

Experiences of health care professionals working with childhood malnutrition in the Xhariep
District, Free State

By

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DECLARATION

I, Natasha Alexandra Bico de Figueiredo, declare that the Master's Degree research dissertation or interrelated, publishable manuscripts/publishable articles, or coursework Master's Degree Mini dissertation that I herewith submit for the Master's Degree qualification MSc. Nutrition and Dietetics at the University of the Free State is my independent work, and that I have not previously submitted it for qualification at another institution of higher education.

ABSTRACT

Introduction: Childhood malnutrition remains a global health crisis where more than 149 million children are stunted. The rate of childhood malnutrition is a persistent issue in South Africa, where many challenges exist regarding management. Priority nutrition interventions aimed at lessening the burden of malnutrition have been identified; however, several challenges hamper progress in achieving the country's goal to reduce the prevalence of malnutrition. By identifying the experiences of health care professionals, who treat childhood malnutrition daily at an operational level, their experiences can be recorded, and aid policy makers understand the factors that presently affect the management of malnutrition from the health professionals' perspectives.

Aim: This study aims to describe the experiences of health care professionals during the management of childhood malnutrition.

Methods: The study followed a typical descriptive design using a qualitative approach. Six healthcare professionals (two doctors, two registered dietitians, and two professional nurses) who work with childhood malnutrition in the Xhariep District were identified and included in the study. Open-ended questions were asked in semi-structured one-on-one narrative interviews conducted with each participant, following an interview protocol. Every interview was audio recorded with informed consent. Data were coded, grouped into categories, and then further organized into themes.

Results: The majority of the participants work at district hospital facilities; however, services are still rendered to primary health care facilities using community outreaches. Participants showed a general understanding of the term malnutrition with an inclination towards the immediate causes thereof. Substance abuse, caregivers' lack of knowledge, and social problems and economic constraints were the common perceptions of why childhood malnutrition is still high in South Africa.

Recurring challenges experienced by the health care professionals with the treatment of childhood malnutrition included: lack of medical and human resources, uncooperative patients, mismanagement by staff and emotional burdens. To overcome these challenges, participants mentioned: availing additional assistance for patients, engaging community

support, sourcing other supplementation stock, promoting education and health campaigns, and acquiring more human resources as methods and solutions.

The general opinion regarding the protocols and programs currently in place to help treat childhood malnutrition is that they are good and valuable. If implemented correctly, it improves the patient's health significantly. However, most participants felt that the implementation and lack of human and financial resources cause the protocols and programs to fail.

Conclusion and Recommendations: Although the participants came from three different components with varying responsibilities within the health system, they all experienced similar challenges. A pattern resulting from the cascade of these challenges was noted, which stemmed from financial constraints. With limited financial resources allocated at primary health institutions, stock and human resources availability is negatively impacted, which leads to poor service delivery. Patients who do not receive adequate quality health care are left unsupported and uninformed, which can factor caregivers of children with malnutrition to neglect their responsibilities, ultimately resulting in a persistent decline of the child's health and nutritional status. The quality-of-service delivery at public health facilities correlates with the rate of malnutrition in South Africa. To decrease the rate of childhood malnutrition, policies need to be revised to greatly improve the quality of care patients receive at public health facilities.

KEY WORDS: Malnutrition; Severe Acute Malnutrition; South Africa; Qualitative research; Lived experiences; Primary Health Care; Rural

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TABLE OF CONTENTS

DECLARATION	i
ABSTRACT	ii
ACKNOWLEDGEMENTS AND DEDICATIONS	iv
TABLE OF CONTENTS	v
LIST OF FIGURES	x
LIST OF TABLES	xi
LIST OF ADDENDA	xii
LIST OF ABBREVIATIONS	xiii
CONCEPT CLARIFICATION	xv
Chapter 1: INTRODUCTION	1
1.1 Background information	1
1.1. Problem statement	4
1.2. Research question	7
1.3. Aim	7
1.4. Objectives	7
1.5. Value and significance of the study	8
1.6. Proposed thesis layout	8
Chapter 2 : LITERATURE REVIEW	9
2.1 Introduction	9
2.2 Definitions	9
2.2.1 Growth Standards	9
2.2.2 Malnutrition	10
2.2.3 Acute malnutrition (wasting)	10
2.2.3.1 Severe Acute Malnutrition (SAM)	11
2.2.3.2 Moderate Acute Malnutrition (MAM)	12
2.2.4 Chronic Malnutrition (stunting)	13
2.2.5 Micronutrient Malnutrition	13
2.2.6 Underweight	17
2.3 Prevalence of malnutrition in the world	17
2.3.1 Prevalence of undernutrition in developed countries	17
2.3.2 Prevalence of undernutrition in developing countries	17

2.3.3	Prevalence of undernutrition in South Africa	18
2.4	Pathophysiology of malnutrition	19
2.4.1	Type 1 (Functional) nutrients	20
2.4.2	Type 2 (Growth) nutrients	20
2.5	Causes of malnutrition	21
2.5.1	Immediate causes	22
2.5.2	Underlying causes	23
2.5.3	Basic causes	24
2.6	Long-term consequences of malnutrition	24
2.6.1	School and educational performance	24
2.6.2	Income and job sustainability	25
2.6.3	Other consequences	26
2.7	Medical management of malnutrition	26
2.7.1	Inpatient management of SAM	26
2.7.2	Outpatient management of SAM (Ambulatory)	35
2.8	Global responses to tackling malnutrition	38
2.8.1	Visibility	39
2.8.2	Direct interventions	39
2.8.3	Filling the health worker gap	41
2.8.4	Poverty eradication	43
2.8.5	Harnessing agriculture	44
2.8.6	Political leadership	45
2.9	South Africa's response to tackling malnutrition	46
2.9.1	South African Health System	46
2.9.2	South African policies	48
2.10	Challenges in implementing intervention programs	50
2.11	Nutrition communication	51
2.11.1	The use of media in conveying nutrition-related information	51
2.12	The role of a dietitian in tackling malnutrition	51
2.13	Conclusion	52
Chapter 3	METHODOLOGY	53
3.1	Research design and approach	53

3.1.1	Study population	54
3.1.2	Sampling method	55
3.1.3	Data collection	56
3.1.4	Data gathering procedure	56
3.2	Data analysis	58
3.3	Trustworthiness	59
3.3.1	Credibility	59
3.3.2	Transferability	60
3.3.3	Dependability	60
3.3.4	Confirmability	60
3.4	Exploratory interviews	60
3.5	Ethical considerations	61
3.5.1	Scientific integrity	61
3.5.2	Fair selection of participants	61
3.5.3	Informed consent	61
3.5.4	Ongoing respect for enrolled participants	62
3.5.5	Researcher competence and expertise	62
Chapter 4 : RESULTS		63
4.1	Introduction	63
4.2	Sociodemographic characteristics of the participants	63
4.3	Themes	65
4.3.1	Question 1: “What do you understand under the term malnutrition?”	65
4.3.1.1	Insufficient intake of nutritious food	66
4.3.1.2	Weight-related illnesses caused by insufficient nutrition	67
4.3.2	Question 2: Why do you think the rate of malnutrition in South Africa is still high?	68
4.3.2.1	Substance abuse	68
4.3.2.2	Lack of knowledge	69
4.3.2.3	Economic constraints	70
4.3.2.4	Social problems	70
4.3.3	Question 3: How do you experience treating children with malnutrition?	71
4.3.3.1	Shortage of stock	72

4.3.3.2	Uncooperative patients	72
4.3.3.3	Mismanagement by staff	73
4.3.3.4	Emotional challenges	74
4.3.4	Question 4: How do you overcome the challenges you deal with when treating a child with malnutrition?	74
4.3.4.1	Additional assistance for patients	76
4.3.4.2	Get community support	76
4.3.4.3	Source additional stock	77
4.3.4.4	Education campaigns	77
4.3.4.5	Additional human resources	78
4.3.5	Question 5: How do you feel about the current protocols and programs in place to help treat childhood malnutrition?	78
4.3.5.1	Protocols and programs are good	79
4.3.5.2	The protocols and programs are poor or non-existent	79
4.3.5.3	The protocols and programs are lacking resources	80
Chapter 5 : DISCUSSION AND LIMITATIONS		81
5.1	Introduction	81
5.2	Discussion of sample	81
5.3	Understanding of malnutrition	82
5.4	Views on the high prevalence of malnutrition in South Africa	83
5.4.1	Substance abuse	83
5.4.2	Lack of knowledge	84
5.4.3	Social problems and economic constraints	85
5.5	Challenges and experiences of HCPs with the management of childhood malnutrition	87
5.5.1	Shortage of stock	88
5.5.2	Uncooperative patients	89
5.5.3	Mismanagement by staff	89
5.5.4	Emotional challenges	90
5.6	Overcoming the challenges identified	91
5.6.1	Additional assistance for patients	91
5.6.2	Community support	91
5.6.3	Source additional stock	92

5.6.4	Education campaigns	92
5.6.5	Additional human resources	93
5.7	Opinions on the current protocols and programs in place to help treat malnutrition	94
5.8	Limitations	94
Chapter 6 : CONCLUSION AND RECOMMENDATIONS		96
6.1	Conclusion	96
6.2	Recommendations	97
	REFERENCES	99
	ADDENDA	108
	INTERVIEW GUIDE	108
	INFORMATION SHEET	110
	CONSENT TO PARTICIPATE IN RESEARCH	112
	ETHICS APPROVAL LETTER	113
	TRANSCRIPTS	114

LIST OF FIGURES

Figure 1: Conceptual framework of the causes of malnutrition (UNICEF, 1990).....	21
Figure 2: UNICEF conceptual framework of the determinants of childhood undernutrition (UNICEF, 2015b).....	22
Figure 4: Decision tree for the Integrated Management of Acute Malnutrition (IMAM) (NDOH, 2015).	28
Figure 5: Occupation of the participants	63
Figure 6: Place of work of the participants.....	64
Figure 7: Participants' number of years' experience in treating malnutrition	65
Figure 8: The Vicious Cycle of Malnutrition	87

