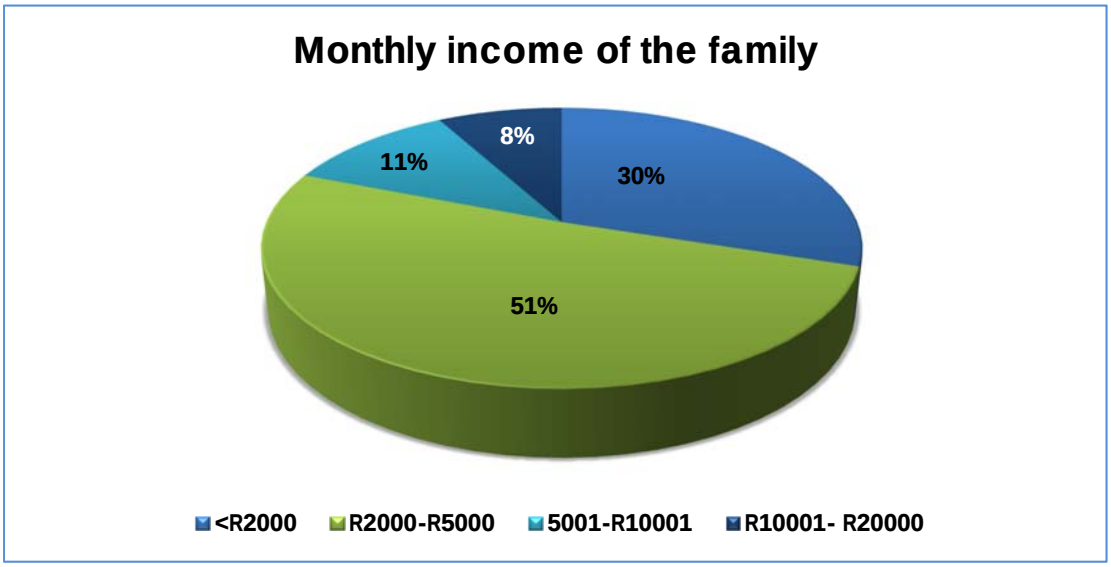

Figure 4.5: Monthly income of the family

4.2.1.7 Level of maternal/parental education

Mothers who had completed their high school education constituted 68% of the mothers in the study, as shown in Figure 4.5 below, are followed by 20% mothers who had primary education or less, and mothers who obtained a college certificate made up the remaining 12%.

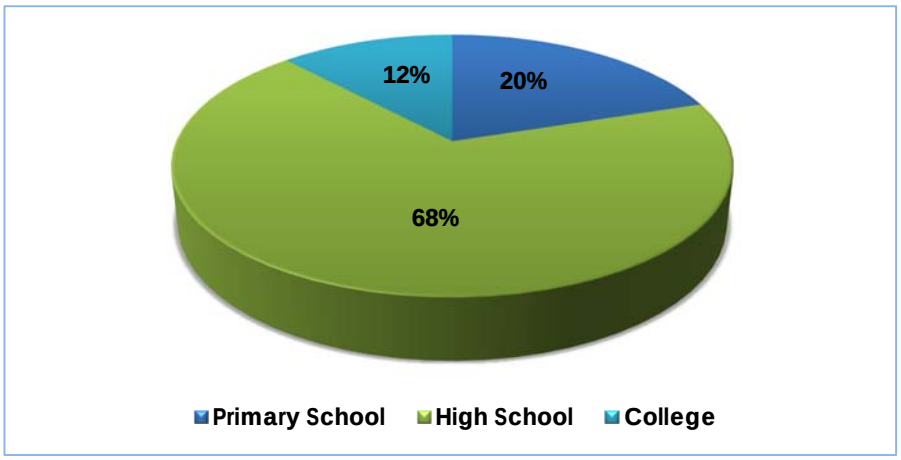

Figure 4.6: Level of maternal/parental education

4.2.1.8 Maternal/parental employment status

According to Figure 4.6, unemployed mothers made up 45% of the mothers in the study, followed by 28% of mothers whose employment status was not given, while 24% of mothers were employed and only 3% of mothers were self-employed.

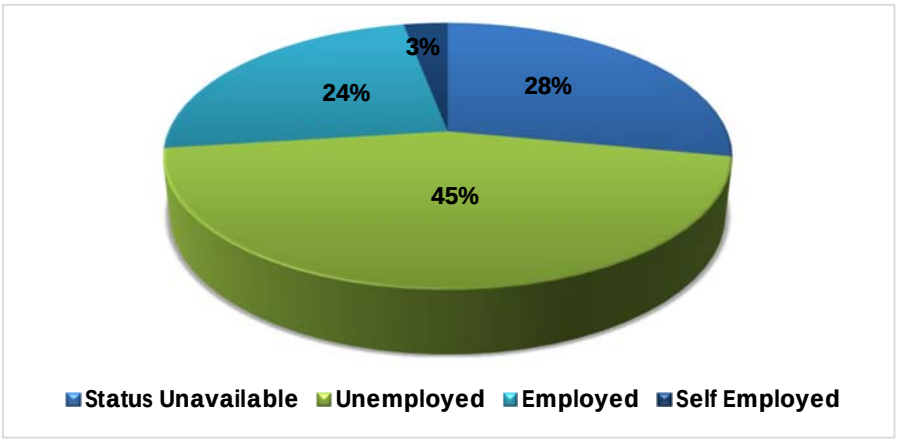

Figure 4.7: Maternal/parental employment status

4.2.2 Factors associated with malnutrition under five-year-old children

The data analysis shows that 12% of males and 14% of females were obese. Equal numbers of females and males 7% had stunting growth, while more males 29% were underweight compared to females 22%. Severe acute malnutrition was also equal in both males and females with 2%. However, moderate acute malnutrition was three times higher in males with 4% against only 1% in females. In both males and females, there were no cases of kwashiorkor and marasmus present. The analysis also shows that there was no significant association between gender and malnutrition in the study at p = 0.05, as shown in Table 4.2 below.

Table 4.2: Gender and nutritional diagnosis

Diagnosis		Obesity	Stunting	Underweight	Severe acute malnutrition	Moderate acute malnutrition	Total
Gender	Male	12	7	29	2	4	54%
	Female	14	7	22	2	1	46%
Total		26	14	51	4	5	100

4.2.2.1 Obesity

There was a 12% obesity rate in children aged 6-12 months, 8% in children aged 13-25 months, 5% in children aged 26-48 months and 1% for children over 49 months. Obesity decreased with an increase in the age of the children. As the children grew older, cases of obesity decreased.

4.2.2.2 Stunting

In the age group of 6-12 months, 2% of participants were stunted. A total of 3% of stunted children was observed in the age group 13-25 months, more than double in the age group 26-48 months 7% and finally, stunting dropped to 2% in the age group over 49 months.

4.2.2.3 Severe acute malnutrition (SAM)

One percent (1%) of SAM was present in the age group 6-12 months, 2% in the age group 13-25 months, 0% in the age group 26-48 months and 1% in the age group over 49 months.

4.2.2.4 Moderate acute malnutrition (MAM)

Cases of MAM were present in 1% of the age group 6-12 months, 0% in the age group 13-25 months, with 2% in the age groups of 26-48 months and over 49 months old respectively.

4.2.2.5 Underweight

The analysis shown in Table 4.3 indicates that 13 of the children in the age group 6-12 months were underweight, followed by 18 in the age group 13-25 months, with 14 in the age group 26-48 months and six in the age group over 49 months old.

Table 4.3: Age and nutritional diagnosis

Age	Obesity	Stunting	SAM	MAM	Underweight	Total
6 – 12 months	12	2	1	1	13	29
13 – 25 months	8	3	2	0	18	31
26 – 48 months	5	7	0	2	14	28
Over 49 months	1	2	1	2	6	12
Total	26	14	4	5	51	100
Percentage	26%	14%	4%	5%	51%	100%

Generally, except for the age group of 13 – 25 months that had the highest cases of malnutrition. All cases of malnutrition put together were found to be less as the children grew older, for instance, the age group of 13 – 25 months had the highest cases with 31, followed by the age group of 6 –12 months with 29 then the age group of 26 – 48 months with (28) and finally, the age group of over 49 months included 12 only.

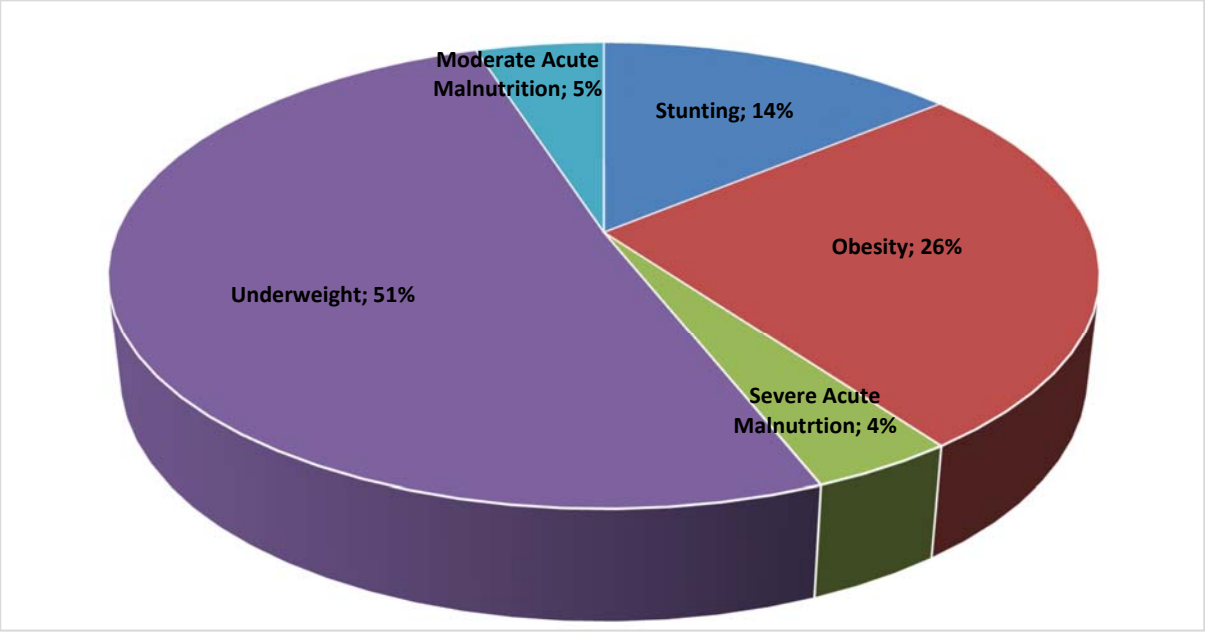

Figure 4.8: The distribution of cases of malnutrition for the children

Figure 4.8: shows the distribution of cases of malnutrition for the children. It indicated that 51% of all the cases of malnutrition for the children were underweight, 26% were obese, 14% were stunted, 5% had MAM and 4% had SAM.

4.2.3 Bivariate associations of socio-demographic variables

Bivariate associations for obesity, stunting, SAM, MAM and underweight, which encompassed malnutrition (refer to Appendix M), were done on relevant socio-demographic, maternal and children variables of respondents. The variables, which were associated with a particular form of malnutrition, were then grouped and reported separately. The significant associations between the dependent and independent variables of the respondents for the different types of malnutrition were then reported at $p < 0.05$. The p-value is the probability of obtaining the observed results of a test, assuming that the null hypothesis is correct. The p-value is used as an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected.

4.2.3.1 Obesity

Bivariate associations of maternal, socio-demographic, and children factors of respondents for obesity are presented on Table 4.4. There was a significant association at p=0.001 between birth weight and obesity. Children with birth weights more than 2500g had more cases of obesity unlike those with birth weight of less than 2500g. In addition, a chi-square ($\chi 2$) and degrees of freedom (DF) were used. According to Investopedia (2019), a chi-square ($\chi 2$) statistic is a test that measures how expectations compare to actual observed data (or model results). Chi-square tests such as the test of independence, which asks a question of relationship and the goodness-of-fit test; for these tests, degrees of freedom are utilized to determine if a certain null hypothesis can be rejected based on the total number of variables and samples within the experiment (Investopedia, 2019).

Parental education was also associated with obesity (p = 0.038). Children from mothers who had completed high school and college education had more cases of obesity compared to mothers who had completed only primary education.

Growth Pattern on the RTHB was equally significantly associated with obesity at p= 0.000. Children who were well or whose growth had faltered had more cases of obesity compared to children who were losing weight.

Family size was also associated with obesity at p = 0.020. Analysis showed that mothers with families with fewer than three members had more children with obesity compared to mothers with families of 4-6 or more members.

Smoking, drinking and using drugs during pregnancy were associated with obesity at p = 0.002. Here, mothers who ‘strongly disagreed’ or ‘disagreed’ that they were smoking, drinking and using recreational drugs during pregnancy had more children with obesity compared to those mothers who simply ‘agreed’ that they were smoking and using drugs during pregnancy.

Willingness to register a child on the Protein energy malnutrition (PEM) scheme was also associated with obesity at p = 0.002. All children of mothers who were unwilling

to register their children on the PEM scheme presented with more cases of obesity than those of mothers who agreed to register their children.

Not breastfeeding exclusively was equally associated with obesity at p = 0.015. In this case, mothers who had never breastfed or rarely breastfed had more children diagnosed with obesity compared to mothers who had breastfed more often. Premature births were associated with malnutrition at p = 0.014.
Mothers who 'disagreed' or 'strongly disagreed' that they had given birth prematurely had more children suffering from obesity compared to those mothers who 'strongly agreed' or 'agreed' that they had given birth prematurely.