LIST OF TABLES

Table 1: Newly diagnosed Severe Acute Malnutrition (SAM) patients in children under five years in the Xhariep District (DHIS, 2020).	6
Table 2: Definition of SAM using MUAC according to different age groups (WHO & UNICEF, 2009):	12
Table 3: Definition of MAM using MUAC according to different age groups (WHO & UNICEF, 2009):	12
Table 4: Nutrient deficiencies in malnutrition (WHO, 2010).	15
Table 5: Children under five years' severe and moderate malnutrition case fatalities (%) and number of deaths (NDOH, 2018).	19
Table 6: Timeframe for inpatient management of SAM (NDOH, 2015).	27
Table 7: South African Protocol for Inpatient Management of Severe Acute Malnutrition with Medical Complications (Emergency Care and Standard Inpatient Care) (NDOH, 2015).	29
Table 8: Action Protocol in Outpatient Care (NDOH, 2015).	35
Table 9: The 13 Lancet Interventions (Maternal and Child Nutrition Study Group, 2013).	40
Table 11: Themes and sub-themes identified in the participants' responses to question 1 ..	66
Table 12: Themes and sub-themes identified in the participants' responses to question 2 ..	68
Table 13: Themes and sub-themes identified in the participants' responses to question 3 ..	71
Table 14: Themes and sub-themes identified in the participants' responses to question 4 ..	75
Table 15: Themes and sub-themes identified in the participants' responses to question 5 ..	78

LIST OF ADDENDA

ADDENDUM 1: Interview Guide	108
ADDENDUM 2: Information Sheet	110
ADDENDUM 3: Consent Form.....	112
ADDENDUM 4: Ethics Acceptance Letter	113
ADDENDUM 5: Interview Transcripts	114

LIST OF ABBREVIATIONS

ABBREVIATIONS

BMI	Body Mass Index
CDC	Centers for Disease Control
CFR	Case Fatality Rate
CSG	Child Support Grant
DHIS	District Health Information System
DOH	Department of Health
FAO	Food and Agriculture Organization
FS	Free State
FSDOH	Free State Department of Health
ITV	Interviewee (Used for anonymity of participants)
IMAM	Integrated Management of Acute Malnutrition
INP	Integrated Nutrition Program
MAM	Moderate Acute Malnutrition
MCWH	Maternal Child and Women's Health
MDG	Millennium Development Goals
MUAC	Mid Upper Arm Circumference
NFCS	National Food Consumption Survey
NSP	Nutrition Supplementation Program
NTP	Nutrition Therapeutic Program
OT	Occupational Therapist
OTP	Outpatient Therapeutic Program
PHC	Primary Health Care
PoU	Prevalence of Undernourishment
PSNP	Primary School Nutrition Program
RUTF	Ready to Use Therapeutic Feed
SADHS	South African Demographics and Health Survey
SAM	Severe Acute Malnutrition
SANHANES	South Africa National Health and Nutrition Examination Survey
SAPS	South African Police Services

SASSA	South Africa Social Services Agency
SD	Standard Deviation
SDG	Sustainable Development Goals
SUN	Scaling Up Nutrition
UNICEF	United Nations International Children’s Emergency Fund
WHO	World Health Organization

CONCEPT CLARIFICATION

The following concepts are used and discussed in this study:

Malnutrition

The World Health Organization defines malnutrition as “the cellular imbalance between the supply of nutrients and energy and the body’s demand for them to ensure growth, maintenance, and specific functions” (Mehta *et al.*, 2013). *In this study malnutrition will refer to the condition of undernutrition in children.*

Severe Acute Malnutrition (SAM)

SAM, in children under the age of five years, is defined as any one or more of the following: the presence of bilateral pitting pedal oedema; weight for height/length below the -3 SD of the WHO growth standards or CDC z-score of <-3 ; and a mid-upper arm circumference (MUAC) of less than 11.5cm (WHO & UNICEF, 2009).

Moderate Acute Malnutrition (MAM)

The World Health Organization (WHO) defines moderate acute malnutrition (MAM), in children under the ages of five years, as low weight for height/length (Standard deviation [SD]) between -2 and -3 of the WHO growth standards) and/or the mid-upper arm circumference (MUAC) measuring between 11.5cm and 12.5cm (WHO & UNICEF, 2009; NDOH, 2015).

Chronic Malnutrition (Stunting)

Stunting occurs as a cumulative effect of chronic malnutrition in children under the age of five years, and it is measured by using the anthropometric index of height-for-age. This index is used to determine the child's linear growth. A child's height-for-age measurement is considered stunted if plotted below the -2SD of the WHO's Growth Standards (Maluleke, 2016).

Chapter 1: INTRODUCTION

1.1 Background information

Malnutrition, also known as undernutrition, comes in many forms, with the three most distinct types being acute malnutrition (wasting), chronic malnutrition (stunting) and micronutrient deficiency malnutrition (Mehta *et al.*, 2013; Popkin *et al.*, 2020). A patient is not limited to having only one type of malnutrition as the different malnutrition types can overlap; for example, a wasted child may also be stunted and have micronutrient deficiencies (Mehta *et al.*, 2013). Acute malnutrition includes severe acute malnutrition (SAM) and moderate acute malnutrition (MAM) (Hawkes *et al.*, 2020). These subtypes may be caused by an illness resulting in pedal oedema and/or sudden weight loss or due to a decrease in food consumption (National Department of Health, 2015).

Paediatric malnutrition has been identified as acute or chronic (Mehta *et al.*, 2013; Dipasquale *et al.*, 2020) as it leads to diminished function and changes in growth development. Paediatric malnutrition, defined as a nutrient requirement versus intake imbalance resulting in overall energy, protein, and micronutrient deficiency, negatively impacts - among other fields - children's growth and development (Mehta *et al.*, 2013). Childhood malnutrition remains a global health crisis where more than 149 million children are stunted (Branca *et al.*, 2020). When considering the group of children aged up to five years, the World Health Organisation found that 33% of the eight million deaths in 2013 resulted from childhood malnutrition (WHO, 2013). This percentage has since grown to 45% fatality linked to undernutrition globally (WHO, 2020). This percentage in developing countries is as high as 35% globally, and in South Africa, in particular, 8.4% of these children die from SAM (NDOH *et al.*, 2017). A further concerning statistic in South Africa is the 29.2% of children aged younger than five years who suffer from stunting, translating to one in every four children being stunted (Maluleke, 2016).

A nutrient-rich meal with adequate vitamin and mineral content is essential for a child's diet. A long-term deficit of nutritious food can result in a lack of vitamins and nutrients, resulting in micronutrient deficiencies (Bhutta *et al.*, 2013). In 2017 it was found that one-third of all malnutrition-related child deaths were related to micronutrient deficiencies (UNICEF, 2017). Micronutrient deficiency malnutrition, also known as hidden hunger, was already an increasing threat to the health of more than two billion people worldwide in 2010 (WHO, 2010). Children under five years are at the greatest risk for micronutrient deficiency. In 2020 the Centres for Disease Control and Prevention (CDC) reported that this threat has grown to affect an estimated 50% of children under five years (CDC, 2020). A deficiency in micronutrients such as iron, vitamin A, zinc and iodine can lead to secondary complications which have a dire impact on a child's health and include premature death, poor health, growth stunting, blindness, mental retardation and learning disabilities (Matrins *et al.*, 2011).

Malnutrition cannot be pinpointed to a singular cause as multiple factors cohesively play an intricate role in the manifestation of malnutrition in an individual. However, the primary and immediate causes include an inadequate diet and infection (Rawe *et al.*, 2012). These two immediate causes can be influenced by or result from poor maternal and child care; lack of basic health services; an unhealthy environment, lack of education and information in communities; lack of resources in the communities; poverty; household food insecurity; and unemployment (UNICEF & Schultink, 2015).

A lack of adequate nutrient supply to an infant or a young child can have severe consequences on their mental and physical development, hindering the child from reaching developmental milestones and impair intellectual development (Faber & Wenhold, 2016). Furthermore, wasting and stunting are crucial factors that place a child under the age of five at an increased risk of mortality (Steenkamp *et al.*, 2016).

Should children survive past the age of five, childhood malnutrition has long-lasting consequences that can persist far into adulthood, including shorter stature, poorer economic productivity, increased risk of metabolic disorders, cardiovascular disease and a lower intellectual ability (Goudet *et al.*, 2017). Studies conducted in low-to-middle income countries found an association between low weight-for-age and low height-for-age and the child's academic achievement (Maternal and Child Nutrition Study Group, 2013; Bhutta *et al.*, 2013).

Amongst children of all ages, food insecurity and the resulting malnutrition is also linked with emotional stress, lower cognitive indicators, and self-destructive behaviour, all of which may influence school achievement (Schwarzenberg *et al.*, 2015; Pienaar, 2019).

In response to this problem of malnutrition, various interventions have been suggested as effective in the prevention of malnutrition, based on studies conducted in developing countries. A study conducted in The 2008 Lancet consisted of numerous papers where maternal and child undernutrition (wasting, stunting, and micronutrient deficiency) were the commonly occurring subject (Bhutta *et al.*, 2008; Black *et al.*, 2008; Bryce *et al.*, 2008; Morris *et al.*, 2008; Victora *et al.*, 2008). This led to the evaluation and analysis of the short-term and long-term consequences of these issues and an estimated reduction using large-scale proven nutrition interventions (Victora *et al.*, 2008; Bhutta *et al.*, 2013).

The 2013 Lancet series indicated 13 interventions with the greatest potential to alleviate malnutrition, given that protocols and policies were carried out accurately (Bhutta *et al.*, 2013). Some of these interventions included: management of SAM; folic acid supplementation or fortification; maternal balanced energy and protein supplementation; maternal multiple micronutrient supplementation; vitamin A supplementation and maternal calcium supplementation (Maternal and Child Nutrition Study Group, 2013). A scoping review of studies that have been conducted between 1980 to 2013 in low and middle-income countries, aimed at the effectiveness of nutrition interventions on the prevention of malnutrition, concluded that such interventions are indeed effective (Goudet *et al.*, 2017).

In 2012 six global targets were specified for the implementation plan on maternal, infant and young children nutrition endorsed by the World Health Assembly Resolution 65.6. These goals were reviewed, and six new targets were developed in 2014. The six Global Nutrition targets for 2025 included (WHO, 2017): a 40% reduction in the number of children under-5 who are stunted; a 50% reduction of anaemia in women of reproductive age; a 30% reduction in low birth weight; no increase in childhood overweight; increase the rate of exclusive breastfeeding in the first six months up to at least 50%; reduce and maintain childhood wasting to less than 5%.

In 2015, the 193 United Nations General Assembly adopted the 2030 Development Agenda, and 17 Sustainable Development Goals (SDGs) were developed, which aimed to address a range of challenges, of which some include challenges related to poverty, inequality and environmental development (FAO *et al.*, 2017). The SDGs were developed and aimed at building on to the Millennium Development Goals that were effective from 2000 to 2015, which faced their own challenges such as the increase of food prices, inadequate mother and child feeding practices, environmental disasters and civil conflict (NDOH, 2015). Of the 17 SDGs, four that speak directly to children's wellbeing include no poverty; zero hunger; good health and well-being; quality education; and clean water and sanitation (FAO *et al.*, 2017).

National protocols and programs have been developed for the management of malnutrition; however, the rate of malnutrition is still alarmingly high in South Africa, and this may partly be due to the many challenges still being faced during implementation (Darnton-Hill & Samman, 2015; Itaka & Omole, 2020; Mbogori *et al.*, 2020).

1.1. Problem statement

According to the South African Demographic and Health Survey (SADHS) 2016, 7% of children below the age of 5 years were considered stunted or short for their age, while 10% were considered severely stunted (Maluleke, 2016; National Department of Health *et al.*, 2017).

SA has identified priority nutrition interventions aimed at lessening the burden of malnutrition. These are mentioned in the government document "Roadmap for Nutrition in South Africa" (DOH, 2013), and they include exclusive breastfeeding promotion; improved complementary feeding with continued breastfeeding; healthy eating for optimal weight management during pregnancy and lactation; implementation of evidence-based interventions for detection of malnutrition during pregnancy; improved hygiene practices including hand washing; nutrition education and information on healthy eating and health risks associated with poor diets; Vitamin A supplementation; therapeutic zinc supplementation; iron folate supplementation (or multiple micronutrients); calcium supplementation; fortification of food staples; salt iodization; deworming; numerous micronutrient supplements and targeted supplementary feeding to undernourished

individuals; treatment of severe acute malnutrition; and prevention or treatment for moderate undernutrition.

Several challenges hamper progress in achieving the country's goal to reduce the prevalence of malnutrition. Initiatives aimed at promoting breastfeeding, adequate complementary feeding, promotion of food security, amongst others, are affected by lack of community participation and mobilisation, lack of integration with nutrition-related strategies in other government departments such as the Departments of Agriculture and Basic Education; the lack of monitoring by the Department of Health of the activities and situation of nutrition in the country; and the lack of training and capacity-building by the Department of Health (Prudhon *et al.*, 2006).

Effective management of childhood malnutrition requires an intact health system with adequately trained staff who have reliable adequate skills and resources for determining children's nutritional status (Darnton-Hill & Samman, 2015).

South Africa has 57.5 million people, where 84% receive health care from public health services (Zweigenthal *et al.*, 2019). South Africa offers 4200 public health facilities, of which some are primary health care clinics. These clinics are each estimated to render services to approximately 13,718 individuals (Jobson, 2015).

There are 38,236 doctors registered with the Health Professions Council of South Africa where, in the public sector, there are 4,219 people to every one doctor. Nurses and doctors at community-based facilities are under immense pressure to assess and treat patients amidst staff shortages and an ever-growing population (Jobson, 2015).

Clinics' scope of service includes managing communicable diseases and non-communicable diseases (Jobson, 2015). At the same time, these facilities also manage childhood malnutrition. Table 1 indicates the number of newly diagnosed SAM cases within the Xhariep district (DHIS, 2020).

Table 1: Newly diagnosed Severe Acute Malnutrition (SAM) patients in children under five years in the Xhariep District, Free State (DHIS, 2020).

	Data Indicator	Jan to Mar 2019 (Nr. of cases)	Apr to Jun 2019 (Nr. of cases)	Jul to Sep 2019 (Nr. of cases)	Oct to Dec 2019 (Nr. of cases)	Apr 2018 to Mar 2019 (Nr. of cases)	Apr 2019 to Mar 2020 (Nr. of cases)
Xhariep District Municipality	SAM new in children under 5 years	31	20	20	15	120	84
Kopanong Local Municipality	SAM) new in children under 5 years	20	14	7	12	78	48
Letsemeng Local Municipality	SAM new in children under 5 years	4	1	1	0	7	5
Mohokare Local Municipality	SAM new in children under 5 years	7	5	12	3	35	31

Governments need to prioritize employing more skilled professionals at the community level, where they are required, to address the evident health worker gap (Rawe *et al.*, 2012; Erzse *et al.*, 2020).

A skilled health worker trained in identifying and managing malnutrition is essential to any health system (Prudhon *et al.*, 2006). Dietitians are such qualified health professionals. Dietitians are trained to provide nutrition counselling to the facility and community-based patients (Tappenden *et al.*, 2013). Though dietitians provide evidence-based therapeutic nutritional care to patients and are considered the authority figure regarding decisions related to nutrition, their employment, specifically at community-based facilities, is limited (Tappenden *et al.*, 2013). In the absence of dietitians, identifying and managing child malnutrition becomes an added responsibility of nurses and doctors.

Very few policy makers, researchers and policy drivers have the opportunity to experience the circumstances and challenges which health professionals are faced with while treating children with malnutrition.

There is a definite disconnect between policies, recommended interventions and strategies and the context in which all these have to be applied. In this researcher's opinion, beyond the statistical evidence provided by most quantitative research, there is a need for qualitative research to understand the experiences of health professionals when working with malnourished children.

1.2. Research question

The research question for this study is: What are the experiences of health professionals working with childhood malnutrition in the Xhariep District, Free State?

1.3. Aim

This study aims to describe the experiences of health professionals working with childhood malnutrition in the Xhariep District, Free State?

1.4. Objectives

To achieve the main aim of the study, the objectives were:

- To describe the perspectives of health care professionals regarding the extent of malnutrition in the Xhariep district, Free State.

- To explore the experiences of health care professionals while treating children with malnutrition.
- To identify possible solutions and means of overcoming any challenges as specified by the health care professionals.

1.5. Value and significance of the study

Malnutrition, directly and indirectly, affects the well-being of South Africans. By identifying the experiences of health care professionals, who treat childhood malnutrition daily at an operational level, their experiences can be recorded and aid policy makers in understanding the factors that presently affect the management of malnutrition from the health professionals' perspectives.

1.6. Proposed thesis layout

The proposed thesis layout (as seen below) will consist of the introduction, followed by the literature review. The methodology will be explained, followed by the study results, the discussion, and finally, the conclusion and recommendations.

Chapter 1: Introduction

Chapter 2: Literature review

Chapter 3: Methodology

Chapter 4: Results

Chapter 5: Discussion and Limitations

Chapter 6: Recommendations and Conclusion

Chapter 2 : LITERATURE REVIEW

2.1 Introduction

Malnutrition remains a worldwide endemic even though extended programs are in place to tackle it (Lassi *et al.*, 2020). This is evident as severe malnutrition remains the most important contributing cause of childhood mortality (Rawe *et al.*, 2012). Severe acute malnutrition (SAM) is the underlying cause of death in children below the ages of five globally, where 19 million suffer from SAM. At the same time, globally, half a million die every year directly because of SAM (NDOH, 2015).

Successful management of malnutrition at community and primary health care levels can greatly help lower the rates by early identification and prevention rather than curative inpatient facility-based treatment (Prudhon *et al.*, 2015). Community-based management will enable a broader coverage in target populations (Jobson, 2015). Early identification can be made utilizing home-based care and screening for individuals without complications. A skilled health worker trained in malnutrition is an essential asset for screening patients and providing the necessary treatment (Prudhon *et al.*, 2015)

Although malnutrition management protocols have been compiled and programs have been initiated, the rate of malnutrition is still alarmingly high in South Africa (National Department of Health, 2015). Many challenges are faced when trying to ensure successful management (Darnton-Hill & Samman, 2015).

2.2 Definitions

2.2.1 Growth Standards

The World Health Organization defines growth references as “the values of weight and height for each age against which parents, caregivers and health workers measure the growth of the children under their care” (WHO, 2011). A simple tool known as the Child Growth Standards was developed by the WHO to identify if children are not growing well and assess interventions' effectiveness (WHO & UNICEF, 2009). Regardless of which country in which

they are born, if children receive the same optimal start in life, they have the potential to grow and develop within the same age range of weight and height-for-age. The tool thus indicates how children should grow (WHO, 2011).

2.2.2 Malnutrition

American Society for Parenteral and Enteral Nutrition (ASPEN) defines paediatric malnutrition (undernutrition) as “an imbalance between nutrient requirements and intake that results in cumulative deficits of energy, protein, or micronutrients that may negatively affect growth, development, and other relevant outcomes” (Mehta *et al.*, 2013).

The most critical period for a child’s development is within the first 1000 days of life, starting at conception, through the mother’s pregnancy, until two years old (Bhutta *et al.*, 2013). This window of opportunity lays the foundation for optimal health and development through the individual’s lifespan. During this period, adequate nutrition and care are essential influencers of whether the child will survive and their future abilities to grow, learn, and essentially break free of the vicious cycle regarding poverty and malnutrition (UNICEF, 2017).

Any damage done to the child’s development during this period is largely irreversible regardless if the child receives adequate nutrition later on and if any health issues are eventually resolved (WHO, 2020). In the absence of proper nutrition during this period, the body learns to adapt to a long-term lack of nutrients by prioritizing the development and function of vital organs rather than the need to grow in height, ultimately leading the child to be stunted (UNICEF, 2017).