Table 4.4: Bivariate associations of socio-demographic, maternal and children variables of respondents for obesity

Predictor	Not obese	Obese	$\chi 2$	DF	p-value
Birth weight	>2500 g = 51 <2500 g = 23	>2500 g = 26 <2500 g = 0	10.4949	1	0.001
Parental education	High school = 48 Primary school = 19 College = 7	High school = 20 Primary school = 1 College = 5	6.5264	2	0.038
Growth pat RTHB	Losing weight = 42 Growing weight = 13 Growth Fa = 19	Losing weight = 0 Growing weight =25 Growth Fa = 1	50.6100	2	0.000
Family size	4-6 members = 40 7 plus members = 20 3 members = 14 2 members = 0	4-6 members = 15 7 plus members = 4 3 members = 4 2 members = 3	9.8049	3	0.020
Alcohol /drugs /smoking	Strongly disagree = 5 Disagree = 36 Agree = 31 Strongly agree = 2	Strongly disagree = 5 Disagree = 20 Agree = 1 Strongly agree = 0	15.1461	3	0.002
Registered at PEM	Strongly disagree = 7 Disagree = 13 Agree = 50 Strongly agree = 1 Unknown = 3	Strongly disagree = 2 Disagree = 13 Agree = 7 Strongly agree = 2 Unknown = 2	16.5147	4	0.002
Ex Breast feeding	Always = 39 Often = 16 Sometimes = 10 Rarely = 3 Never = 6	Always = 14 Often = 1 Sometimes = 1 Rarely = 4 Never = 6	12.3366	4	0.015

Predictor	Not obese	Obese	$\chi 2$	DF	p-value
Giving birth prematurely	Strongly disagree = 22 Disagree = 13 Agree = 12 Strongly agree = 4 Unknown = 0	Strongly disagree = 13 Disagree = 12 Agree = 0 Strongly agree = 0 Unknown = 1			0.014

4.2.3.2 Stunting

Bivariate associations of socio-demographic, maternal and children variables of respondents for stunting are found in Table 4.5 below. The levels of maternal education were significantly associated with stunting at p = 0.010. There were more cases of stunting among children of mothers who had primary education only compared to mothers who had finished their high school or college education. Using alcohol and smoking during pregnancy were also associated with stunting at p = 0.024.

Children of most mothers who confirmed that they had used alcohol during pregnancy or ‘strongly agreed’ using it were the ones with stunting growth compared to mothers who ‘disagreed’ or ‘strongly disagreed’ to have used alcohol during pregnancy. This type of caregiver who looked after the children was associated with stunting at p = 0.037.

A single child in the dataset that was looked after by his father as a primary care-giver had stunting growth. Also, the children who were looked after by their mothers had more cases of stunting growth contrary to the other children who were looked after by day care centres, grandmothers or neighbours.

Table 4.5: Bivariate associations of socio-demographic, maternal and children variables of respondents for stunting

Predictor	No stunting	With stunting	χ^2	DF	p-value
Parental education	High school = 62 Primary school = 13 College = 11	High school = 6 Primary school = 7 College = 1	9.1590	2	0.010
Growth pattern RTHB	Losing weight = 37 Growing weight = 37 Growth Fa = 12	Losing weight = 5 Growing w = 1 Growth Fa = 8	15.4614	2	0.000
Drug use and smoking	Strongly disagree = 7 Disagree = 53 Agree = 25 Strongly agree = 1	Strongly disagree = 3 Disagree = 3 Agree = 7 Strongly agree = 1	9.4017	3	0.024
Alcohol use	Disagree = 65 Agree = 10 Strongly agree = 11 Strongly disagree = 0	Disagree = 7 Agree = 4 Strongly agree = 2 Strongly disagree = 1	9.7268	3	0.021
Day caregiver	Mother = 38 Grandmother = 20 Day care = 15 Caregiver = 12 Father = 0 Neighbour = 1	Mother = 7 Grandmother = 1 Day care = 5 Caregiver = 0 Father = 1 Neighbour = 0	11.8481	5	0.037

4.2.3.3 Severe acute malnutrition

Bivariate associations of socio-demographic, maternal and children variables of respondents for severe acute malnutrition are represented in Table 4.6 below. Birth weight showed a significant statistical association with SAM at p = 0.000. More children with a birth weight of less than 2 500 g were suffering from SAM unlike those children with a birth weight of more than 2 500 g.

Updating children's immunisation status was associated with severe acute malnutrition at p = 0.024. Mothers who disagreed that they had been updating their children's immunisation status had more children with SAM, compared to mothers who agreed or strongly agreed that they had been updating their children's immunisation status.

Paying regular visits to the clinic was also associated with severe acute malnutrition ($p = 0.003$). Children of mothers who ‘disagreed’ that they regularly visited the clinic had more cases of SAM compared to those who ‘agreed’ or ‘strongly agreed’ that they visited it more often.

Updating one child’s vitamin A intake was also associated with severe acute malnutrition at $p = 0.002$. More children of mothers who disagreed that they were updating their children’s vitamin A intake presented with cases of SAM than those of mothers who ‘agreed’ or ‘strongly agreed’ to have been giving their children Vitamin A.

Often having symptoms of diarrhoea, acute respiratory diseases and other diseases were statistically associated with SAM at $p = 0.000$. All the children who often had symptoms of diarrhoea or acute respiratory diseases had SAM, followed by those who often had symptoms of other diseases. However, there was no child who often had symptoms of fever who also had severe acute malnutrition.

Giving birth prematurely was associated with SAM at $p = 0.035$. The mothers who agreed that they had given birth prematurely had more cases of children with severe acute malnutrition when contrasted with mothers who disagreed or strongly disagreed that they had given birth prematurely.

The type of caregiver was equally associated with severe acute malnutrition stood at $p = 0.037$. Children who were looked after by day care centres, caregivers, neighbours or mothers had more cases of SAM compared to those who were looked after by grandmothers and fathers.

The number of children in a family was also associated with severe acute malnutrition at $p = 0.029$. Families who had four children had more cases of SAM compared to those families who had a fewer children in the household.

Table 4.6: Bivariate associations of socio-demographic, maternal and children variables of respondents for severe acute malnutrition

Predictor	No severe acute malnutrition	With severe acute malnutrition	χ^2	DF	p-value
Birth weight	>2500 g = 77 <2500 g = 0	>2500 g = 9 <2500 g = 4	13.9493	1	0.000
EPI Update	Agree = 73 Strongly agree = 20 Disagree = 3	Agree = 1 Strongly agree = 1 Disagree = 1	7.4305	2	0.024
EPI Revisits	Agree = 82 Strongly agree = 13 Disagree = 1	Agree = 2 Strongly agree = 1 Disagree = 1	11.9544	2	0.003
EPI Vit A	Agree =79 Strongly agree = 15 Disagree = 1 Strongly disagree = 1	Agree = 1 Strongly agree = 2 Disagree = 1 Strongly disagree = 0	15.3071	3	0.002
EPI symptoms child	Others = 92 Fever = 4 Diarrhoea = 0 Acute respiratory = 0	Others = 2 Fever = 0 Diarrhoea = 1 Acute respiratory = 1	49.0248	3	0.000
EPI premature	Disagree = 43 Strongly disagree =34 Agree = 14 Strongly agree = 4 Unknown = 1	Disagree = 0 Strongly disagree = 1 Agree = 3 Strongly agree = 0 Unknown = 0	10.3641	4	0.035
No of children	1 = 32 2 = 26 3 = 21 4 = 14 5 = 3	1 = 0 2 = 0 3 = 1 4 = 3 5 = 0	10.8038	4	0.029
Day caregiver	Mother = 44 Grandmother = 21 Day care = 19 Caregiver = 11 Father = 1 Neighbour = 0	Mother = 1 Grandmother = 0 Day care = 1 Caregiver = 1 Father = 0 Neighbour = 1	25.9259	5	0.000

4.2.3.4 Moderate acute malnutrition (MAM)

Bivariate associations of socio-demographic, maternal and children variables of respondents for MAM are shown in Table 4.7. The health status of mothers or caregivers was statistically associated with MAM at p = 0.000. More children whose mothers reported having poor health, presented with cases of MAM in comparison to those who reported having good health or satisfactory health.

The size of the family was statistically associated with malnutrition at p = 0.027. While families with 4-6 members or more had more cases of MAM, families with fewer members than 4-6 members had no cases of MAM.

The employment status of mothers was also associated with MAM (p = 0.026). More children from unemployed mothers and few children from self-employed mothers had MAM when compared to employed mothers who had no children suffering from it.

Eating vegetables and fruits every day was also associated with MAM (p = 0.000). Mothers who agreed to not giving their children vegetables and fruit daily had more children suffering from MAM unlike those mothers who strongly disagreed doing so.

Not keeping up to date with children's iron intake was associated with MAM at p = 0.005. More children of mothers who agreed or strongly agreed that they did not keep up to date with their children's iron intake presented with cases of MAM compared to those mothers who disagreed to have been updating their children's iron intake.

Table 4.7: Bivariate associations of socio-demographic, maternal and children variables of respondents for moderate acute malnutrition

Variable	No moderate acute malnutrition	With moderate acute malnutrition	χ^2	DF	p-value
Health Status mother caregiver	Good = 78 Satisfactory = 16 Poor = 0 Unknown = 1	Good = 3 Satisfactory = 1 Poor = 1 Unknown = 0	19.3670	3	0.000
Family size	4-6 members = 54 7 plus members = 20 3 members = 18 2 members = 3	4-6 members = 1 7 plus members = 4 3 members = 0 2 members = 0	9.1547	3	0.027
Parental employment status	Unemployed = 41 Others = 28 Employed = 24 Self-employed = 2	Unemployed = 4 Others = 0 Employed = 0 Self-employed = 1	9.2398	3	0.026
Vegetables and fruit	Agree = 77 Strongly agree = 13 Disagree = 5 Strongly disagree = 0	Agree = 4 Strongly agree = 0 Disagree = 0 Strongly disagree = 1	19.9480	3	0.000
EPI iron intake	Disagree = 67 Agree = 18 Strongly agree = 6 Strongly disagree = 4	Disagree = 0 Agree = 4 Strongly agree = 1 Strongly disagree = 0	13.0554	3	0.005

4.2.3.5 Underweight

Bivariate associations of socio-demographic, maternal and children factors of respondents for underweight are shown in Table 4.8 below. There was a significant association between growth pattern on RTHB and underweight at p = 0.001, as a significant number of children were suffering from underweight. Receiving good health care services at the clinic was associated with underweight at p = 0.031. There were more children being underweight of mothers who agreed or strongly agreed that they did not receive good health care services at the clinic compared to those who disagreed.

Family size was also associated with underweight (p = 0.025). Families who had more children had more cases of underweight when compared to families who had fewer children.

Table 4.8: Bivariate associations of socio-demographic, maternal and children variables of respondents being underweight

Predictor	Not underweight	Underweight	χ^2	DF	p-value
Growth curve	Losing weight = 11 Growing w = 26 Growth Fa = 12	Losing weight = 31 Growing w = 12 Growth Fa = 8	15.4479	2	0.000
Health care services	Agree = 34 Strongly agree = 8 Disagree = 1 Unknown = 6	Agree = 38 Strongly agree = 8 Disagree = 5 Unknown = 0	8.8524	3	0.031
Number of children	1 = 19 2 = 17 3 = 10 4 = 3 5 = 2	1 = 13 2 = 9 3 = 12 4 = 14 5 = 1	11.1838	4	0.025

4.2.4 Multivariate associations for factors predicting malnutrition symptoms

In the multivariate associations, a forward stepwise logistic regression process was used to select independent variables that were combined in a model with obesity, stunting, severe acute malnutrition, moderate acute malnutrition and underweight respectively to determine factors that remained significant after controlling for confounding (see Table 4.9).

The following factors remained significantly associated with obesity in the adjusted model:

- Growth Pattern in RTHB remained significantly associated with obesity in the adjusted model (OR 0.005; 95% CI 0.000 - 0.126, p = 0.001).
- Smoking or using drugs during pregnancy remained associated with obesity at OR 0.151; 95% CI 0.029 - 0.790, p = 0.025.
- Age was the next factor that was significantly associated with obesity in the multivariate analysis but it was not associated in the bivariate analysis (OR 0.158; 95% CI 0.030 - 0.816, p = 0.028).
- Not having given birth prematurely equally remained associated with obesity (OR 0.145; 95% CI 0.033 - 0.639, p = 0.011).

- Although family income was not associated with obesity in the bivariate analysis, it was found to be associated with obesity in the multivariate analysis (OR 0.136; 95% CI 0.026 - 0.710, p = 0.018).
- Parental education remained associated with obesity (OR 9.014; 95% CI 0.944 - 86.063, p = 0.056).

The following factors remained significantly associated with other forms of malnutrition in the adjusted model:

- Drinking alcohol during pregnancy remained significantly associated with stunting (OR 1.823; 95% CI 1.033 - 3.216, p = 0.038).
- The number of children in a family remained significantly associated with severe acute malnutrition (OR 4.965; 95% CI 1.118 - 22.042, p = 0.035) as well as not having given birth prematurely (OR 2.659; 95% CI 0.960 - 7.361, p = 0.060).
- The type of day caregiver stood at OR 1.816; 95% CI. 0.923 - 3.575, p = 0.084.
- Not updating the iron intake of children equally remained significantly associated with moderate acute malnutrition (OR 4.745; 95% CI. 1.328 - 16.949, p = 0.005) as well as the family size (OR 16.784; 95% CI. 1.478-190.524, p = 0.023).
- Finally, for underweight factors, growth pattern in RTHB remained significantly associated with underweight (OR 2.911; 95% CI. 1.706 - 4.964, p = 0.000) as well as the number of children in the family (OR 0.561; 95% CI 0.375 - 0.838, p = 0.005).