Malnutrition comes in many forms, but the three distinct types are acute malnutrition (wasting), chronic malnutrition (stunting) and micronutrient deficiency malnutrition (Popkin *et al.*, 2020). A patient is not limited to only one type as the different malnutrition types can overlap; for example, a wasted child may also be stunted and have micronutrient deficiencies (NDOH, 2015).

2.2.3 Acute malnutrition (wasting)

According to (KZN Department of Health, 2014), acute malnutrition is “caused by decreased food consumption and/or illness resulting in bilateral pitting pedal oedema and/or sudden

weight loss.” The aetiology of malnutrition indicates either illness-related or non-illness related, or both (Mehta *et al.*, 2013).

Telomere attrition, microbiome maturation, epigenetic variability and the development of hormonal set points make up some of the sensitive physiological mechanisms disrupted when there is a lack of nutrient intake in the body (Wells *et al.*, 2020). A decrease in food consumption refers to inadequate nutrient intake to sustain physiological mechanisms crucial for growth and development (Goudet *et al.*, 2017).

Acute malnutrition can be caused by either an illness resulting in pedal oedema and/or sudden weight loss or decreased food consumption (NDOH, 2015). Wasting refers to sudden weight loss primarily seen as a loss in muscle mass (Merriam-Webster, 2019), measured using the mid-upper arm circumference (Van Tonder *et al.*, 2019). The most commonly occurring infectious diseases related to childhood malnutrition include pneumonia, measles and diarrhoeal infections (Wells *et al.*, 2020).

Clinical signs such as anorexia or a poor appetite and medical complications indicate the severity of acute malnutrition or aggravate the status of malnutrition even more (WHO and UNICEF, 2009).

2.2.3.1 Severe Acute Malnutrition (SAM)

Severe acute malnutrition (SAM) is accompanied by complications such as dehydration, hypoglycaemia, hypothermia, etc. which place a child diagnosed with SAM at a much higher risk of death (approximately 5-20 times above a sick child with a healthy nutrition status), as such complications are deadly within the first 48 hours if not resolved (Mambulu-Chikankheni *et al.*, 2017).

SAM, in children under the age of five years, is defined as any one or more of the following: the presence of bilateral pitting pedal oedema; weight for height/length below the -3 SD of the WHO growth standards or CDC z-score of <-3; and a mid-upper arm circumference (MUAC) of less than 11.5cm (WHO & UNICEF, 2009). Table 2 indicates the various diagnosis criteria of SAM according to different age groups using MUAC measurements (WHO & UNICEF, 2009).

Table 2: Definition of SAM using MUAC according to different age groups (WHO & UNICEF, 2009):

Age Group	Normal	Severe Acute Malnutrition (SAM)
6 to 59 months old	≥ 12.5 cm	< 11.5 cm
5 to 9 years old	≥ 14.5 cm	< 13.5 cm
10 to 14 years old	≥ 18.5 cm	< 16.0 cm
15 to 17 years old and adults	≥ 22.0 cm	< 18.5 cm
Pregnant and post-partum adolescents and adults	≥ 23.0 cm	< 19.0 cm

2.2.3.2 Moderate Acute Malnutrition (MAM)

The World Health Organization (WHO) defines moderate acute malnutrition (MAM), in children under the ages of five years, as low weight for height/length (Standard deviation [SD]) between -2 and -3 of the WHO growth standards) and/or the mid-upper arm circumference (MUAC) measuring between 11.5cm and 12.5cm (WHO & UNICEF, 2009; NDOH, 2015).

MAM identification is not limited to the ages of 0 to 59 months but is defined differently according to various age groups, as seen in table 3 (WHO & UNICEF, 2009).

Table 3: Definition of MAM using MUAC according to different age groups (WHO & UNICEF, 2009):

Age Group	Normal	Moderate Acute Malnutrition
6 to 59 months old	≥ 12.5 cm	≥ 11.5 to < 12.5 cm
5 to 9 years old	≥ 14.5 cm	≥ 13.5 to < 14.5 cm
10 to 14 years old	≥ 18.5 cm	≥ 16.0 to < 18.5 cm

Table 3: Definition of MAM using MUAC according to different age groups (WHO & UNICEF, 2009):

15 to 17 years old and adults	≥ 22.0 cm	≥ 18.5 to < 22.0 cm
Pregnant and post-partum adolescents and adults	≥ 23.0 cm	≥ 19.0 to < 23.0 cm

2.2.4 Chronic Malnutrition (stunting)

Stunting occurs as a cumulative effect of chronic malnutrition in children under the age of five years, and it is measured by using the anthropometric index of height-for-age. This index is used to determine the child's linear growth. A child's height-for-age measurement is considered stunted if plotted below the -2SD of the WHO's Growth Standards (Maluleke, 2016).

Regardless of where they are born, every child has the same growth potential up to the age of five years old, as long as the child receives adequate nutrition (WHO & UNICEF, 2009). The WHO defines chronic malnutrition or stunting as height-for-age < -2 SD of the WHO Child Growth Standards median in children up to five years old (WHO, 2010).

2.2.5 Micronutrient Malnutrition

A nutrient and a vitamin-rich meal are essential for a child's diet (Branca *et al.*, 2020). A long-term deficit of nutritious food can result in a lack of vitamins and nutrients, resulting in micronutrient deficiencies.

More than two billion people worldwide face micronutrient malnutrition, threatening their health and efficiency in their daily lives (Goudet *et al.*, 2017). A deficiency in micronutrients such as iron, vitamin A, zinc and iodine can lead to secondary complications which have a dire impact on an individual's health. Such complications include premature death, poor health, growth stunting, blindness, mental retardation and learning disabilities (WHO, 2010). One-third of all malnutrition-related child death are related to micronutrient deficiencies, while 10% of children's deaths are accountable to micronutrient deficiencies (UNICEF, 2017).

Correcting and preventing micronutrient deficiencies, especially in children and young adolescents as they are still in the crucial stages of development, is an important health care

goal (De Pee *et al.*, 2015). Should this goal is not be reached, the consequences include increased morbidity, a decrease in immunity and impaired cognitive function (Lassi *et al.*, 2020).

Table 4 indicates the most common nutrient deficiencies and their consequences (WHO, 2010).

Table 4: Nutrient deficiencies in malnutrition (WHO, 2010).

Micronutrient Deficiency	Definition/Indicators	Consequences and implications	Risk factors
Vitamin A deficiency	Vitamin A deficiency can be defined clinically or sub clinically. Night blindness (in which it is difficult or impossible to see in relatively low light) is one of the clinical signs. Blood concentrations of retinol (the chemical name for vitamin A) in plasma or serum are used to assess subclinical vitamin A deficiency. A plasma or serum retinol concentration < 0.70 µmol/l indicates subclinical vitamin A deficiency in children and adults, and < 0.35 µmol/l indicates severe vitamin A deficiency.	<ul style="list-style-type: none"> • Night blindness • Complete blindness • Maternal mortality • Decreased immunity • Increase children's risk for respiratory and diarrhoeal infections • Decreased growth rates • Slow bone development • Decrease the likelihood of survival from serious illness. 	<ul style="list-style-type: none"> • Low dietary intake of Vitamin A. • Poor absorption of vitamin A.
Iodine deficiency	Goitre assessment by palpation or ultrasound may be useful for assessing thyroid function. The indicator is the median concentration of iodine in urine in a population of children aged 6–12 years. Adequate iodine nutrition is considered to pertain when the median urinary iodine concentration is 100–199 µg/l	<ul style="list-style-type: none"> • Hypo- and hyperthyroidism • Iodine deficiency during pregnancy can result in stillbirth, spontaneous abortion and congenital abnormalities such as cretinism • Mental impairment 	<ul style="list-style-type: none"> • Low dietary intake of iodine. • Poor iodine absorption.
Iron deficiency anaemia	Anaemia is defined as a haemoglobin concentration below a specified cut-off point	<ul style="list-style-type: none"> • Increased risks for maternal and child mortality 	<ul style="list-style-type: none"> • Low dietary intake of iron.

Table 4: Nutrient deficiencies in malnutrition (WHO, 2010).

	<p>The WHO defines anaemia in children under 5 years of age and pregnant women as a haemoglobin concentration < 11 g/dL at sea level.</p>	<ul style="list-style-type: none">• Negative consequences on the cognitive and physical development of children and on physical performance	<ul style="list-style-type: none">• Poor absorption of iron from diets rich in phytate or phenolic compounds• Population groups with greater iron requirements, such as growing children and pregnant women
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2.2.6 Underweight

A child under and up to the age of five is considered to be underweight if the weight-for-age is < -2 SD of the WHO Child Growth Standards median (Kruger *et al.*, 2014). Evidence has shown that children who have been identified as even mildly underweight are at an increased risk of mortality. In contrast, those identified as severely underweight are at even greater risk (WHO, 2010) as nutritional needs for growth and development are far greater in children, and without optimal nutrition the normal physiological processes for development are disrupted, which lead to potentially irreversible adverse effects (Mehta *et al.*, 2013; Dipasquale *et al.*, 2020).

2.3 Prevalence of malnutrition in the world

In 2019 the global prevalence of acute malnutrition in children below the ages of five was 6.9%, while stunting was at 21.3%, a decrease from 2000 when stunting attributed to 32.4% (UNICEF, 2020). Chronic child malnutrition is a constant emergency affecting 170 million children, where one in four children in the world are stunted due to malnutrition. In developing countries, this figure increases to one in three children (De Onis *et al.*, 2012).

2.3.1 Prevalence of undernutrition in developed countries

The prevalence of undernourishment has maintained a steady percentage of less than 2.5 since 2000 and up to and including 2016 in both North America and Europe (FAO *et al.*, 2017). This steady percentage can be related to lower poverty levels and improved quality healthcare availability in developed countries, as compared to developing countries. Malnutrition in developed countries is primarily secondary to disease (Mehta *et al.*, 2013).

2.3.2 Prevalence of undernutrition in developing countries

The FAO PoU indicated the following percentages for the mentioned regions: Africa (20.0), with Northern Africa (8.3), Sub-Saharan Africa (22.7), Eastern Africa (33.9), Middle Africa (25.8), Southern Africa (8.0) and Western Africa (11.5); Asia (11.7) with Central Asia and Southern Asia (14.2), Eastern Asia and South-Eastern Asia (9.7) and Western Asia (10.6). Latin

America and the Caribbean (6.6) with Latin America (5.9) and the Caribbean (17.7) (FAO *et al.*, 2017).