Table 4.9: Adjusted model for factors associated with obesity, stunting, severe acute malnutrition, moderate acute malnutrition and underweight

Obesity			
Predictor	**Odd ratio**	**95% CI**	**p-value**
Growth pattern in RTHB	0.0050146	0.0001985 - .1266602	0.001
Drug and alcohol use	0.1515707	0.0290689 - .7903186	0.025
Age	0.1586566	0.0308256 - .8165915	0.028
EPI premature	0.1454337	0.0330681 - .6396179	0.011

Family income	0.1364094	0.0261834 - .7106623	0.018
Parental education	9.014274	0.9441554 - 86.06331	0.056
Stunting			
Alcohol use	1.823028	1.033364 - 3.216126	0.038
Severe Acute Malnutrition			
Number of children	4.965814	1.118699 - 22.04285	0.035
EPI premature	2.659017	0.9604464 - 7.361548	0.060
Day caregiver	1.816976	0.9234405 - 3.57511	0.084
Moderate Acute Malnutrition			
EPI iron intake	4.745064	1.328379 - 16.94971	0.017
Family size	16.7841	1.478579 - 190.5249	0.023
Underweight			
Growth path	2.911036	1.706845 - 4.964789	0.000
Number of children	0.5612432	0.3758242 - .8381417	0.005

4.2.5 Characteristics of households with children under five years of age

The characteristics of households with children six months to five years of age living in the semi-rural area in the Western Cape are presented in Appendix N.

4.2.5.1 Type of house in which the mother lives

Most of the mothers living in the semi-rural area in the Western Cape lived in brick houses or RDP houses (56%), followed by mothers who lived in informal settlements (26%) and 18% of mothers lived in backyards.

4.2.5.2 Household with access to clean drinking water

The majority of the mothers (70%) agreed that they lived in households with access to clean drinking water, closely followed by 22% of mothers who strongly agreed that

they had access to clean drinking water. Only 8% of mothers disagreed that they lived in households with access to clean drinking water.

4.2.5.3 Availability of a source of income for the household

Of the 100 mothers in the study, 80% agreed that they had sources of income for the family and 17% strongly agreed that they had sources of income for the household. However, 3% of the mothers disagreed that they had sources of income for the household.

4.2.5.4 Households with access to electricity

Most women in the study (71%) agreed that they their households had access to electricity, followed by 21% of women who strongly agreed that their households had access to electricity and only 8% of women disagreed that their households had access to electricity.

4.2.5.5 Households with a fridge for storing food

Aside from 11% of households that disagreed that they had access to a fridge for storing food, many households in the study (68%) agreed that they had access to a fridge for storing food, while 21% strongly agreed that they had access to a fridge for storing food.

4.2.5.6 Having access to an electric stove to prepare food

Only a few women (8%) disagreed that their households had access to an electric stove, while 71% of the women agreed that their households had access to an electric stove, followed by 21% of the women strongly agreed that their households had access to an electric stove.

4.3 Qualitative Findings

The qualitative data was used to answer the third research question, namely:

> *How do health organisations prevent malnutrition in the identified semi-rural area of the Western Cape?*

A thematic content analysis of the data unveiled certain prevention practices implemented by the health care providers. These are discussed below.

4.3.1 Interventions for preventing malnutrition

The interventions for preventing malnutrition were further classified into clinic-based and community-based interventions and practices. Three categories of interventions for preventing malnutrition were recorded in this study. The first category contained the interventions and practices that had taken place in the clinic. This category was followed by the second category of interventions, namely those interventions that had taken place in the community and the third category of interventions presented in the form of referrals.

4.3.2 Clinic-based interventions and practices

Clinic-based interventions that were documented in this study were classified under four types of interventions, namely routine health talks at the facility, education of pregnant mothers during their maternity visits, education during consultations and, when necessary, during TB treatment sessions.

4.3.2.1 Routine health talks at the facility

Community health workers mentioned the type of health officials who deliver health talks on the prevention of malnutrition in the health facilities, and how well and often these talks are delivered, as shown by these quotes:

> *"The councillor does the health talks in the facilities, but not as regularly as it should be done. It is their duty to do health talks two times a day, every day."* [GD1CHW 2]

The community health workers also reported that they were not having any more health talks. However, the Hospice (local NPO) who took over the duties of the health promoters was very good at what they were doing. It was noted that they even included their clients in the reports and referrals that they had submitted as follows:

> *"We also use to have talks but right now we don't have it anymore. The Hospice has taken over the role of health promoter and is very good at what they do in this regard and include us in their reports and referrals."* [GD3CHW 2]

4.3.2.2 Education of pregnant mothers during their maternity visits

The clinical nurse practitioner reported that they gave health advice to pregnant mothers, and also handed out informative pamphlets that explained everything about a proper diet, starting from pregnancy until when the child is two years old.

> *"The CNP's [Clinical Nurse Practitioner] when they are treating clients, they give health advice to the mothers."* [GD1CHW 2]

> *"I think that there are cute pamphlets we do have unfortunately it's in a small amount and when it's finished it's finished. There is that cute one that starts in the pregnancy and goes through up until the child is 2 years old that explains a proper diet and everything. I just think that if we have more of those available it would be good."* [GD1CHW 3]

4.3.2.3 Education during consultations

A community health worker highlighted when to start giving health talks about malnutrition to mothers. It should be done from the beginning of and throughout pregnancy. She stated:

> *"So the time to start is when they are pregnant and clear governance should be given to educate them more during pregnancy."* [GD1CHW 5]

One health worker also confirmed how daily health talks on malnutrition were given to mothers:

> *"We do talks of malnutrition every day."* [GD2CHW 6]

4.3.2.4 When the need arises for education during TB treatment

A community health worker articulated that she had given health talks to malnourished children, and in cases of children presenting with TB, she had also given individual health talks to their mothers according to their employment status, their individual background and the needs of their babies:

> *"I work in the TB room so when I encounter children that are malnourished I have the talk as in the case of TB it is very important, so I must talk to individual cases."* [GD3CHW 1]

The same health worker elucidated how she monitored children's weight to give their mothers proper health advice on what they should eat:

> *"It is very important for me in the TB room to have these talks as I need to monitor the children's weight and to educate the mother around nutrition. All talks depend on the cases as you get the unemployed mom and you can't tell her she needs to buy this or that. As well as the premature baby you can measure the same as a baby born full term, or an alcohol foetus syndrome child so it is individual talks to the child's background and needs. The mother's would tell me the child does not want to eat, the child do not like vegetables but the mom is busy giving the child a packet of chips. I normally tell the mothers to use the chips as a bribe in such cases. A breastfed child would be waiting until the mother comes from work and would not have had any feeding during the day."* [GD3CHW 1]

Another community health worker had this to say regarding the health education on malnutrition given to the mothers:

> *"When children come to the baby room we give health education on malnutrition. The children over a year that are still being breastfed not feeding the child, as the child nutrition category is different, due to this it is easier for the mother to rather give the breast and not make food for the child. I also show and explain that in the Road to Health book where*

it explains what the child should eat and at what stage of their growth." [GD3CHW 3]

4.3.3 Community-based interventions

The community-based interventions that had been identified by health workers in preventing malnutrition in the communities were routine home visits, visits to local crèches, community campaigns, and deworming and the provision of vitamins.

4.3.3.1 Routine home visits

As part of their duties, community health workers reported doing their health talks in the areas allocated to them, as well as checking if the children had missed their vitamins or immunisations indicated in the health booklets. Those children who had missed them were referred to the health facilities. She reported as follows:

> *"We do have CHW's but they are working in the community and they do their health talks in the area where they are allocated too. CCWs are allocated to the area and do daily visits door to door and check the children's road to health booklet to see if there is any who did not get their vitamins or immunisations that were missed, they give them a date and refer to the facility."* [GD1CHW 2]

Some community health workers further testified that, during their door-to-door visits, they attended to sick children and also picked up those malnourished children not in the crèches:

> *"Door to door is when we go to every house in the community in the past we did it to go see sick people but now we go see the healthy ones to see if they are not sick. On these visits we pick up on the malnourished children who are not attending crèche."* [GD2CHW 2]

Similarly, another community health worker talked about the following additional support given to mothers through the use of translators who translated the health talks into the language they understood best:

"We give this information in every house when we do our rounds in the community. There is someone that works with the institution. She also translates to the mother if they do not understand." [GD2CHW 4]

4.3.3.2 Visits to local crèches

Below, some community health workers shared their experiences during malnutrition prevention campaigns at crèches. They said, even though they visited many crèches, some were still not up to date. Because they had limited staff, they could not report these irregularities and then they did their routine follow-ups.

"We have done the campaign now recently and going through the areas we would find that there is a lot of crèches that we visited that are not really up to standard. CHW workers goes in and out of the crèches but because it's such a lot that there is not enough back up to report these and do regular follow ups on the crèches." [GD1CHW 5]

Another group of community health workers added that they checked children's health booklets to see if they were being dewormed, as well as taking their vitamin A as required:

"We do the crèches and look at the road to health book to see if they had deworming and vitamin A." [GD2CHW 2]

4.3.3.3 Community campaigns for the prevention of malnutrition

Community health workers confirmed that they had organised campaigns with community care workers to check the weight of the children in the community, as well as to give health education to the mothers. They said:

"We have campaigns with the CHW's [Community health workers] and give a date for the children for weighing and check whether their weight is stable and give them health education to the mothers ... providing vitamins and de-worming." [GD1CHW 1]

4.3.3.4 Deworming and the provision of vitamins

Another group of community health workers clarified some circumstances in which children are dewormed and received their vitamin A:

> *"It depends as its 6 months / 6 months if there are those children who did not get their vitamin A then we give it but the sister will give the de-worming."* [GD2CHW 2]

4.3.4 Malnutrition treatment or management

The malnutrition treatment or management interventions reported in the study were referrals to a clinic, specialists or nutritionists, referrals for food parcels and referrals to social workers.

4.3.4.1 Referrals to a clinic, specialists or nutritionists

The following is testimony by a community health worker of how they refer children to the clinic for treatment for malnutrition:

> *"I would like to add that Ms X refers the children when they are under weight or have been on the second line for a while."* [GD1CHW 4]

Similarly, another community health worker articulated the assessments they make on the state of nutrition, immunisation and intake of vitamin A of the children before referring them to the clinic, a specialist or a nutritionist.

> *"We can only give them information and refer them to the clinic. I can see on the road to health book. Also when doing the mid-arm I can see this child is under weight. I then give them a referral letter to the clinic. The process is you check the road to health book and then we see the child is underweight we refer the child or if the immunizations are not up to date, or the vitamin A drops we refer them to the clinic."* [GD2CHW 4]

4.3.4.2 Referrals for food parcels

The basic assessments reported by community health workers on children prior to referring them for food parcels were as follows:

> "*If a child comes to us with a BMI of under 13 for the first time depending on situation and the birth weight we would do a HB test in cases where they are underweight, we give a feeding pack to the mother and a return consultation date. In cases where the BMI is under 10.1 the child comes back every 2 weeks for an iron deficiency test and by the 3rd time the child will be referred to the dietician for consultation."* [GD3CHW 3]

4.3.4.3 Referrals to social workers

Community health workers also mentioned that, when they discover cases of abuse at home, they refer the child to the social worker.

> *"When you see there is abuse at home you can refer them to the social worker so that they can play their part they take to children and put them in a safe place."* [GD1CHW 6]

4.4 SUMMARY

This chapter concluded the main findings and results of the study. These were discussed in detail. The results from the questionnaires were presented in pie charts and tables. The results from the interviews were presented descriptively under themes and sub-themes.

CHAPTER FIVE

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

5.1 Introduction

The aim of this study was to examine the factors associated with malnutrition among children six months to five years of age in a semi-rural area of the Western Cape. The research objectives of this study were to identify the associated factors of malnutrition among children six months to five years of age, and to determine the typical characteristics of households with children six months to five years of age living in the semi-rural area in the Western Cape. The third objective was to explore what health care organisations do to prevent malnutrition in this semi-rural area of the Western Cape.

Chapter 1 gave an overview of the study while Chapter 2 presented a comprehensive review of literature relevant to the study. Chapter 3 discussed the research design and methodology, and the findings from the data analysis were presented and discussed in Chapter 4. In this final chapter, conclusions, limitations and recommendations are discussed.

5.2 Conclusions

5.2.1 Objective one

The first objective of the study was to identify the associated factors of malnutrition among children six months to five years of age.

Based on the study results, it was indicated that out of the hundred participants who were surveyed, more boys were diagnosed with malnutrition than girls. According to Steenkamp *and Lategan* (2016:27), boys appear more likely to be stunted in sub-Saharan Africa. Poda, Hsu and Chao (2017) agree with Steenkamp *and Lategan* (2016) and the current study that boys are more prone to malnutrition.

The employment status of the mothers also affects the nutritional status of the child. The theoretical framework applied to this study refers to this as an economical approach, focusing on various determinants that contribute to malnutrition (Yusuke, 2009:8). In this study, the employment status of the mothers was associated with MAM ($p = 0.026$). More children from unemployed mothers and a few children from self-employed mothers had MAM compared to employed mothers who had no children suffering from malnutrition. Together with MAM, this study has revealed that children who do not eat enough vegetables and fruit suffer from MAM.

According to Steenkamp and Lategan (2016), more than half of households in South Africa experience hunger on a daily basis. According to the poverty trends in South Africa, specifically between the year 2011 and 2015, the worsening financial status of households and individuals under the current situation of economic pressures has intensified in a rise in the poverty levels. This is evident in the report released by Statistics South Africa in 2017. The report cites rising unemployment levels, low commodity prices, higher consumer prices, lower investment levels, household dependency on credit and policy uncertainty as the key contributors to the economic decline in recent times.

These findings indicate that the semi-rural area in the Western Cape where this study has been conducted, has revealed that a greater proportion of families (51%) have a monthly income of between R2 000 and R5 000, followed by 30% of families who earn a monthly salary of less than R2 000. However, mothers who are employed and are able to provide their children with fresh fruit and vegetables daily, agree that it improves their children's nutritional status.

In the current study, it was revealed that mothers who did not supplement iron in their children's diet did not believe that it contributed to malnutrition. However, mothers who gave children iron supplements agreed that it had nutritional value. This study also revealed that not keeping up to date with children's iron intake, was associated with MAM ($p = 0.026$). A systematic review done by Ojukwu *et al.* (2009) on iron supplementation in children demonstrated that iron supplementation improved mental development and intelligence.