These statistics indicate the highest prevalence of undernutrition occurs on the African continent. The highest of which occurs in the war-stricken areas of Eastern Africa (Darnton-Hill & Samman, 2015). Similarly, the same can be assumed for the prevalence of undernutrition in the Asian mentioned areas as these are predominantly war-stricken regions. Environmental disasters and civil conflict and wars are linked to undernutrition in children (FAO *et al.*, 2017).

2.3.3 Prevalence of undernutrition in South Africa

South Africa is one of the few countries where undernutrition, specifically stunting and micronutrient deficiencies, coexists with an increasing incidence of overweight and obesity, as it is undergoing a nutrition transition (Wells *et al.*, 2020). According to the 2012 South African National Health and Nutrition Examination Survey (SANHANES), 26.8% of children were stunted. Approximately 9.3% of children were underweight; 27.9% of children and 29.4% of women, aged between 15 and 49 years of age, were anaemic (Shisana *et al.*, 2014). The 2005 National Food Consumption Survey (NFCS) indicated that 63.6% of children and 27.7% of women in South Africa had a vitamin A%; and 45.3% of children had a zinc deficiency (Shisana *et al.*, 2014).

The Saving Children report indicated that over 60% of hospitalized children who had died in South Africa were identified as being underweight, where more than half had severe acute malnutrition (Rawe *et al.*, 2016). Table 5 reflects the in-hospital case fatality rate (%) and the number of deaths in severe and moderate acute cases in children under five years, per province in South Africa, as reported in the Implementation Framework for the Integrated Management of Children with Acute Malnutrition in SA. The report also indicates that it may not reflect a true picture due to challenges with the assessment, classification and reporting of severe acute malnutrition and moderate acute malnutrition (NDOH, 2018)

Table 5: Children under five years' severe and moderate malnutrition case fatalities (%) and number of deaths (NDOH, 2018).

Province	Baseline data 2014/2015 FY		2015/2016 FY		2016/2017 FY		2017/2018 FY		Recorded and reported from April 2017/2018	
	SAM iCFR	SAM deaths u-5 years	SAM iCFR	SAM deaths u-5 years	SAM iCFR	SAM deaths u-5 years	SAM iCFR	SAM deaths u-5 years	MAM iCFR	MAM deaths u- 5years
Eastern Cape	11.8	339	10.1	284	10.2	226	11.8	161	5.3	35
Free State	12.2	146	8.2	91	9.6	103	7.5	64	28.4	42
Gauteng	9.3	126	7.5	113	6.5	120	6.2	79	4.5	33
KwaZulu- Natal	10.4	405	7.7	281	7.4	230	7.7	200	2.7	68
Limpopo	14.9	291	11.6	222	8.3	178	5.0	102	4.5	35
Mpumalanga	19.1	233	12.5	146	8.4	83	9.1	55	4.4	12
North West	12.3	225	12.3	183	10.6	204	8.0	125	19.8	82
Northern Cape	10.9	67	8.3	49	5.1	39	6.1	35	3.8	17
Western Cape	1.8	18	0.9	11	0.6	5	2.2	10	0.4	1
National	11.6	1852	8.9	1380	8.0	1188	7.4	831	5.2	325

The 2016 SADHS' findings linked with the mother's education and income level; the lower the education or income level, the higher the stunting rate presented (Department of Health *et al.*, 2016; Department of Health, 2017).

2.4 Pathophysiology of malnutrition

There are roughly forty identified essential nutrients that result in an increased risk of severe illnesses and the probability of death in young children if they are not available in the correct balance in the body. These nutrients have been classed into either Type 1 nutrients, otherwise known as functional nutrients, and Type 2 nutrients, also known as growth nutrients (Mehta *et al.*, 2013).

If the body experiences any such nutrient depletion, the physiological responses place children at an increased risk of life-threatening complications, ultimately resulting in death (Lassi *et al.*, 2020). Systemic medical management of children with SAM is crucial for the successful treatment of any underlying infections. Rehabilitation and dietary therapy with specially formulated therapeutic feeds make part of the treatment (UNICEF & Schultink, 2015). These therapeutic feeds are scientifically formulated with high nutrient density and the correct balance of Type 1 and Type 2 nutrients and bioavailability. The use of these therapeutic feeds ensures adequate provision of nutrients to allow for catch-up growth, the child's metabolism to be restored, and the electrolyte balance to be corrected; metabolic abnormalities are reversed, and organ function is restored (NDOH, 2015).

2.4.1 Type 1 (Functional) nutrients

Iron, iodine, vitamin C and vitamin A are some examples of Type 1 nutrients. Deficiency in these nutrients results in the child's body growing while utilizing the stored quantities of the nutrient in the body, ultimately resulting in metabolic dysfunction, tissue depletion, and ill health (Mehta *et al.*, 2013). Iron deficiency anaemia and scurvy are two examples of Type 1 nutrient deficiencies. Type 1 nutrient deficiencies cannot be identified using anthropometric measurements, even though the deficit may have characteristic signs and symptoms. However, it can coexist with a nutrient deficiency, affecting the child's anthropometric measurements (Duggan, 2012; NDOH, 2015).

2.4.2 Type 2 (Growth) nutrients

A few examples of Type 2 nutrients include potassium, zinc, magnesium, selenium and amino acids. In the event of any such nutrient deficiency, the body's response includes stopping the body's growth and repairing tissue to conserve nutrients. The body will also break down its own tissue to make more nutrients available (Dipasquale *et al.*, 2020). Type 2 nutrient deficiencies are identifiable through anthropometric measurements (wasting and stunting), but identifying the exact nutrient that is deficient is a challenge because Type 2 nutrient deficiencies are commonly accompanied by another Type 1 nutrient deficiency simultaneously (Duggan, 2012; NDOH, 2015).

2.5 Causes of malnutrition

Countries ridden with conflict and/or natural disasters have been identified as having the highest number of food insecurity and malnourished individuals; however, peaceful countries with an economic decline also serve great challenges of food accessibility to the poor (FAO *et al.*, 2017). In South Africa, poverty and inequality are prominent factors that greatly contribute to malnutrition (Brits *et al.*, 2017).

Figure 1 shows the conceptual framework for the causes of malnutrition, compiled by UNICEF in 1990. The causes of malnutrition can be divided into three levels, as shown in figures 1 and 2 (UNICEF, 1990).

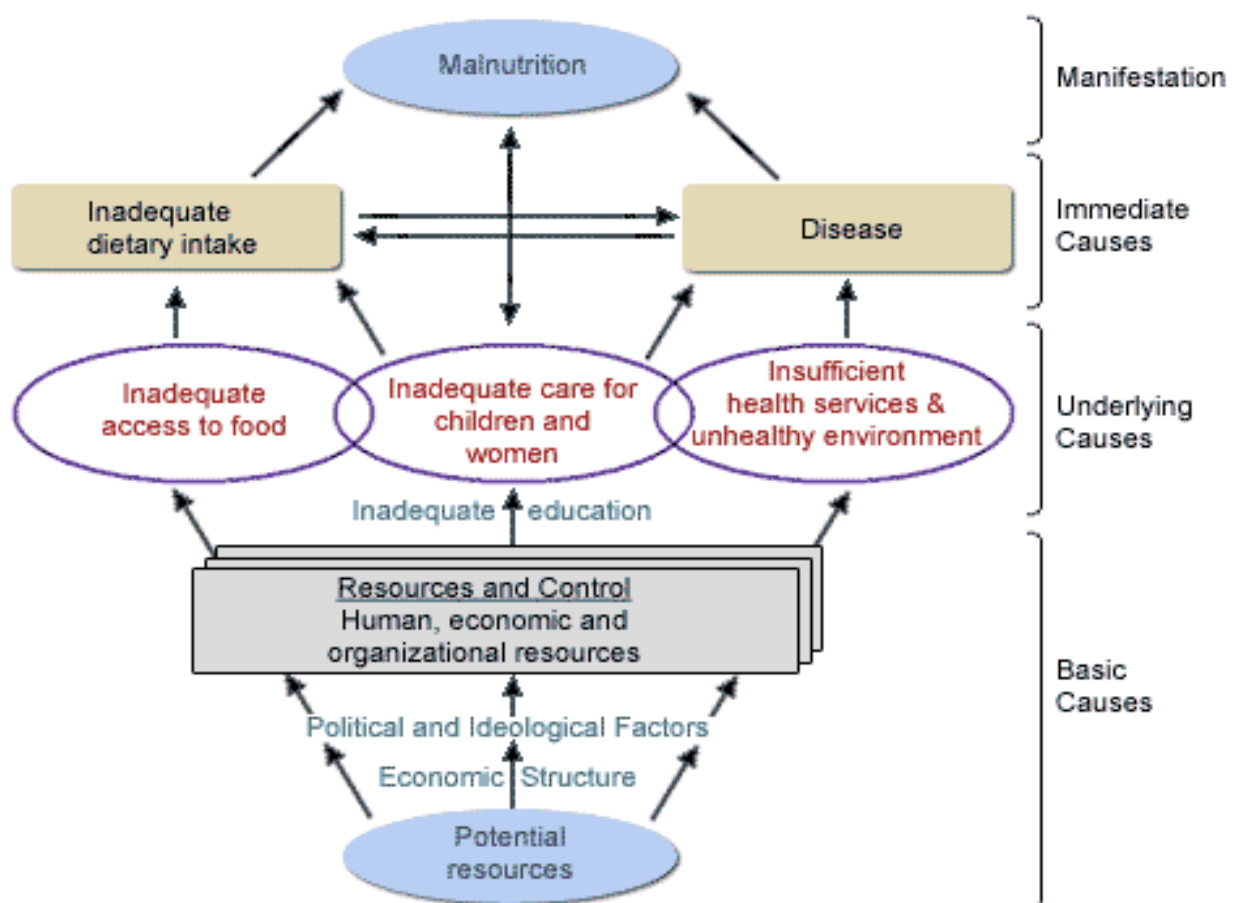


Figure 1: Conceptual framework of the causes of malnutrition (UNICEF, 1990).

UNICEF has since developed a new conceptual framework for the causes of malnutrition by adapting the original framework compiled, as seen in Figure 2 (UNICEF, 2015b).

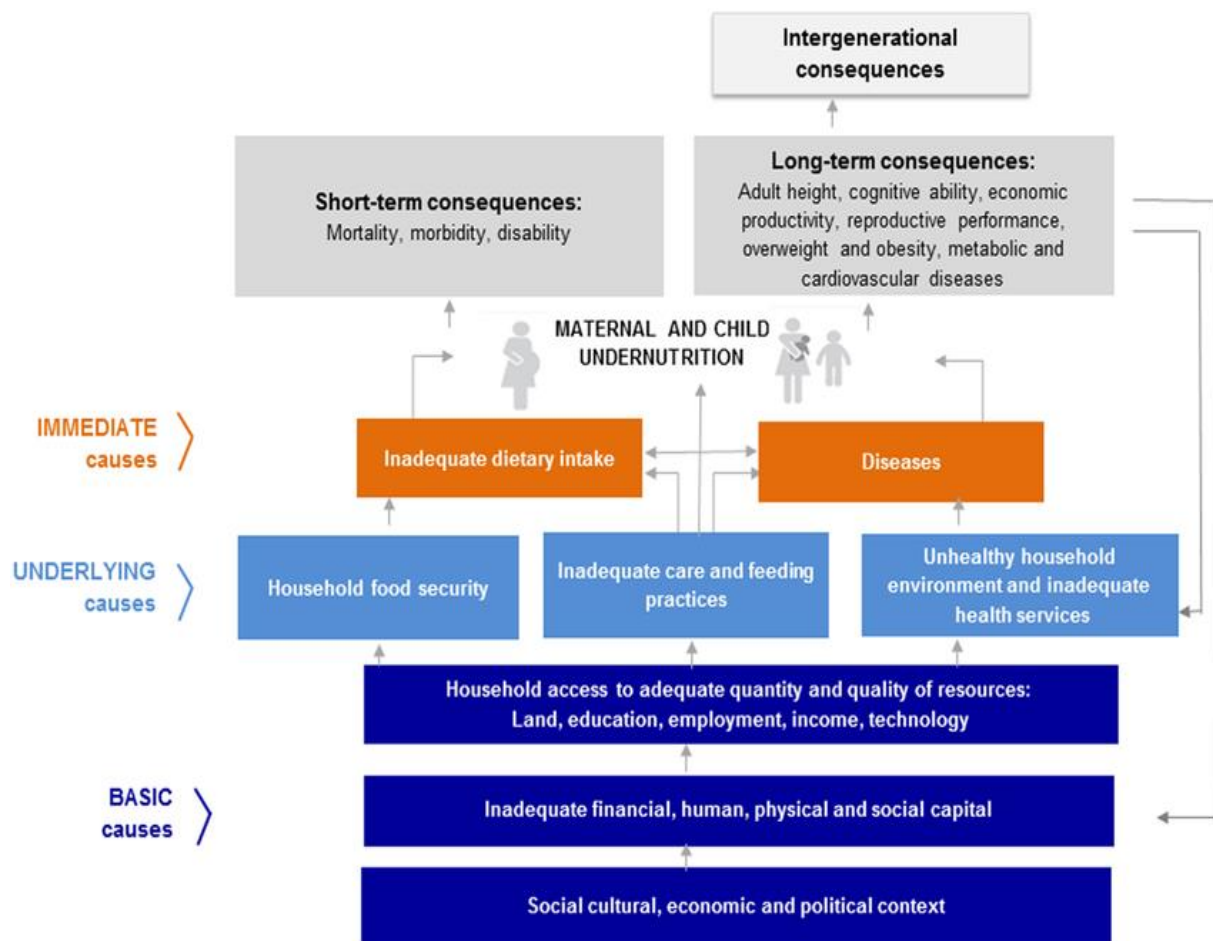


Figure 2: UNICEF conceptual framework of the determinants of childhood undernutrition (UNICEF, 2015b).

2.5.1 Immediate causes

Energy needs differ between adults and children, where children need a greater amount of energy to sustain their growth and development and their much higher metabolism (UNICEF, 2017). A baby should be exclusively breastfed from birth until the age of six months, as recommended by the WHO (WHO, 2017). If a child is exclusively breastfed, it greatly improves their development and decreases mortality risk (FAO *et al.*, 2017).

Two of the immediate causes of malnutrition include an inadequate diet and the presence of infection (Goudet *et al.*, 2017). A diverse range of foods can be introduced after the first six

months in addition to breastfeeding, which should ideally continue up until the age of two years to ensure the child receives all the nutrients and minerals it requires to grow (UNICEF, 2017).

An inadequate diet refers to insufficient complementary feeding practices; unhygienic and infrequent feeding of infant formula; and an inadequate intake of energy density and nutrients (Dipasquale *et al.*, 2020). Rice and maize are examples of staple foods in developing countries that make up most children's diet. While this provides adequate energy intake for children, it results in a poor intake of protein and other nutrients and minerals, as very few vegetables and protein sources are included in the diet (UNICEF, 2015b).

Digestion, absorption, transport and utilization of nutrients in the body may be negatively influenced by disease factors such as HIV/AIDS, tuberculosis, gastroenteritis, acute respiratory infections, measles and whooping cough. Infections may also result in decreased absorption, decreased nutrient intake, increased nutrient losses and increased nutrient requirements (UNICEF, 1990).

2.5.2 Underlying causes

Household food security, maternal and child care, basic health services and a healthy environment, education and information comprise the underlying causes of malnutrition (UNICEF, 1990).

Household food security includes the provision, production and distribution of food at the household level. Although South Africa is food secure at the national level, this is not true at the household level (Faber & Wenhold, 2016). Adequate nutrition cannot be guaranteed with access to food alone, even though it is necessary. When there is inadequate access to food within the household, children fail to thrive and grow optimally. A few causes of household food insecurity include poverty, inflation, high cost of food and transport, inadequate knowledge in budgeting, lack of education regarding food purchasing and preparation methods (Hanoman, 2017).

Maternal and child care is an underlying cause of malnutrition, as research has found that children born to uneducated women are at a higher risk of malnutrition (Faber & Wenhold,

2016). This is due to inadequate nutritional knowledge, a low income and inadequate access to child care facilities (Hanoman, 2017). These mothers are also more prone to having too many children and become mothers at a very young age or when they are already too old. If the mother is uneducated, she is most likely unemployed, resulting in a low income and a lack of food provision at the household level (Faber *et al.*, 2011; Hanoman, 2017).

Overcrowding; fragmented services; insufficient staff and training; limited access to primary health care; lack of adequate health services; poor water supply; poor personal hygiene, and an insanitary environment are all factors that contribute as underlying causes of malnutrition as they deny the individual the right to health services and a healthy environment (De Pee *et al.*, 2015).

2.5.3 Basic causes

The basic causes of malnutrition include: unequal distribution and availability of resources in communities; poverty; unemployment; ideological factors such as religion, culture, tradition and beliefs; urbanization; informal urban settlements; poor use of technology; unfavourable ecological conditions and migrant labour systems (UNICEF, 1990)

2.6 Long-term consequences of malnutrition

Apart from the short-term and acute consequences of malnutrition, such as the susceptibility to infections, diseases and mortality, long-term effects exist. A high prevalence of malnutrition may hinder economic development and affect the country's economy (Itaka & Omole, 2020). This occurs as the rate of poverty rises, directly due to a decrease in productivity due to an individual's poor physical condition, and indirectly through poor brain and cognitive development and function and learning deficits (Matrins *et al.*, 2011).

2.6.1 School and educational performance

In South Africa, if a child is found to be stunted between the ages of one and three, the probability of the child having lower school grades in middle school was high (Matrins *et al.*, 2011). Studies conducted in low-income countries found an association between both low weight-for-age and low height-for-age and the child's academic achievement (De Onis *et al.*,

2012). The possible mechanisms that cause poor brain development and cognitive deficits due to malnutrition in children include potential damage to the brains structure; and impaired motor development and exploratory behaviour (Pienaar, 2019).

Evidence shows how children with poor nutritional status have impaired academic performances if breakfast or any other meal is skipped (Nugent *et al.*, 2020). The adverse effects of food insecurity on behaviour and academic performance in children, specifically on math and reading achievements, may impact later life regarding employment opportunities and success (Kruger *et al.*, 2014). Amongst children of all ages, food insecurity is also linked with lower cognitive indicators, dysregulated behaviour, and emotional distress (Schwarzenberg *et al.*, 2015), all of which may influence school achievement.

2.6.2 Income and job sustainability

The individual's capacity for physical labour is negatively affected if the individual is undernourished (Matrins *et al.*, 2011). A low BMI is associated with a greater number of days an employee is absent from work and a decrease in productivity. Productivity is negatively affected, and work capacity is directly related to a BMI of 17kg/m² as found by (Matrins *et al.*, 2011); however, light work activities such as cutting grass or planting crops are not negatively affected. Heavy activities require a high energy expenditure and use of body mass, which can be affected by malnutrition (Rawe *et al.*, 2016). A few examples of these activities include cutting sugar cane, loading/carrying sacks of grain and pushing a loaded wheelbarrow. The study also found that taller workers had higher work productivities (Matrins *et al.*, 2011). Stature was identified as being the parameter more associated with productivity. Consequentially, impaired working capacity can have a negative effect on the quality of life.

(Dewey & Begum, 2011) states, "Poverty is both a cause and an outcome of poor human development". This is evident as poverty plays a vital role in an individual's earning potential as lower muscle mass and shorter height results in lower productivity in manual labour (Nugent *et al.*, 2020).

2.6.3 Other consequences

Other long-term consequences of malnutrition include a negative effect on the birth weight of the next generation; BMI, body composition and obesity; blood lipids; insulin resistance; type 2 diabetes; blood pressure; impaired lung function; increased risk of cancer and fractures; as well as mental illness (Dewey & Begum, 2011).