In the current study, obesity was also found to be a factor in malnutrition. More girls than boys were found to be overweight. In all the children who were involved in this study, their Road-to-Health Booklet indicated that they were obese. The growth pattern in this booklet showed obesity at p = 0.000. Smoking or using drugs during pregnancy also remained associated with obesity (p = 0.002). Not being born prematurely equally remained associated with obesity (p = 0.015). Although family income was not associated with obesity in the bivariate analysis, it was evident in the multivariate analysis.

In contrast with the study done by Ogden, Carroll, Kit and Flegal (2014) in the USA regarding obesity and malnutrition, the results revealed that there was a significant decrease in malnutrition in children between the ages of two and five years old. However, the authors concluded that obesity still remained a problem in the USA, not only among children, but more so among adults. Inadequate dietary intake, insufficient access to food, and poor water and sanitation are contributing factors to MAM in their study. This was also recognised by the State of the World's Children (1998) report to overcome malnutrition.

Furthermore, maternal and childcare practices also contributed to MAM (Yusuke, 2009), as indeed was the case in this study. Mothers agreed that visiting the clinic on a regular basis would allow the health staff to detect any signs of malnutrition in their children at an early stage. Vitamin A, deworming medication and iron supplements are given free at the clinics. Another advantage of regular clinic attendance with any malnourished child is that the child could be enrolled in the nutritional supplementation programme or the PEM scheme. In this study, it was revealed that children who were enrolled in these schemes/programmes put on weight (p = 0.002).

A study conducted by Tette *et al.* (2015) concurred that the promotion of breastfeeding, suitable complementary feeding, deworming and vitamin A supplementation at regular intervals as well the case management of malnutrition were very effective to combat malnutrition. However, they found little evidence of the effectiveness of interventions such as growth monitoring. Their findings indicated that other interventions such as immunisations, health education and nutritional

counselling at postnatal centres and child health services could prevent childhood malnutrition.

In this study, substance and alcohol abuse during pregnancy have also proven to be contributing factors to stunting children's growth. Most mothers in this study agree that they have had some form of substance or alcohol abuse during their pregnancy. They are also the caregivers of the children. Only one child who was stunted in this study was cared for by a father (as a primary care-giver). The majority were mothers who cared for the children who suffered from MAM.

Polanska, Jurwicz and Hanke (2015:421) agree with this study that alcohol intake and smoking during pregnancy are associated with mental health challenges and cognitive development of children four years and younger, which then stunts the growth of these children. Another study done by Tomasz *et al*. (2015) confirms that alcohol addiction is a severe problem and it involves high costs for people, families and society. In turn, the abuse then contributes to the emotional suffering of addicted persons as well members of their families, and children are the ones mainly affected. Children who are exposed to such an environment are prone to become malnourished as a result of the adverse effects of substance and recreational drug abuse of the parents or caregivers.

5.2.1.1 Recommendations

Based on the above conclusions, the recommendations are as follows:

- Encourage parents/communities to engage in planting their own vegetable gardens.
- Educate parents on iron supplementation and the reasons why it improves children's mental development and intelligence.
- Education to all adults and children on a balanced diet within the constraints of their socio-economic circumstances is vital. This can be done via health promotion sessions in the clinics and also in conjunction with the school nurses in the area. It can be done in the surrounding schools and crèches with the learners.

- Valuable inputs could be given at crèches regarding the preparation and types of food the children need.
- Health promotion in the clinic on the dangers of the use of substances and other recreational drugs, smoking and alcohol should be done on a daily basis.
- Making clients aware of the referral systems for assistance at faith-based organisations or the local Department of Social Development will assist in preventing malnutrition in children.
- The PEM scheme has to be advertised broadly in the clinics on a daily basis.
- Home visits should be done to explain the advantages of this programme to all households with children under five years old.

5.2.2 Objective two

The second objective was to determine the typical characteristics of households with children six months to five years of age living in the semi-rural area in the Western Cape.

Most of the mothers who live in this semi-rural area majority of them (56%) live in RDP houses made of bricks. A total of 26% of the mothers live in informal settlements, while 18% of these mothers are backyard dwellers. The majority of mothers (70%) agree that they have access to clean drinking water, while 22% strongly agree that they have access to clean drinking water. In addition, 8% of the mothers disagree that they live in households with access to clean drinking water.

According to Tasmin *et al.* (2017), children who live in informal dwellings or settlements are 1.9 times more likely to be underweight than children who live in formal structures. These authors have also found that a lack of clean water in households is a strong predictor of underweight in children under five years old. These study findings concur with the outcomes of the current study. In this study, 3% of mothers have indicated that they do not have enough sources of income to provide for their families.

The current study indicated that most mothers were single parents. This finding concurred with a study done by Tette *et al.* (2015:2) that households with low financial

income, single parents and the type of child care contributed considerably to malnutrition in children under five years old. In the current study, the majority of the parents were single parents. However, there was no significant association between parent marital status and malnutrition. Poda *et al*. (2017) agreed in their study that marital status had no significant association with any form of malnutrition.

The current study indicated that the majority of households had access to electricity supply and only 8% of the participants indicated that they did not have electricity supply to their households. In addition, most of the households had fridges and electrical stoves that assisted the families to store and prepare their food to ensure the food was fresh and safe for human consumption. Findings of a study conducted by Martins and Rocha (2014) also indicated that the correct hygienic preparation of food and storage at the right temperature of food would prevent foodborne diseases. These were seen as good food service practices.

In this study, most of the mothers included in the study had at least obtained a high school education. A study conducted by Frempong and Annim (2017) found that maternal education was positively associated with child health issues, as there was a positive relationship between maternal education and child health outcomes. This concurred with the theoretical framework of the State of the World's Children's report (1998) to overcome malnutrition that inadequate and inappropriate knowledge could affect the relationship between maternal education and child health regarding malnutrition. Furthermore, Demissie and Worku (2013:181) in their study found that maternal education had a significant connotation with wasting and underweight, as these forms of malnutrition were higher among children whose mothers were illiterate.

5.2.2.1 Recommendations

- Educate households to boil water before use.
- The Department of Health should share these research results with the local governments and the Department of Human Settlements in order to create an awareness of the plight for proper housing of residents in this area, and the detrimental effect it has on the children and households at large regarding malnutrition of children age six months to five years of age.

- The Department of Social Development should assist and support households with a low income with food parcels and link the parents up for support which the Zero Hunger Initiative provides.
- Educate all parents and caregivers at the clinics about the importance of the correct cooking methods and storage of food to prevent spoiling.
- The Department of Health should share and collaborate with other stakeholders such as the Department of Basic Education to encourage education of all families and communities regarding malnutrition.

5.2.3 Objective three

The third objective was to explore what health care organisations did to prevent malnutrition in this semi-rural area of the Western Cape.

Clinic-based interventions and practices were recorded in the study. These interventions were classified into four types, namely routine health talks at the facility, education of the pregnant mothers during their maternity visits, education during consultations, and when necessary, also during TB treatment sessions.

5.2.3.1 Routine health talks at the facility

The counsellors agree that health talks are held in the facilities, but not as regularly as it should be done. They indicate that it is their duty to do the health talks twice a day, every day. The counsellors agree that they used to have talks but they are no longer held. The role of the health promoting officers (HPOs) has been taken over by the local non-profit organisation, Hospice.

5.2.3.2 Education of the pregnant mothers during their maternity visits

All clinical nurse practitioners (CNPs) agree that they give health advice to all mothers while consulting. All CNPs also agree that they have relevant information in the form of pamphlets but clients complain that they cannot read it, as the print is too small.

Health education material is available in the health facilities, but it only covers pregnancy and children up to the age of two years.

Yusuke (2009) suggests in his framework that all resources relating to the environment, human and economics should be developed in such a way that it educates caregivers/parents regarding malnutrition. All clinicians working with mothers and children should, therefore, educate themselves regularly regarding various issues on malnutrition in children.

According to literature, health education and adult learning are key elements in addressing child malnutrition. The NDoH (2003:8) claims that, due to the lack of health education and adult learning, malnutrition is exacerbated by poor nutritional information and knowledge. It is particularly important to educate all pregnant women on malnutrition during the antenatal period when they visit the clinics. Nutritional advice in this period is essential, as it is also linked to the nutrition of the unborn child.

5.2.3.3 Education during consultations

Breastfeeding also plays a role in preventing malnutrition; hence, each child and parent should be treated on merit. In line with the Sustainable Development Goals (SDGs) (2015), the promotion of breastfeeding and the provision of nutritional milk formulas have been promoted among schools and crèches for all children under five years old. SANHANES-1 (2012) claims that 9.3% of children are underweight; hence, the development of the SDGs as guidelines for all health care workers.

5.2.3.4 Education during TB treatment sessions

CNPs who administer tuberculosis treatment to children have a pivotal role to play in providing advice and education to the caregiver/mother who accompanies the child for his/her treatment. One participant has reiterated the fact that she cannot ignore a child on TB treatment that appears to be malnourished. Part of the monitoring process is weighing these children on a regular basis and educating the mother/caregiver regarding nutrition. According to Singh *et al.* (2005:624), the important risk factor for

contracting tuberculosis in children is malnutrition. This concurs with the theoretical framework, as it refers to basic causes at societal level, but more particularly, underlying causes at household and family level (State of the World's Children, 1998). Here, knowledge of the CNP is crucial, as advice will differ from patient to patient because every case needs to be dealt with individually. CNPs cannot give the same advice to an unemployed mother/caregiver or the mother/caregiver of a premature baby or a foetal alcohol syndrome child who is malnourished or a child who was born full term.

5.2.3.5 Routine home visits

In this semi-rural area in the Western Cape there are community health workers (CHWs) who work in the communities where they live. These CHWs do home visits on a daily basis as well. During these home visits they check all the children's Road-to-Health Booklets to see if they are up to date with their immunisations. They also refer defaulters and sick children to the local health facility. It is also during these visits that they find many malnourished children who are then also referred to the health facility in the area.

Part of the CHWs responsibility is visiting the crèches in the area. CHWs have a responsibility to remind and educate pregnant women regarding the First 1000 Days Initiative. CNPs visit and do follow-ups at these crèches, as many of these childcare facilities are sub-standard. It is in these facilities where many malnourished children are recognised and then referred to the clinics. Deworming and vitamin A supplementations are administered to all children at these crèches. The CHWs are able to do a BMI test for all children under three years of age. If the children are underweight, they will be referred to the clinic and the mother will also receive a feeding pack. She then has to attend a consultation with the CNP at the clinic. If there is no improvement after monitoring the child, a referral is done to a dietician for a consultation. If abuse is detected, the case is referred to a social worker who is based in the local office of the Department of Social Development.

5.2.3.6 Recommendations

The recommendations for the third objective of this study are as follows:

- Health facilities should map all funded or non-funded crèches, non-funded organisations, as well as private sector and other services in the geographical area to strengthen intersectoral collaboration.
- Health facilities should make use of the newly piloted COPC model to ensure linkage to care for all patients in need of health care.
- The NDoH should liaise and build relationships with other departments such as the Department of Transport to ensure reliable transport services in the area, since health care services are far apart from one another; for example, farming communities are located far from clinics and district hospitals.
- Health education and promotion should be done at all heath facilities and at regular intervals, after every hour to accommodate all the clients visiting the health facility throughout the day.
- All health talks should be documented or diarised and kept for audit purposes to account for quality of care.
- Health education material should be comprehensive and cover children of all ages.
- All health promotion material must be reprinted in a bigger font size so that it is legible.
- Health authorities should provide a platform for all clinicians to attend regular courses and to participate in continuous development programmes concerning child health issues and malnutrition.
- All clinicians should be aware of and know the SDGs so that they may work towards achieving these goals in their health facilities.
- Regular assessments of crèches in the area by the dietician, Department of Social Development (DSD) and Environmental Health Officers (EHO) should be carried out to ensure crèches and day care centres adhere to the policies and regulations set out by the state.
- Regular meetings and updates with CHWs are to be held so that they can impart the correct knowledge regarding malnutrition to the communities they serve.

- Regular community campaigns should be held to sensitise the communities to nutritional value, focusing on malnourished children in particular.
- Reimplementation of the immunisation register at facilities is vital to keep track of defaulters and to ensure that a reliable defaulter tracking system is set in place.

5.2.3.7 Benefits of health education and information for mothers/caregivers

- Continuous support and health promotion will assist these mothers and caregivers to make the correct choices of different foods and supplements despite their economic circumstances.
- The results could improve health care practices in the community.
- The mothers/caregivers will become aware of the help they can receive at the clinic regarding free deworming and vitamins for their children.
- The mothers/caregivers will become aware of access to a nutritional supplementation programme for those who qualify.
- During the antenatal period, mothers will be educated on nutritional choices and the dangers of substance abuse, recreational drugs and smoking that could have a detrimental effect on the nutritional status of the child. They are taught that it could lead to malnutrition in the child.
- It will also assist the mothers to enhance the core relationship between themselves and the caregivers.

5.2.3.8 Benefits of health education to the health workers at the facilities

- Continuous updates will allow them to identify malnourished children at an early stage to ensure the commencement of early treatment.
- They will be made aware of appropriate referral pathways in order to assist the child at the early onset of malnutrition.
- Teamwork will be reiterated, as intersectoral collaboration is important in order to treat malnutrition in children.

- All health workers will constantly be made aware of the importance of continuous outreach to communities and particularly local crèches which these children attend.

5.3 LIMITATIONS

The limitations of this study were as follows:

- This study was only done at one clinic in the Cape Winelands District despite the fact that there were many other facilities in the district. Hence, results could not be generalised. There are a total number of 45 health facilities in the district.
- Further research in the rest of the semi-rural areas in the Western Cape should be embarked on in order to use further results to influence the Politician's and policy makers in the Western Cape regarding proper housing, sanitation and malnutrition.
- Only parents/caregivers of children who had already been diagnosed with malnutrition were included in the study. However, there are many other children who attend this facility who are malnourished and immunisation defaulters.
- It was a major challenge to recruit staff to participate, as they were always conscious of workloads and a fully packed clinic. Other staff members who consented to participate took leave at the time of data collection.