It isn't easy to conduct studies in this area as the entire life-course of the individuals needs to be considered, which can only be undertaken through experimental models due to ethical reasons (Matrins *et al.*, 2011).

2.7 Medical management of malnutrition

The medical management of SAM consists of both inpatient and outpatient treatment; however, before treatment can be administered to the patient, the patient must first be assessed and classified to determine which type of treatment they will receive (NDOH, 2015)

Algorithms exist that aid the health worker to determine the type of treatment the underweight paediatric patient is to receive. These algorithms help the health worker assess, classify and treat all children aged between 6 – 59 months for acute malnutrition. The South African Department of Health compiled a decision tree for the Integrated Management of Acute Malnutrition (IMAM) as seen in Figure 3 (NDOH, 2015).

2.7.1 Inpatient management of SAM

Inpatient treatment of SAM includes three phases known, in order, as the stabilization phase, followed by the transition phase and ending with the rehabilitation phase (NDOH, 2015).

Table 6 illustrates an inpatient treatment timeline for severe acute malnutrition.

Table 6: Timeframe for inpatient management of SAM (NDOH, 2015).

	Stabilization Days 1 - 2	Transition Days 3-7	Rehabilitation Weeks 2-6
1 Hypoglycaemia	→		
2 Hypothermia	→		
3 Dehydration	→		
4 Electrolytes	→		
5 Infection	→		
6 Micronutrients	No Iron →	Add Iron	→
7 Initiate Feeding	→		
8 Catch-up growth			→
9 Sensory stimulation		→	
10 Prepare for follow-up			→

The main aim during the stabilization phase is to control infection, restore cellular function, ensure the child is kept warm, and receives proper dietary support (Mambulu-Chikankheni *et al.*, 2017). It also allows health professionals to detect/respond to any serious complications that may be present such as hypoglycaemia, hypothermia, poor feeding and diarrhoea. Once the patient develops a good appetite, is active, and the oedema is resolved, can the patient begin transitioning to the rehabilitative phase where rehabilitative feeds are given (NDOH, 2015).

Table 7 demonstrates the current South African Inpatient Protocol for treatment of SAM in patients that present with medical complications (NDOH, 2015).

**Assess, Classify and Treat All Children 6-59 months for Acute Malnutrition and Growth Faltering
(MUAC or Weight-for-Height (WHZ) based Assessment)**

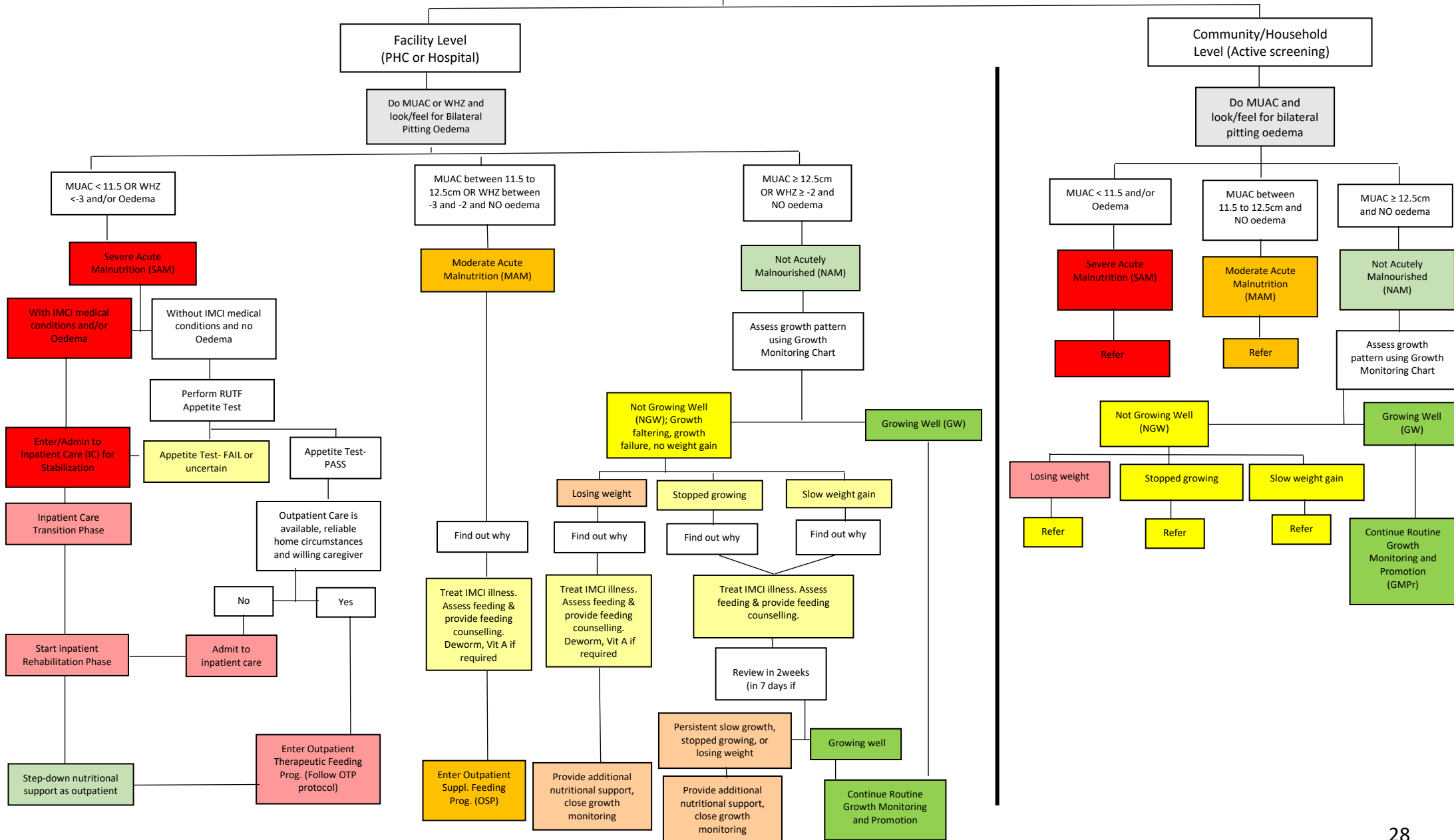


Figure 3: Decision tree for the Integrated Management of Acute Malnutrition (IMAM) (NDOH, 2015).

Table 7: South African Protocol for Inpatient Management of Severe Acute Malnutrition with Medical Complications (Emergency Care and Standard Inpatient Care) (NDOH, 2015).

<p style="text-align: center;">PROTOCOL FOR THE INPATIENT MANAGEMENT OF CHILDREN WITH SEVERE ACUTE MALNUTRITION IN SOUTH AFRICA</p> <p style="text-align: center;"><i>“Severely malnourished children are <u>different</u> from other children; so, they need <u>different</u> treatment.”</i></p>			
CONDITION	PREVENTION	WARNING SIGNS	IMMEDIATE ACTION
<p>1. Hypoglycaemia (Low blood sugar)</p> <p>Hypoglycaemia is blood glucose <3mmol/L</p>	<p>For all children: -</p> <p>Feed immediately “stabilizing feed”/ F75 every 3 hours (8 feeds), day and night. Start straight away, i.e., on arrival at the hospital and within 30 minutes after admission. (Use feeding chart to find the amount to give)</p> <p>Encourage mothers to stay with very ill children to watch for deterioration, help feed and keep the child warm.</p>	<ol style="list-style-type: none"> 1. Low temperature (hypothermia) noted on a routine check 2. Child feels cold 3. Child becomes drowsy or lethargic 4. Signs of shock 5. If blood sugar is low, monitor blood sugar every 30 minutes to 60 minutes and intervene accordingly 	<p>Perform Dextrostix test in outpatients/casualty and on admission on all patients.</p> <p>If conscious and blood sugar is below 3mmol/L: -</p> <ol style="list-style-type: none"> 1. If hypoglycaemic, feed 2hourly (12 feeds in 24 hours). Use a feeding chart to find the amount to give. Start straightaway. Afterwards, feed 3-4hours. 2. Give 50 ml of 10% glucose (to prepare mix10m150% dextrose with 40ml sterile water) or sugar solution (1 rounded teaspoon sugar in 3 tablespoons of plain water) orally or, if the child refuses, via nasogastric tube (NG tube). If 10% glucose is not available, give sugar solution or F75 rather than wait for glucose. Test again 30 minutes after treatment. If blood sugar is still low, repeat oral 50ml 10% glucose or sugar solution. Consider putting up a short IV line. <p>If unconscious, give dextrose IV (5ml/kg of sterile 10% glucose: prepare 1ml/kg 50% dextrose mixed with 4ml/kg sterile water), followed by oral 50ml of 10% glucose or oral sugar solution or via NG tube. Monitor response to treatment.</p> <p>Monitor blood sugar 3-hourly until stable especially in first 48hours.</p> <p>If blood sugar is persistently low, review feed and look for infections.</p>
<p>2. Hypothermia (Low Temperature)</p>	<p>For all children: -</p> <ol style="list-style-type: none"> 1. Feed straightaway and then every 2 – 3 hours, day and night. 2. Keep warm. Cover with a blanket. Let mother sleep with child to keep child warm. 	<ol style="list-style-type: none"> 1. Cold extremities. 2. Lethargic. 3. Poor appetite. 	<p>Take temperature at outpatients/casualty and on admission (Ensure thermometer is well shaken down).</p> <p>If temperature is below 36°C:</p>

Table 7: South African Protocol for Inpatient Management of Severe Acute Malnutrition with Medical Complications (Emergency Care and Standard Inpatient Care) (NDOH, 2015).