5.4 Final Word

The aim of the study was to examine the factors associated with malnutrition among children six months to five years of age in a semi-rural area in the Western Cape. All three objectives were achieved and the results will be published in accredited journals in order for the entire population to be made aware of this global problem of malnutrition. Conclusions, limitations and recommendations have been presented in chapter five. The researcher related the results from the study with the literature review, theoretical and conceptual frameworks of the study in chapter 5 during the discussions.

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APPENDICES

Appendix A: Malnutrition clinic survey questionnaire

Please make a "√" on your choice in the shaded block.

1. SOCIO-ECONOMIC AND DEMOGRAPHIC DATA

1.1 Gender of the child

1	Male	
2	Female	

1.2 Birth weight of the child

1	<2500 g	
2	>2500 g	

1.3 Age of the child

1	< 6 months	
2	6-12 months	
3	12-24 months	
4	24-48 months	
5	Older than 48 months	

1.4 Number of family members

1	2 members	
2	3 members	
3	4-6 members	
4	More than 6 members	

1.5 Number of family members in house

1	2 members	
2	3 members	
3	4-6 members	
4	More than 6 members	

1.6 Marital status of the mother

1	Single	
2	Married	
3	Divorce	
4	Widowed	

1.7 Monthly income of the family

1	<R2000	
2	R2000~R5000	
3	R5001~R10000	
4	R10001~R20000	
6	>R20000	

1.8 Maternal/parental education

1	Primary school or less	
2	High school	
3	College Certificate	
4	University Degree	
5	Others (Please indicate)	

1.8 Maternal/parental employment status

1	Employed by a company / organisation	
2	Self-employed	
3	Unemployed (i.e., housewife)	
4	Others (Please indicate)	

2. CHILD CARING PRACTICES

This section includes feeding, hygiene, health care seeking and immunisation.

2.1	Feeding	Decision-making				
No.	**Items**	**Strongly Disagree**	**Disagree**	**Unknown**	**Agree**	**Strongly Agree**
1	The milk was always prepared hygienically	⊙	⊙	⊙	⊙	⊙
2	You are willing to register your child on the PEM scheme	⊙	⊙	⊙	⊙	⊙
3	You often to feed rooibos tea to your child	⊙	⊙	⊙	⊙	⊙
4	Your child often eats any form of protein such as milk, meat, fish, chicken, eggs daily	⊙	⊙	⊙	⊙	⊙
5	Your child eats vegetables and fruits every day	⊙	⊙	⊙	⊙	⊙
6	Your child eats sweets (or food with high volume of sugar) regularly	⊙	⊙	⊙	⊙	⊙

2.2 Did the mother/care-giver use “Never”, “Rare”, “Sometimes”, “Often”, and “Always” to rank your option below?

No.	**Items**	**Decision-making**				
1	The mother exclusively breastfeeds	Never	Rare	Sometimes	Often	Always
2	The mother exclusively formula feeds	Never	Rare	Sometimes	Often	Always
3	The mother uses mixed feed for the child	Never	Rare	Sometimes	Often	Always

2.3 If the child was not exclusively breastfed what other milk was used?

1	Formula milk	
2	Cow’s milk	
3	Soya	
4	Other (please specify)	

2.4 Has the mother or caregiver received any counselling on the following?

1	Diarrhoea	
2	Healthy eating	
3	Breastfeeding	
4	Complimentary feeding	
5	Food fortification	
6	Growth monitoring	
7	Hygiene	
8	Other (please specify)	

2.5 Describe the growth pattern in RTHB?

1	Growing well	
2	Growth faltering	
3	Losing weight	

2.6 At what age did the mother/care-giver introduce complimentary feeds to the child?

1	Before 6 months	
2	At 6 months	
3	After 1 year	

2.7 For what reason did the child attend the health facility today?

1	Growth monitoring	
2	Immunisation	
3	Sick	
4	Follow-up visits	
5	Other (please specify):	

2.8 How often did the child attend the health facility after birth?

1	Weekly	
2	Monthly	
3	Quarterly	
4	Semi-annually	
5	Annually	

2.9 What are the growth parameters of the child?

Growth Parameter	< -3	< -2	-2 < +2	> +2	> +3
Weight for age					
Height for age					
Weight for height					

2.10 Immunisation		**Decision-making**				
N	**Items**	**Strongly Disagree**	**Disagree**	**Unknown**	**Agree**	**Strongly Agree**
1	You always ensure that the child's immunisation is updated.	⊙	⊙	⊙	⊙	⊙
2	Your child always receives any catch-up immunisations.	⊙	⊙	⊙	⊙	⊙
3	Your always ensure that your child receives a booster campaign immunisation.	⊙	⊙	⊙	⊙	⊙
4	Your child is dewormed regularly.	⊙	⊙	⊙	⊙	⊙
5	Your child's Vitamin A supplication is up to date.	⊙	⊙	⊙	⊙	⊙
6	Your child has previously received iron supplementation.	⊙	⊙	⊙	⊙	⊙
7	Your child attends the health facility regularly.	⊙	⊙	⊙	⊙	⊙
8	You have completed the RTHB correctly.	⊙	⊙	⊙	⊙	⊙
9	Your child was born prematurely.	⊙	⊙	⊙	⊙	⊙

2.11 Does the child have any of the following nutritional diagnoses?

1	Kwashiorkor	
2	Marasmus	
3	SAM	
4	MAM	
5	Obesity/Overweight	
6	Underweight	
7	Stunting	
8	Vitamin A deficiency or iron deficiency	
9	Other (please specify):	

3. CHILD CHARACTERISTICS

3.1 Does the child present with the following symptoms?

1	Fever	
2	Measles	
3	Diarrhea	
4	Acute respiratory infection (ARI)	
5	Other (please specify):	

3.2 Describe the growth pattern in the RTHB.

1	Growing well	
2	Growth faltering	
3	Losing weight	

4. MATERNAL CARING AND CHARACTERISTICS

4.1 Age of the mother

1	<16 years old	
2	16-25 years old	
3	26-35 years old	
4	36-40 years old	
5	>40 years old	

4.2 Number of children ever born

1	Only one child	
2	2 children	
3	3 children	
4	4 children	
5	More than 4 children	

4.3 Who looks after the child during the day?

1	Mother	
2	Father	
3	Grandmother	
4	Neighbour	
5	Daycare centre	
6	Caregiver	

4.4 What is the health status of the mother or caregiver?

1	Good	
2	Satisfactory	
3	Poor	

4.3 Health status during pregnancy

No.	Items	Decision-making: Strongly Disagree	Disagree	Unknown	Agree	Strongly Agree
1	The mother attended an antenatal clinic while pregnant with this child.	⊙	⊙	⊙	⊙	⊙
2	The mother was sometimes depressed during the pregnancy.	⊙	⊙	⊙	⊙	⊙
3	The mother smoked or used drugs during the pregnancy.	⊙	⊙	⊙	⊙	⊙
4	The mother used alcohol during pregnancy.	⊙	⊙	⊙	⊙	⊙
5	The mother consumed alcohol daily.	⊙	⊙	⊙	⊙	⊙

5. ENVIRONMENTAL HEALTH CONDITIONS

No.	Items	Decision-making				
		Strongly Disagree	Disagree	Unknown	Agree	Strongly Agree
1	The household has access to clean drinking water.	⊙	⊙	⊙	⊙	⊙
2	There are sources of income to the household.	⊙	⊙	⊙	⊙	⊙
3	The household has access to electricity.	⊙	⊙	⊙	⊙	⊙
4	The household has a fridge for storing food.	⊙	⊙	⊙	⊙	⊙
5	The household has an electric stove to prepare food.	⊙	⊙	⊙	⊙	⊙
6	The staff at the health facility are helpful.	⊙	⊙	⊙	⊙	⊙
7	The health care workers give enough or adequate health information with regard to healthy nutrition.	⊙	⊙	⊙	⊙	⊙
8	The family has sufficient rooms for family members to stay.	⊙	⊙	⊙	⊙	⊙
9	The mother receives good services rendered by the health facility.	⊙	⊙	⊙	⊙	⊙

Does the mother stay in:

	Informal settlement	
	Brick house / RDP house	
	Backyard	
	Other (please specify):	

Appendix A (Afrikaans version): Wanvoedingvraestel

Merk asseblief "√" om u keuse in gekleurde blok aan te dui.

1. SOSIO-EKONOMIESE EN DEMOGRAFIESE DATA

1.1 Geslag van die kind

1	Manlik	
2	Vroulik	

1.2 Geboortegewig van kind

1	<2 500 g	
2	>2 500 g	

1.3 Ouderdom van kind

1	< 6 maande	
2	6-12 maande	
3	12-24 maande	
4	24-48 maande	
5	Ouer as 48 maande	

1.4 Getal gesinslede in huis

1	2 lede	
2	3 lede	
3	4-6 lede	
4	Meer as 6 lede	

1.5 Getal gesinslede

1	2 lede	
2	3 lede	
3	4-6 lede	
4	Meer as 6 lede	

1.6 Huwelikstatus van moeder

1	Enkellopend	
2	Getroud	
3	Geskei	
4	Weduwee	

1.7 Maandelikse inkomste van gesin

1	<R2 000	
2	R2 000 - R5 000	
3	R5 001 - R10 000	
4	R10 001 - R20 000	
6	>R20 000	

1.8 Moeder/vader se geletterdheidsvlak

1	Laerskool/ongeskoold	
2	Hoërskool	
3	Kollegesertifikaat	
4	Universiteitsgraad	
5	Ander (spesifiseer)	

1.9 Werkstatus van moeder/vader

1	Werksaam by maatskappy / fabriek	
2	In eie diens (eie besigheid)	
3	Werkloos (bv. huisvrou)	
4	Ander (spesifiseer)	

2. VERSORGING VAN DIE KIND

Die gedeelte sluit in voeding, higiëne, gesondheidsorg en immuniserings.

2.1 Voeding

Opsie	Strongly Disagree	Disagree	Unknown	Agree	Strongly Agree
Kode	SDA	DA	UK	A	SA

No.	Items	Decision-making				
		Strongly Disagree	Disagree	Unknown	Agree	Strongly Agree
1	Melk is altyd higiënies voorberei.	⊙	⊙	⊙	⊙	⊙
2	Is u bereid om u kind op die PEM-skema te plaas?	⊙	⊙	⊙	⊙	⊙
3	Voed u die kind gereeld met rooibostee?	⊙	⊙	⊙	⊙	⊙
4	Eet u kind enige vorm van proteïne soos melk, vleis, vis, hoender of eiers daagliks?	⊙	⊙	⊙	⊙	⊙
5	Eet u kind elke dag groente en vrugte?	⊙	⊙	⊙	⊙	⊙
6	Eet u kind gereeld lekkers of kosse ryk aan suiker?	⊙	⊙	⊙	⊙	⊙

2.2 Het die moeder “Nooit”, “Selde”, “Soms”, “Gereeld ” of “Altyd” gebruik om haar keuses aan te dui?

No.	Item	Keuses				
1	Eksklusief geborsvoed	Nooit	Selde	Soms	Gereeld	Altyd
2	Eksklusief met formulemelk gevoed	Nooit	Selde	Soms	Gereeld	Altyd
3	Die kind ontvang bors- en formulemelk	Nooit	Selde	Soms	Gereeld	Altyd

2.3 Indien die kind nie eksklusief geborsvoed is nie, watter melk het u vir die kind gegee?

1	Formulemelk	
2	Koeimelk	
3	Sojamelk	
4	Ander (spesifiseer)	

2.4 Beskryf die groei raamwerk in die RTHB.

1	Groei goed	
2	Groeivertraging	
3	Verloor gewig	

2.5 Is berading aan ouer/versorger rakende die volgende verskaf?

1	Diarree	
2	Gesonde eetgewoontes	
3	Borsvoeding	
4	Bykomende voeding	
5	Voedingversterking	
6	Groeimonitering	
7	Higiëne	
8	Ander (spesifiseer)	

2.6 Wanneer het u met bykomende of aanvullende voedings begin?

1	Voor 6 maande	
2	Na 6 maande	
3	Na 1 jaar	

No.	Item	Keuses

2.7 Hoekom het u kind vandag die kliniek besoek?

1	Groeimonitering	
2	Immunisering	
3	Siek	
4	Opvolgbesoek	
5	Ander (spesifiseer asb):	

2.8 Hoe gereeld het die kind die kliniek na sy/haar geboorte besoek?

1	Weekliks	
2	Maandeliks	
3	Kwartaalliks	
4	Halfjaarliks	
5	Jaarliks	

2.9 Wat is die groeiraamwerk van die kind?

Groeiraamwerk	< -3	< -2	-2 < +2	> +2	> +3
Gewig vir ouderdom					
Lengte vir ouderdom					
Gewig vir lengte					

2.10 Immunisering

Nr.	Item	Besluit				
		Verskil sterk	Stem nie saam	onbekend	Stem saam	Stemten volle saam
1	U kind se immunisering is op datum.	⊙	⊙	⊙	⊙	⊙
2	U kind het gereeld opvolg-immuniserings ontvang.	⊙	⊙	⊙	⊙	⊙
3	U kind het gereeld veldtog-versterkingsimmunisering ontvang.	⊙	⊙	⊙	⊙	⊙
4	U kind is gereeld ontwurm.	⊙	⊙	⊙	⊙	⊙
5	U kind se Vitamine A-aanvulling is op datum.	⊙	⊙	⊙	⊙	⊙
6	Het u kind voorheen ysteraanvullings ontvang?	⊙	⊙	⊙	⊙	⊙
7	Het u kind die kliniek gereeld besoek?	⊙	⊙	⊙	⊙	⊙
8	Is die RTHB korrek voltooi?	⊙	⊙	⊙	⊙	⊙
9	Is u kind prematuur gebore?	⊙	⊙	⊙	⊙	⊙

2.11 Lys u kind aan enige van die volgende wanvoedingdiagnoses?

1	Kwashiorkor	
2	Marasmus	
3	Erge akute wanvoeding	
4	Matige akute wanvoeding	
5	Obesiteit/Oorgewig	
6	Ondergewig	
7	Groeibelemmering	
8	Vitamine A- of ystergebrek	
9	Ander (spesifiseer):	

3. KINDERKARAKTERTREKKE/-EIENSKAPPE

3.1 Het u kind enige van die volgende simptome?

1	Koors	
2	Masels	
3	Diarree	
4	Akute respiratoriese nfeksie (ARI)	
5	Ander (spesifiseer):	

3.2 Beskryf die groei patroon in die RTHB.

1	Groei goed	
2	Groeivertraging	
3	Verloor gewig	

4. MOEDERLIKE SORG EN KARAKTEREIENSKAPPE

4.1 Ouderdom van moeder

1	<16 jaar oud	
2	16-25 jaar oud	
3	26-35 jaar oud	
4	36-40 jaar oud	
5	>40 jaar oud	

4.2 Hoeveel kinders het u gehad?

1	1 kind	
2	2 kinders	
3	3 kinders	
4	4 kinders	
5	Meer as 4 kinders	

4.4 Wie versorg die kind bedags?

1	Moeder	
2	Vader	
3	Ouma	
4	Bure	
5	Dagsorgsentrum	
6	Versorger	

4.5 Wat is die gesondheidstatus van die moeder of versorger?

1	Goed	
2	Bevredigend	
3	Swak	

4.3 Gesondheidstatus gedurende swangerskap

Nr.	Item	Keuses				
		Verskil sterk	Stem nie saam	Onbekend	Stem saam	Stem tenvolle saam Agree
1	Moeder het voorgeboortekliniek tydens swangerskap met hierdie kind besoek.	⊙	⊙	⊙	⊙	⊙
2	Moeder het soms gedurende die swangerskap aan depressie gely.	⊙	⊙	⊙	⊙	⊙
3	Het u gedurende die swangerskap gerook of dwelmmiddels gebruik?	⊙	⊙	⊙	⊙	⊙
4	Het u alkohol gedurende u swangerskap gebruik?	⊙	⊙	⊙	⊙	⊙
5	Het u daagliks tydens u swangerskap alkohol gebruik?	⊙	⊙	⊙	⊙	⊙

5. OMGEWINGSFAKTORE

Nr.	Item	Keuses				
		Verskil sterk	Stem nie saam	Onbekend	Stem saam	Stem ten volle saam
1	Huishouding het toegang tot skoon drinkwater.	⊙	⊙	⊙	⊙	⊙
2	Daar is ’n vorm van inkomste tot die huishouding.	⊙	⊙	⊙	⊙	⊙
3	Huishouding het toegang tot elektrisiteit.	⊙	⊙	⊙	⊙	⊙
4	Huishouding het ’n yskas om voedsel vars te hou.	⊙	⊙	⊙	⊙	⊙
5	Huishouding het ’n elektriese stoof om voedsel voor te berei.	⊙	⊙	⊙	⊙	⊙
6	Kliniekpersoneel is baie behulpsaam.	⊙	⊙	⊙	⊙	⊙
7	Die gesondheidswerkers verskaf genoegsame gesondheidsvoorligting met betrekking tot gesonde eetgewoontes.	⊙	⊙	⊙	⊙	⊙
8	Die gesinswoning is groot genoeg vir al die gesinslede om in te bly.	⊙	⊙	⊙	⊙	⊙
9	Ontvang u goeie dienslewering by die kliniek?	⊙	⊙	⊙	⊙	⊙

Bly die moeder in:

1	Informele nedersetting	
2	Baksteenhuis / HOP-huis	
3	Agterplaas	
4	Ander (spesifiseer):	

Appendix B. Interview schedule with clinic staff (English version)

1. In your understanding, how would you define malnutrition?
2. How often does the staff do health promotion talks regarding malnutrition in this facility?
3. What measures do you have in place to combat malnutrition in your facility, and what would be the way forward to address child malnutrition?
4. In the light of combatting malnutrition, in your opinion as a health care provider, how can the service of the community care worker be improved?
5. When last did you attend any breastfeeding course?
6. What are the major conditions on which you as clinic staff have to focus when the mother/guardian opts to bottlefeed exclusively?
7. What advice would you offer the mother/guardian regarding bottle feeding?

Onderhoudskedule met die verpleegpersoneel in die kliniek (Afrikaans)

1. Wat verstaan u onder die term “wanvoeding”?
2. Hoe dikwels bied u gesondheidspraatjies met betrekking tot wanwoeding in die kliniek aan?
3. Watter maatreëls is in plek in die kliniek om wanvoeding te bestry, en hoe sien u die pad vorentoe om wanvoeding te voorkom?
4. Watter rol kan die gemeenskapwerker in die voorkoming van wanvoeding speel?
5. Wanneer laas het u ’n opknappingskursus in borsvoeding bygewoon?
6. Wat is die belangrikste eienskappe waarop u fokus wanneer ’n ouer/voog die kind uitsluitlik bottelmelk wil gebruik?
7. Watter raad sal u vir die moeder/voog gee in verband met bottelvoeding?

Appendix C: Patient information letter

Dear Participant

You are invited to take part in a research project. Kindly spend a few minutes to read the information presented here, which will explain the details of this project. Please feel free to ask any questions about this project that you may not fully understand. It is very important that you are fully satisfied and that you clearly understand what this research entails and how you could be involved. Furthermore, your participation is entirely voluntary and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you have agreed to participate initially.

This research has been approved by the Committee for Human Research at the Cape Peninsula University of Technology, and will be conducted according to the ethical guidelines and principles of the International Declaration of Helsinki, the South African Guidelines for Good Clinical Practice and the Medical Research Council's (MRC) Ethical Guidelines for Research.

What does the research entail?

The study aims to examine factors causing malnutrition among children six months to five years of age in a semi-rural area of the Western Cape, South Africa, to improve the nutritional status, growth development and health of the infants and young children. The primary research objective is to determine underlying factors contributing to malnutrition among children aged six months to five years living in a semi-rural area in the Western Cape, South Africa. When a large group of mothers with children suffering from malnutrition with similar concerns has been collected, meaningful research into the understanding of malnutrition may become possible.

Why have you been invited to participate?

Child malnutrition, in the researcher's view, is a major problem in South Africa and in the Groendal community in particular despite the implementation of various policies and programmes to combat malnutrition among these children. In order to assess the factors leading to malnutrition among children aged six months to five years, you have been approached to participate in this project to determine the factors leading to malnutrition among children in the Groendal community in Franschhoek. You also meet the criteria used to select participants for this study.

What will your responsibilities be?

You are requested to provide information based on your knowledge of the research problem. This means that you are requested to complete the questionnaire which will take no longer than 15 minutes.

Will you benefit from taking part in this research?

The responses from you and all the other participants will add great value to the research field in combating malnutrition in the area, and it will also be beneficial to the individuals concerned, the community and society in general. In addition, it will provide knowledge about nutrition to the parents/caregivers to improve their children's nutritional status.

Are there any risks involved?

There is no risk involved if you participate in the research. The questions do not require any personal details such as your name, address or identity or passport details. You will only be asked to provide your child's date of birth and gender.

Will you be paid to take part in this study? Are there any costs involved?

Your participation is voluntary and you are not expected to pay anything.

DECLARATION BY PARTICIPANT

I declare that:

- I have read the information.
- The consent form is written in a language in which I am fluent and comfortable using.
- I have had a chance to ask questions, and that all my questions have been adequately answered.
- I understand that taking part in this study is voluntary, and I have not been pressured to participate in it.
- I may choose to withdraw from the study at any time.
- I will not be penalised or prejudiced in any way if I do so.
- I may be asked to leave the study before it has finished if the researcher feels it is in my best interest or if I do not follow the study plan as agreed.

I also consent that my information may be:

- Used / discarded ……

Signed at (place) …….. on (date) ……..…….. 2016

Signature of participant …… Signature of witness ……..

Appendix D: Consent form

School of Health and Wellness
Nursing Division
E-mail: reginaldloots@yahoo.com
Cell: +2782 219 8866
10 January 2016

MANAGEMENT OF MALNUTRITION STUDY CONSENT FORM

Principal Investigator	Mr. R Loots
Co-investigators	Dr. B Yan
	Dr. H Vember
Address	Faculty of Health and Wellness Sciences,
	Cape Peninsula University of Technology (CPUT)
	Bellville Campus,
	Symphony Road
	Bellville
	7535
Contact Details	Mr. R Loots: 082 219 8866
	Prof. B Yan: 072 613 6286 //YanB@cput.ac.za
	Dr. H Vember: 021 959 6155 //vemberH@cput.ac.za

Appendix E: Letter requesting permission to conduct research

Brewelskloof Hospital
Worcester
6850
17 December 2015

For attention: Dr. L Philips and Ms. S Neethling

REQUEST FOR PERMISSION TO CONDUCT MY STUDY FROM SEPTEMBER 2014 TO NOVEMBER 2016 AT YOUR HEALTH FACILITY IN FRANSCHHOEK

I, Reginald Loots, student at the Cape Peninsula University of Technology, hereby request permission to conduct a study at your institution for my master's degree in nursing.

The title of my research is FACTORS CAUSING MALNUTRITION AMOUNG CHILDREN SIX MONTHS TO FIVE YEARS OF AGE IN A SEMI-RURAL AREA OF THE WESTERN CAPE, SOUTH AFRICA.

Benefits of the study will be to enable the local health care organisations to promote nutritional education with the aim of improving nutritional knowledge and food choices to encourage a better quality of life into adulthood.

There are no risks associated with this study, as participants will only be asked to fill in a questionnaire. In case of any emotional trauma suffered by any participant due to this study, help with counselling has been requested from the Department of Social Services based in Franschhoek.

Yours faithfully
R. LOOTS

Cape Peninsula University of Technology

Health Research
Head Office
Cape Town
8001
17 December 2015

For attention: Ms. Vikilahle, Ms. Roderick and Mr. Petros

REQUEST FOR PERMISSION TO CONDUCT MY STUDY FROM SEPTEMBER 2014 TO NOVEMBER 2016 AT YOUR HEALTH FACILITY IN FRANSCHHOEK

I, Reginald Loots, student at the Cape Peninsula University of Technology, hereby request permission to conduct a study at your institution for my master's degree in nursing.

The title of my research is FACTORS CAUSING MALNUTRITION AMOUNG CHILDREN SIX MONTHS TO FIVE YEARS OF AGE IN A SEMI-RURAL AREA OF THE WESTERN CAPE, SOUTH AFRICA.

Benefits of the study will be to enable the local health care organisations to promote nutritional education with the aim of improving nutritional knowledge and food choices to encourage a better quality of life into adulthood.

There are no risks associated with this study, as participants will only be asked to fill in a questionnaire. In case of any emotional trauma suffered by any participant due to this study, help with counselling has been requested from the Department of Social Services based in Franschhoek.

Yours faithfully
R. LOOTS

Appendix F: Permission request from health research

Cape Peninsula University of Technology

Health Research
Head Office
Cape Town
8001
4 March 2016

For attention: Dr Hawkridge and Mr. Petros

REQUEST FOR PERMISSION TO CONDUCT MY STUDY FROM JANUARY 2016 TO NOVEMBER 2016 AT YOUR HEALTH FACILITY IN FRANSCHHOEK.

I, Reginald Loots, student at the Cape Peninsula University of Technology, hereby request provisional permission and support from your office, pending the outcomes of the Ethics Committee, to conduct a study at the Groendal Clinic for my master's degree in nursing.
The response from your office will only be included in my proposal as an annexure and will not be used as permission to do the study.

The title of my research is FACTORS CAUSING MALNUTRITION AMOUNG CHILDREN SIX MONTHS TO FIVE YEARS OF AGE IN A SEMI-RURAL AREA OF THE WESTERN CAPE, SOUTH AFRICA.

Benefits of the study will be to enable the local health care organisations to promote nutritional education with the aim of improving nutritional knowledge and food choices to encourage a better quality of life into adulthood. There are no risks associated with this study, as participants will only be asked to fill in a questionnaire. In case of any emotional trauma suffered by any participant due to this study, help with counselling has been requested from the Department of Social Services based in Franschhoek.

Yours faithfully
R. LOOTS

Cape Peninsula University of Technology

Stellenbosch Hospital
Merriman Street
Stellenbosch
7600
4 March 2016

For attention: Dr. R Davids

REQUEST FOR PERMISSION TO CONDUCT MY STUDY FROM JANUARY 2016 TO NOVEMBER 2016 AT YOUR HEALTH FACILITY IN FRANSCHHOEK.

I, Reginald Loots, student at the Cape Peninsula University of Technology, hereby request provisional permission and support from your office, pending the outcomes of the Ethics Committee, to conduct a study at the Groendal Clinic for my master's degree in nursing.
The response from your office will only be included in my proposal as an annexure and will not be used as permission to do the study.

The title of my research is FACTORS CAUSING MALNUTRITION AMOUNG CHILDREN SIX MONTHS TO FIVE YEARS OF AGE IN A SEMI-RURAL AREA OF THE WESTERN CAPE, SOUTH AFRICA.

Benefits of the study will be to enable the local health care organisations to promote nutritional education with the aim of improving nutritional knowledge and food choices to encourage a better quality of life into adulthood. There are no risks associated with this study, as participants will only be asked to fill in a questionnaire. In case of any emotional trauma suffered by any participant due to this study, help with counselling has been requested from the Department of Social Services based in Franschhoek.

Yours faithfully
R. LOOTS

Appendix G: Response from Health Research Council

Dear Researcher

Thank you for your enquiry regarding seeking approval to conduct research in the Western Cape provincial health facilities.

Kindly note that you will need to register on the National Health Research database and submit your proposal online. You are required to submit the Annexure 2 form attached along with your research proposal as one document. Please refer to the Researcher User Manual and FAQs before you begin your application. Should you have any problems, please submit your query to the NHRD helpdesk.

Also note that all applications for tertiary hospitals (Groote Schuur, Tygerberg and Red Cross) must be submitted directly to the facility as well as a separate application done on the National Health Research database.

Kindly note that research proposals wishing to access facilities that are managed by the City of Cape Town need to be submitted to them as well. The contact person for the City of Cape Town is Helene Visser at Helene.Visser@capetown.gov.za, telephone 021 400 3981.

Normally the following are the necessary documents we expect from researchers:

1. Research proposal/protocol and supporting documents
2. Ethics clearance letter
3. Annexure 2 (completed)
4. MCC approval where applicable
5. Proof of registration with the National Clinical Trials Register (where applicable)
6. CVs of principal investigator and collaborating researchers

The link to the NHRD is:

http://nhrd.hst.org.za

Regards

Sinazo Vikilahle

Intern: Health Research
Directorate: Health Impact Assessment
Western Cape Government: Department of Health
Address: 5th Floor, 8 Riebeek Street, Cape Town 8001
Tel.: 021 483 0881
E-mail: Sinazo.Vikilahle@westerncape.gov.za
Website: www.westerncape.gov.za

Appendix H: Letter to the Department of Social Services

Dear Sir / Madam

REQUEST FOR PROFESSIONAL COUNSELLING, ASSISTANCE AND SUPPORT IN CASE OF ANY EMOTIONAL DISTRESS DUE TO STUDY

I, Reginald Loots, student at the Cape Peninsula University of Technology currently studying towards a master's degree in nursing at the institution, will conduct a research study at a clinic in Groendal in Franschhoek.

I hereby request the assistance of a social worker who could provide assistance and support to any participant in case of their experiencing any emotional distress due to the study.

Your assistance in this regard will be appreciated. Should you to wish to obtain more information regarding the study, please feel free to contact me telephonically at 082 219 8866 or by email. Please forward any response to my principal supervisor, Prof Khalil, at profdkhalil@gmail.co

Thank you in advance.

Yours faithfully

R LOOTS

AFRIKAANSE CHRISTELIKE VROUEVERENIGING
H/v La Provence en Stiebeuelstr. 17
Posbus 216
FRANSCHHOEK, 7690

ASSOCIATION OF AFRIKAANS CHRISTIAN WOMAN
Tel : 021-876 2670
Fax : 021-876 2688
E-mail: acvv@mweb.co.za

NPO : 002-887

28/09/2015

Mnr. Loots
Cheval 19
Spring Field Close
Buh Rein Estate
KRAAIFONTEIN
7606

Beste Mnr. Loots

Die ACVV Franschhoek lewer dienste in die woonbuurte Mooiwater, Groendal, Langrugplakkerskamp en Franschhoek dorp. Ek is beskikbaar om u te ondersteun soos in u skrywe versoek. Kontak nommer: 021-876 2670. Die Departement Maatskaplike Dienste, Paarl, lewer dienste in Bosbou La Motte, Wemmershoek Saagmeule, Dennegeur en omliggende plase in Franschhoek area.

U kan Mnr. Brian Goliath vir dienste in hierdie areas kontak by tel. 021-8711682, E-pos: brian.goliath2@westerncape.gov.za.

Vriendelike groete.

M. H.

Mientie Kroukamp
MAATSKAPLIKE WERKER
ACVV Franschhoek

Sent from my BlackBerry 10 smartphone.

From: ACVV Franschhoek <acvv@mweb.co.za>

Sent: Thursday 24 July 2014 15:23

To: reginaldloots@yahoo.com

Subject:

----- Original Message -----

From: Mientie ACVV

To: 'ACVVFranschhoek'

Sent: Thursday, July 24, 2014 3:10 PM

Subject: RE: Fw:

Beste mnr. Loots,

Die ACVV Franschhoek lewer dienste in die woonbuurte Mooiwater, Groendal, Langrugplakkerskamp en Franschhoekdorp. Ek is beskikbaar om u te ondersteun soos in u skrywe versoek. Kontaknommer: 021 876 2670. Die Departement Maatskaplike Dienste Paarl, lewer dienste in Bosbou La Motte, Wemmershoek, Saagmeule, Dennegeur en omliggende plase in Franschhoek-area. U kan mnr. Brian Goliath vir dienste in hierdie areas kontak by tel. 021 871 1682, e-pos: brian.goliath2@westerncape.gov.za

Vriendelike groete.

Mientie Kroukamp
Maatskaplike Werker
ACVV Franschhoek

From: ACVV Franschhoek [mailto:acvv@mweb.co.za]

Sent: 23 July 2014 03:08 PM

To: Mientie Kroukamp; Sharesa Arendse; Ronelle Pinard

Subject: Fw: Fw:

----- Original Message -----

From: reginaldloots@yahoo.com

To: acvv@mweb.co.za

Sent: Wednesday, July 23, 2014 2:24 PM

Subject: Fw:

Sent via my BlackBerry from Vodacom - let your email find you!

Appendix I: Permission to Conduct Study at Health Facility

Groendal Clinic
Stiebeul Street
Groendal
Franschhoek
7691
12 August 2015

Dear Sr. Andries

I am Reginald Loots, an MTech student at the Cape Peninsula University of Technology, intending to conduct a study at your facility. Permission has been requested from the Chief Directorate of the Cape Winelands District. I am awaiting response.

The title of my proposal is *Factors associated with malnutrition among children six months to five years of age in a semi-rural area of the Western Cape, South Africa.*

I hereby request your assistance with the recruitment of participants for this study.

Kind regards

Reginald Loots
082 219 8866

Appendix J: Ethics approval from the Faculty

Cape Peninsula
University of Technology

HEALTH AND WELLNESS SCIENCES RESEARCH ETHICS COMMITTEE (HW-REC)
Registration Number NHREC: REC- 230408-014

P.O. Box 1906 • Bellville 7535 South Africa
Symphony Road Bellville 7535
Tel: +27 21 959 6917
Email: sethn@cput.ac.za

9 May 2016
REC Approval Reference No:
CPUT/HW-REC 2016/H2

Faculty of Health and Wellness Sciences – Nursing Department

Dear Mr Reginald Loots

Re: APPLICATION TO THE HW-REC FOR ETHICS CLEARANCE

Approval was granted by the Health and Wellness Sciences-REC on 14 April 2016 to Mr Loots for ethical clearance. This approval is for research activities related to staff research in the Department of Biomedical Sciences at this Institution.

TITLE: Factors Associated with Malnutrition among Children Six Months to Five Years of age in Semi-Rural area of the Western Cape

Supervisor: Dr Bingwen Yan
Co-Supervisor: Dr Hilda Vember

Comment:
Approval will not extend beyond 10 May 2017. An extension should be applied for 6 weeks before this expiry date should data collection and use/analysis of data, information and/or samples for this study continue beyond this date.

The investigator(s) should understand the ethical conditions under which they are authorized to carry out this study and they should be compliant to these conditions. It is required that the investigator(s) complete an **annual progress report** that should be submitted to the HWS-REC in December of that particular year, for the HWS-REC to be kept informed of the progress and of any problems you may have encountered.

Kind Regards

Mr. Navinadhra Naidoo
Chairperson – Research Ethics Committee
Faculty of Health and Wellness Sciences

Appendix K: Response from Facility Manager in Franschhoek

From: Elizabeth Andries <Elizabeth.Andries@westerncape.gov.za>
Date: Thu, 13 Aug 2015 12:35:54 +0000
To: reginaldloots@yahoo.com<reginaldloots@yahoo.com>
Cc: vanwyklindzay@yahoo.com<vanwyklindzay@yahoo.com>
Subject: RE: Permission To Conduct Study At Your Facility

Dear Reggie
I hereby acknowledge receipt of your application. I give permission that the study can be conduct at our facility.
Regards
Sr E Andries

From: reginaldloots@yahoo.com [mailto:reginaldloots@yahoo.com]
Sent: 13 August 2015 02:11 PM
To: Elizabeth Andries; Groecli Groecli
Subject: Fw: Permission To Conduct Study At Your Facility
Sent via my BlackBerry from Vodacom - let your email find you!

reginaldloots@yahoo.com
From: Surina Neethling <Surina.Neethling@westerncape.gov.za>
Date: Thu, 13 Aug 2015 16:03:16 +0000
To: Denise Johnson<Denise.Johnson@westerncape.gov.za>
Cc: reginaldloots@yahoo.com<reginaldloots@yahoo.com>
Subject: RE: Permission To Conduct Study At Your Facility

Dear all
Please follow communication and research requests via: **Apply for Approval on the National Health Research Database: http://nhrd.hst.org.za**
Regards
Surina
SURINA NEETHLING | DD: PROFESSIONAL SUPPORT SERVICES (PSS) | WESTERN CAPE GOVERNMENT
Private Bag X3079 | 7 Haarlem Street | Worcester | 6850
Tel: (023) 348 8120 |Fax: 086 720 1602 | e-mail: **Surina.Neethling@westerncape.gov.za**

Western Cape Government
BETTER TOGETHER.

From: Denise Johnson
Sent: 13 August 2015 02:53 PM
To: Surina Neethling
Cc: reginaldloots@yahoo.com
Subject: RE: Permission To Conduct Study At Your Facility
Dear Surina
Please see request.

Regards

Denise Johnson
Primary Health Care Manager
Stellenbosch Sub-District
Cape Winelands District
WESTERN CAPE GOVERNMENT HEALTH
Private Bag X5027 | Stellenbosch Hosp Admin Building|Merriman Avenue | Stellenbosch | 7599
Tel: +27 21 808 6108
Fax2mail: 0862632700
E-mail: Denise.Johnson@westerncape.gov.za
Website: www.westerncape.gov.za

From: Denise Johnson <Denise.Johnson@westerncape.gov.za>
Date: Thu, 13 Aug 2015 12:53:29 +0000
To: Surina Neethling<Surina.Neethling@westerncape.gov.za>
Cc: reginaldloots@yahoo.com<reginaldloots@yahoo.com>
Subject: RE: Permission To Conduct Study At Your Facility

Dear Surina

Please see request.

Regards

Denise Johnson
Primary Health Care Manager
Stellenbosch Sub-District
Cape Winelands District
WESTERN CAPE GOVERNMENT HEALTH
Private Bag X5027 | Stellenbosch Hosp Admin Building|Merriman Avenue | Stellenbosch | 7599
Tel: +27 21 808 6108
Fax2mail: 0862632700
E-mail: Denise.Johnson@westerncape.gov.za
Website: www.westerncape.gov.za
!

Appendix L: Intervention type, nature, themes and quotes

Intervention type	Nature	Themes	Quotes
Malnutrition prevention intervention	Clinic-based interventions and practices	Routine health talks at the facility	The councillor does the health talks in the facilities, but not as regularly as it should be done. It is their duty to do health talks two times a day, every day [GD1CHW 2]. We also use to have talks but right now we don't have it anymore. The Hospice has taken over the role of health promoter and is very good at what they do in this regard and include us in their reports and referrals. [GD3CHW 2]
		Education during consultation	The CNP's [Clinical Nurse Practitioner] when they are treating clients, they give health advice to the mothers.[GD1CHW 2]I think that there are cute pamphlets we do have unfortunately it's in a small amount and when it's finished it's finished. There is that cute one that starts in the pregnancy and goes through up until the child is 2 years old that explains a proper diet and everything. I just think that if we have more of those available it would be good.[GD1CHW 3]
		When the need arises during TB treatment	I work in the TB room so when I encounter children that are malnourished I have the talk as in the case of TB it is very important, so I must talk to individual cases. [GD3CHW 1]It is very important for me in the TB room to have these talks as I need to monitor the children's weight and to educate the mother around nutrition. All talks depend on the cases as you get the unemployed mom and you can't tell her she needs to buy this or that. As well as the pre-mature baby you can measure the same as a baby born full term, or an alcohol foetus syndrome child so it is individual talks to the child's background and needs. The mother's would tell me the child does not want to eat, the child do not like vegetables but the mom is busy giving the child a packet of chips. I normally tell the mothers to use the chips as a bribe in such cases. A breastfed child would be waiting until the mother comes from work and would not have had any feeding during the day.[GD3CHW 1]When children come to the baby room we give health education on malnutrition. The children over a year that are still being breastfed not feeding the child, as the child nutrition category is different, due to this it is easier for the mother to rather give the breast and not make food for the child. I also show and explain that in the Road to Health book where it explains what the child should eat and at what stage of their growth. [GD3CHW 3]
		Education of pregnant mothers	So the time to start is when they are pregnant and clear governance should be given to educate them more during pregnancy. [GD1CHW 5]

Intervention type	Nature	Themes	Quotes
		during their maternity visits	We do talks of malnutrition every day [GD2CHW 6]
	Community-based interventions	Routine home visits	We do have CCW's but they are working in the community and they do their health talks in the area where they are allocated too.[GD1CHW 2] CCWs are allocated to the area and do daily visits door to door and check the children's road to health booklet to see if there is any who did not get their vitamins or immunisations that were missed, they give them a date and refer to the facility.[GD1CHW 2] We give this information in every house when we do our rounds in the community. There is someone that works with the institution. She also translates to the mother if they do not understand.[GD2CHW 4] Door to door is when we go to every house in the community in the past we did it to go see sick people but now we go see the healthy ones to see if they are not sick. On these visits we pick up on the malnourished children who are not attending crèche.[GD2CHW 2]
		Visits to local crèches	We have done the campaign now recently and going through the areas we would find that there is a lot of crèches that we visited that are not really up to standard. CCW workers goes in and out of the crèches but because it's such a lot that there is not enough back up to report these and do regular follow ups on the crèches.[GD1CHW 5] We do the crèches and look at the road to health book to see if they had deworming and vitamin A. [GD2CHW 2]
		Community campaigns	We have campaigns with the CCW's [Community care workers] and give a date for the children for weighing and check whether their weight is stable and give them health education to the mothers.[GD1CHW 1]
		Deworming and provision of vitamins	[The campaigns include providing] vitamins and de-worming.[GD1CHW 1] It depends as its 6months /6months if there are those children who did not get their vitamin A then we give it but the sister will give the deworming.[GD2CHW 2]
Malnutrition treatment/management	Referrals	Referral to clinic/specialist/nutritionists	I would like to add that Ms X refers the children when they are under weight or have been on the second line for a while.[GD1CHW 4] We can only give them information and refer them to the clinic. I can see on the road to health book. Also when doing the mid-arm I can see this child is under weight. I then give them a referral letter to the clinic. The process is you check the road to health book and then we see the child is underweight we refer the child or if the immunizations are not up to date, or the vitamin A drops we refer them to the clinic.[GD2CHW 4]

Intervention type	Nature	Themes	Quotes
		Referral for food parcels	If a child comes to us with a BMI of under 13 for the first time depending on situation and the birth weight we would do a HP test in cases where they are underweight, we give a feeding pack to the mother and a return consultation date. In cases where the BMI is under 10.1 the child comes back every 2 weeks for an iron deficiency test and by the 3rd time the child will be referred to the dietician for consultation.[GD3CHW 3]
		Referral to social workers	When you see there is abuse at home you can refer them to the social worker so that they can play their part they take to children and put them in a safe place. [GD1CHW 6]

Appendix M: Bivariate associations of socio-demographic variables

Predictors	Obesity			Stunting			NutriSAM			Nutrimam			Underweight		
	χ^2	df	p-val	χ^2	df	p-val	χ^2	df	p-val	χ^2	df	p-val	χ^2	df	p-val
Gender	0.8708	1	0.351	0.1049	1	0.746	0.0268	1	0.870	1.4323	1	0.231	0.3434	1	0.558
CHeating	1.7156	1	0.190	0.0879	1	0.767	1.9608	1	0.161	0.3483	1	0.555	0.0188	1	0.891
CComfeds	1.0075	1	0.315	0.0037	1	0.952	2.9304	1	0.087	0.5205	1	0.471	0.2326	1	0.630
Cfortfoods	1.8298	1	0.176	0.6143	1	0.433	2.4211	1	0.120	1.0812	1	0.298	0.4457	1	0.504
CGMOs	0.6237	1	0.430	0.1107	1	0.739	0.0000	1	1.000	0.6316	1	0.427	0.6536	1	0.419
C Hgyenic	2.9092	1	0.088	0.2458	1	0.620	0.0017	1	0.967	2.0240	1	0.155	1.4508	1	0.228
bweight	10.4949	1	0.001	0.2853	1	0.593	13.9493	1	0.000	0.8589	1	0.354	0.3644	1	0.546
IntroSfood	2.2752	1	0.131	2.7474	1	0.097	0.0701	1	0.791	0.2977	1	0.585	0.2649	1	0.607
P Educat	6.5264	2	0.038	9.1590	2	0.010	1.9608	2	0.375	1.7337	2	0.420	0.0188	2	0.991
Other feed	0.4678	2	0.791	0.1042	2	0.949	1.0161	2	0.602	0.9288	2	0.629	1.3252	2	0.515
GpRTHB	50.6100	2	0.000	15.4614	2	0.000	2.7158	2	0.257	3.4586	2	0.177	15.4479	2	0.000
Cunts Diar	1.4331	2	0.231	1.4871	2	0.223	0.9774	2	0.323	1.5082	2	0.219	1.5082	2	0.219
CBrstfed	2.1678	1	0.141	0.3125	2	0.855	0.1201	2	0.942	0.2397	2	0.887	2.7771	2	0.249
EPIUpdat	0.1651	2	0.921	0.6996	2	0.705	7.4305	2	0.024	0.2457	2	0.884	0.0141	2	0.993
Nof visits	5.1598	2	0.076	0.6365	2	0.727	0.0782	2	0.962	1.1760	2	0.555	2.9722	2	0.226
EPIRvisit	0.7524	2	0.686	1.0244	2	0.599	11.9544	2	0.003	0.2506	3	0.882	0.0076	2	0.996
EPI RTHB	1.4798	2	0.477	1.3924	2	0.498	0.4277	2	0.807	0.2482	2	0.883	3.0279	2	0.220

Clean H20	0.1742	2	0.917	0.0221	2	0.989	2.0563	2	0.358	0.5058	2	0.777	0.4602	2	0.794
EHincoms	0.2283	2	0.892	0.6254	2	0.731	3.2629	2	0.196	5.9649	2	0.051	0.5524	2	0.759
EHAssEl	0.7053	2	0.703	3.4935	2	0.174	2.2608	2	0.323	1.0396	2	0.595	1.5793	2	0.454
Asscstorag	1.2884	2	0.525	4.8012	2	0.091	2.3255	2	0.313	4.6332	2	0.099	2.1488	2	0.342
Asselstove	0.7053	2	0.703	3.4935	2	0.174	2.2608	2	0.323	1.0396	2	0.595	1.5793	2	0.454
HSmothercarg iver	5.2748	3	0.153	6.3881	3	0.094	0.2587	3	0.968	19.3670	3	0.000	4.9554	3	0.175
Fam size	9.8049	3	0.020	1.4900	3	0.685	1.1798	3	0.758	9.1547	3	0.027	4.0354	3	0.258
Age	7.0637	3	0.070	4.5468	3	0.208	2.1887	3	0.534	5.4198	3	0.144	0.6031	3	0.896
Fam Inco	3.9407	3	0.268	4.1878	3	0.242	1.2970	3	0.730	1.2590	3	0.739	3.8284	3	0.281
P marital status	0.6801	3	0.878	0.2014	3	0.977	4.6045	3	0.203	2.8340	3	0.418	1.2418		0.743
P empl stat	5.1992	3	0.158	7.0427	3	0.071	1.2173	3	0.749	9.2398	3	0.026	1.0160	3	0.797
U Rtea	0.7828	3	0.854	1.4648	3	0.690	2.4621	3	0.482	4.1467	3	0.246	1.9972	3	0.573
Veggies	0.5593	3	0.906	1.3860	3	0.709	5.1322	3	0.162	19.948	3	0.000	2.1618	3	0.540
Sugar	0.7261	3	0.867	6.4813	3	0.090	3.8470	3	0.278	0.7381	3	0.864	2.1873	3	0.534
EPICtchup	2.8804	3	0.410	3.3315	3	0.343	4.4978	3	0.212	7.0045	3	0.072	2.6055	3	0.457
EPI Vit A	1.2015	3	0.753	0.6803	3	0.878	15.3071	3	0.002	0.1858	3	0.980	1.6901	3	0.639
EPI Iron	7.4325	3	0.059	0.9891	3	0.804	2.2920	3	0.514	13.0554	3	0.005	2.0168	3	0.569
EPIsyptom	0.7221	3	0.868	0.7298	3	0.866	49.0248	3	0.000	0.3359	3	0.953	2.1311	3	0.546
Ageofmot	7.3940	3	0.060	4.0056	3	0.261	1.6518	3	0.648	2.6443	3	0.450	7.3146	3	0.063
HSantvisit	4.0310	3	0.258	2.1779	3	0.536	0.4051	3	0.939	1.7544	3	0.625	1.8630	3	0.601
HSdeprpre	0.7926	3	0.851	0.6437	3	0.886	1.3672	3	0.713	7.6316	3	0.054	3.0612	3	0.382

Msmrdrug	15.1461	3	0.002	9.4017	3	0.024	5.7617	3	0.124	2.1617	3	0.540	7.5059	3	0.057
HSalcoho	6.6948	3	0.082	9.7268	3	0.021	1.0917	3	0.779	3.3835	3	0.336	2.1611	3	0.540
Enhlthinfo	5.9365	3	0.115	1.2729	3	0.736	0.2406	3	0.971	0.2913	3	0.962	2.5582	3	0.465
Hsgdhcars	5.6508	3	0.130	3.7352	3	0.292	7.0457	3	0.070	2.1930	3	0.533	8.8524	3	0.031
Hyg Prep	2.8892	4	0.577	3.5490	4	0.470	1.6204	4	0.805	4.2941	4	0.368	6.2800	4	0.179
Reg PEM	16.5147	4	0.002	3.2614	4	0.515	2.8387	4	0.585	7.4177	4	0.115	6.0117	4	0.198
T of ptein	3.6856	4	0.450	0.5213	4	0.971	7.5203	4	0.111	1.1553	4	0.885	2.6277	4	0.622
Ex Bfed	12.3366	4	0.015	4.9430	4	0.293	1.6980	4	0.791	5.2571	4	0.262	4.4301	4	0.351
Ex Fmfed	2.3011	4	0.681	3.6976	4	0.448	2.6791	4	0.613	0.8379	4	0.933	2.2835	4	0.684
Mix feed	4.0279	4	0.402	8.1981	4	0.085	3.2174	4	0.522	6.1290	4	0.190	5.8485	4	0.211
Booster	6.7048	4	0.152	3.7468	4	0.441	2.0182	4	0.732	7.7778	4	0.100	4.0116	4	0.404
EPIWorm	9.0688	4	0.059	1.7314	4	0.785	5.6237	4	0.229	1.6194	4	0.805	1.9862	4	0.738
EPI prema	12.5645	4	0.014	2.7037	4	0.609	10.3641	4	0.035	0.9831	4	0.912	2.0715	4	0.723
Noof child	2.2383	4	0.692	7.4722	4	0.113	10.8038	4	0.029	2.8532	4	0.583	11.1838	4	0.025
HSalcdaily	5.3312	4	0.255	7.8518	4	0.097	0.6231	4	0.960	1.3158	4	0.859	4.5547	4	0.336
Stafhelpful	3.6058	4	0.462	7.4622	4	0.113	6.6168	4	0.158	2.6686	4	0.615	4.4360	4	0.350
Hsufiroom	5.7302	4	0.220	8.9520	4	0.062	1.3165	4	0.859	4.9111	4	0.297	3.1093	4	0.540
Daycargive	2.6334	5	0.756	11.8481	5	0.037	25.9259	5	0.000	3.2247	5	0.665	3.7234	5	0.590

Appendix N: Frequencies of characteristics of the participants

Household attribute	Description	Frequency
Type of house in which the mother lives	Informal settlement	26%
	Brick house or RDP house	56%
	Backyard dweller	18%
	Total	**100%**
The household has access to clean drinking water.	Disagree	8%
	Agree	70%
	Strongly agree	22%
	Total	**100%**
There are sources of income to the household	Disagree	3%
	Agree	80%
	Strongly agree	17%
	Total	**100%**
The household has access to electricity	Disagree	8%
	Agree	71%
	Strongly agree	21%
	Total	**100%**
The house hold has a fridge for storage of food	Disagree	11%
	Agree	68%
	Strongly agree	21%
	Total	**100%**
The household has an electric stove to prepare the foods.	Disagree	8%
	Agree	71%
	Strongly agree	21%
	Total	**100**%
Marital status of mothers	Single	65%
	Married	28%
	Divorced	6%
	Widowed	1%
	Total	**100**%
Maternal/parental employment status	Employed by a company or organization	24%

	Self employed	3%
	Unemployed	45%
	Others	28%
	Total	**100**%
Number of family members in house	2 members	3%
	3members	18%
	4-6members	55%
	Over 6 members	24%
	Total	**100**%
The family has sufficient rooms for family members to stay	Strongly disagree	2%
	Disagree	11%
	Agree	70%
	Strongly agree	16%
	Unknown	1%
	Total	**100**%
Family income	<R2000	30 %
	R2000~R5000	51%
	R5001~R10000	11%
	R10001~R20000 |	8%
	Total	**100**%
Parental educational status	Primary or less	20%
	High school	68%
	college certificate	12%
	Total	**100**%

Appendix O: Declaration by Language Practitioner

DECLARATION BY LANGUAGE PRACTITIONER

I, Yvonne Smuts, hereby declare that I have been appointed by Reginald Loots ("the candidate") to attend to the linguistic aspects of the research report that is hereby submitted in fulfilment of the requirements for the degree Master of Technology in the Faculty of Health and Science of the Cape Peninsula University of Technology.

To the best of my knowledge, all suggestions and recommendations made by me in this regard have been attended to by the candidate.

Title of dissertation: *Factors associated with malnutrition among children six months to five years of age in a semi-rural area of the Western Cape, South Africa*

Date: 17 October 2019

(Ms) Y Smuts
BA (Languages) (UP)
HED (cum laude) (UP)
SATI Accredited Translator (1002242)

Appendix P: Turnitin Report

FACTORS ASSOCIATED WITH MALNUTRITION AMONGST CHILDREN SIX MONTHS TO FIVE YEARS OF AGE IN A SEMI-RURAL AREA OF THE WESTERN CAPE

by Reginald Loots

Submission date: 18-Oct-2019 02:02PM (UTC+0200)
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Cape Peninsula University of Technology

FACTORS ASSOCIATED WITH MALNUTRITION AMONGST CHILDREN SIX MONTHS TO FIVE YEARS OF AGE IN A SEMI-RURAL AREA OF THE WESTERN CAPE

By

Reginald Loots

Student Number: 209178175

A dissertation submitted in fulfilment of the requirements for the degree

Master of Technology

in the

Faculty of Health and Science

of the

CAPE PENINSULA UNIVERSITY OF TECHNOLOGY

Supervisor: Dr B Yan

Co-supervisor: Dr H Vember

Cape Town

15 October 2019

FACTORS ASSOCIATED WITH MALNUTRITION AMONGST CHILDREN SIX MONTHS TO FIVE YEARS OF AGE IN A SEMI-RURAL AREA OF THE WESTERN CAPE

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