<p>Hypothermia is Axillary/underarm temperature <35°C</p>	<ol style="list-style-type: none"> 3. Keep room warm, no draughts. 4. Keep bedding/clothes dry. Dry carefully after bathing (do not bathe if very ill). 5. Avoid exposure during examinations, bathing. 	<p>Note:</p> <p>Hypothermia in malnourished children often indicates co-existing hypoglycaemia and infection.</p>	<ol style="list-style-type: none"> 1. Begin feeding straightaway (or start rehydration if diarrhoea with dehydration). 2. Active rewarming: Put the child on the mother's bare chest (skin-to-skin contact) and cover the child. Cover the child's head, clothe the child, apply a warmed blanket and place a heater or lamp nearby. 3. Feed 2-3hourly (8-12 feeds in 24hours). <p>Check temperature 3-4hourly. Monitor during rewarming.</p> <p>Take temperature every two hours: stop rewarming when temperature rises above 36.5°C.</p> <p>Take temperature every 30 minutes if heater is used because the child may become overheated.</p>
			<p>DO NOT GIVE IV FLUIDS EXCEPT IN SHOCK</p>
<p>3. Some or Severe Dehydration (Without Shock)</p> <p>(Too little fluid in the body)</p>	<ol style="list-style-type: none"> 1. When a child has watery diarrhoea, give 10ml/kg Oral Rehydration Solution (ORS) after each loose stool to replace stool losses to prevent dehydration. 2. Treat some or severe dehydration with ORS to prevent severe dehydration or shock 	<p>Profuse watery diarrhoea, sunken eyes, slow skin pinch, absent tears, dry mouth, very thirsty, reduced urine output.</p>	<p>(see Emergency Treatment Wall Chart for treating shock)</p> <p>If there is some or severe dehydration:</p> <p>Give ORS, oral or by NG tube, 20ml/kg every hour for 4 hours (i.e., 5 mL/kg every 15min for 4hours using frequent small sips.</p> <p>Show the caregiver how to give ORS with a cup and spoon. If child vomits wait 10 minutes and then continue more slowly.</p> <p>3. Stop ORS when there are 3 or more hydration signs, or signs of over-hydration.</p> <p>Monitor during rehydration for signs of over-hydration:</p> <ul style="list-style-type: none"> • increasing oedema and puffy eyelids

Table 7: South African Protocol for Inpatient Management of Severe Acute Malnutrition with Medical Complications (Emergency Care and Standard Inpatient Care) (NDOH, 2015).

			<ul style="list-style-type: none"> • increasing pulse and respiratory rate. Check for signs at least hourly. Stop if pulse increases by 25 beats/minute and respiratory rate by 5 breaths/minute. <p>Encourage caregiver to continue feeding the child, especially if breast-feeding.</p> <p>Review at least hourly general condition, capillary filling time, level of consciousness, skin turgor, sunken eyes, respiratory rate, abdomen, if passing urine and number/quality of stools —</p> <p>If shock redevelops, treat for shock (see Emergency Wall Chart).</p> <p>If dehydration is improving — continue for up to 10 hours.</p> <p>If there is no dehydration go to prevention 10ml/kg ORS orally after each loose stool.</p> <p>If dehydration is not improving consider IV fluids with great care.</p>
<p>4. Electrolyte imbalance</p> <p>(Too little potassium and magnesium, and too much sodium)</p>	<p>1. Use ORS 60mmo1 sodium/L and F75 formula as these are low in sodium.</p> <p>2. Do not add salt to food.</p> <p>3. Do not treat oedema with diuretics</p> <p>Give extra potassium and magnesium (either as CMV in feeds or as a supplement)</p>	<p>Oedema develops or worsens, poor appetite and apathy.</p>	<p>1. If the child is on Stabilizing feed with added minerals and vitamins (CMV) they will receive the necessary Potassium, Magnesium, Copper and Zinc within their feeds daily, or</p> <p>2. Give daily: extra potassium (4mmol/kg/day bodyweight) and magnesium (0.4-0.6mmol/kg/day). For potassium, give Oral Mist Pot Chloride (MPC) solution: MPC 1ml/kg 8 hourly (1ml=1mmol K+), AND Trace element mix (contains <u>MgSO4</u> 280mg/ml, ZnSO4 36mg/ml, CuSO4 0.1mg/ml,) daily orally, or magnesium individually, give a single IM injection of 50% magnesium sulphate (0.3ml/kg body weight) to a maximum of 2ml. or 1ml of 2% MgSO4 daily mixed with food.</p>
<p>5. Infections</p>	<p>1. Good nursing care.</p> <p>2. Reduce overcrowding if possible (separate room or ward for malnourished children).</p>	<p>NOTE: The usual signs of infection, such as fever, are often absent so assume all severely malnourished children have infection and treat with antibiotics.</p>	<p>Starting on the first day, give antibiotics to all children.</p> <p>1. If the child is severely ill (apathetic, lethargic) or has complications (hypoglycaemia, hypothermia, raw skin/fissures,</p>

Table 7: South African Protocol for Inpatient Management of Severe Acute Malnutrition with Medical Complications (Emergency Care and Standard Inpatient Care) (NDOH, 2015).

	<p>3. Wash hands before preparing feeds and before and after dealing with any child.</p> <p>4. Follow Guidelines for "safe preparation, storage and handling of feeds".</p> <p>5. Give measles vaccine to unimmunized children over 6 months of age.</p>	<p>Hypothermia and hypoglycaemia are signs of severe infection.</p> <p>NOTE: Ensure all doses are given. Give them on time.</p>	<p>meningitis, respiratory tract or urinary tract infection) give IV/IM Ceftriaxone 80mg/kg/day for 7days</p> <p>2. If the child has medical complications but not seriously ill, give IV/IM Ampicillin: 50mg/kg IM/IV 6-hourly for 7 days AND Gentamicin: 6mg/kg IM/IV once daily for 7 days.</p> <p>If a child fails to improve after 48 hours, search for new infection, then change to Ceftriaxone 80mg/kg daily IM/IV for 5-7 days (or guided by local microbiological flora).</p> <p>If child does not improve after 5 days</p> <ul style="list-style-type: none"> • Refer to higher level of care <p>3. If the child has no medical complications, give antibiotics orally Amoxicillin 30mg/kg/dose 8-hourly for 5 days</p> <p>NOTE: Avoid steroids as these depress immune function. Give measles vaccine if due. Continue use of cotrimoxazole to prevent PCP pneumonia if indicated.</p> <p>Treat for intestinal infestation (parasitic worms) once stable: 1-2 yrs. old or < 10kg Mebendazole 100mg po bd for 3 days > 2 yrs. and > 10kg Mebendazole 500mg po single dose.</p> <p>Investigate for TB. Do Tuberculin Skin Test and read it within 48 hours. Record the findings.</p> <p>Counsel and Test for HIV. Record the findings.</p>
CONDITION	MANAGEMENT		
<p>6. Micronutrient Deficiencies</p>	<p>Give:</p> <p>1. Vitamin A orally on day 1. If under 6 months give 50,000 units; if 6-11 months give 100,000 units; and if 12-59 months give 200,000 units. If the child has any signs of vitamin A deficiency (eye changes: xerophthalmia/drying of the eye), repeat this dose on day 2 and day 14. Children with severe measles should receive vitamin A on days 1,2 and 14.</p> <p>2. Folic acid 2.5mg daily orally. (Folic acid is in CMVC, if CMVC is used in feeds then give only the 5mg dose of day).</p> <p>3. Multivitamin syrup 5 ml daily orally. (Multivitamins are in CMVC, so if CMVC is used in feeds then omit the syrup).</p>		

Table 7: South African Protocol for Inpatient Management of Severe Acute Malnutrition with Medical Complications (Emergency Care and Standard Inpatient Care) (NDOH, 2015).

	<p>4. If the child is on Stabilizing feed with added minerals and vitamins (CMVC) they will receive the necessary Potassium, Magnesium, Copper and Zinc within their feeds, or</p> <p>5. If CMV is not used, give daily orally trace element mix (TEM) (ZnSO₄ 36mg/ml, CuSO₄ 0.1mg/ml, MgSO₄ 280mg/ml): 2.5ml if weight up to 10kg OR 5ml if weight ≥ 10kg.</p> <p>6. If CMV or TEM not available then give elemental Zinc (2mg/kg body weight/day) and copper sulphate solution (0.3mg Cu/kg body weight/day).</p> <p>7. Start iron (2mg/kg/day) when you change to the F100 catch-up formula.</p> <p>(DO NOT GIVE IRON IN THE INITIAL & STABILISATION PHASE EVEN IF ANAEMIC)</p>
<p>7. Stabilization feeding</p> <p>(Stabilization phase)</p>	<p>1. Give stabilizing feed (F75- feeding chart for volumes). These provide Energy: 100kcal/kg/day and Protein: 0.9g/kg/day. The fluid requirement is 130ml/kg/day.</p> <p>2. Give 8-12 feeds over 24 hours. Monitor intake and output (vomiting, diarrhoea, urine output) in Feed Chart/Fluid Balance Charts. Keep a 24-hour intake chart. Measure feeds carefully. Record leftovers.</p> <p>3. If the child has gross oedema (Oedema 3+), reduce the volume to 100 ml/kg/day (see F75 feed chart for gross oedema for volumes).</p> <p>4. If the child has poor appetite, encourage the child to finish the feed. If not finished, keep the leftovers and re-offer later. If less than 80% of the amount offered is not taken, insert a nasogastric tube in order to feed the child. If in doubt, check feeding chart for intakes.</p> <p>5. If the child is breastfed, encourage continued breastfeeding.</p> <p>6. Weigh daily and plot weight daily.</p>
<p>8. Transition feeding and Catch-up growth</p> <p>(Rehabilitation phase)</p>	<p>1. Transition to catch-up feed (F100) as soon as appetite has returned (usually within one week) and/or oedema is lost or is reduced. Change to F100 (this provides energy: 150-220Kcal/kg/day and Protein: 4-6 g/kg/day). Transition Phase: for 2 days, replace F75 with the same amount of F100. On day 3, increase each feed by 10ml until some feed remains.</p> <p>2. Give 8 feeds over 24 hours. As the child is eager to eat, progress to 5 feeds of F100 and 3 specially modified family meals, high in energy and protein. Ready-to-Use Therapeutic Food (RUTF) may be introduced and given at discharge for catch-up growth.</p> <p>3. Encourage the child to eat as much as possible, so that the child can gain weight rapidly. If the child has finished everything, offer more and increase subsequent feeds. Make sure that the child is actively fed. Involve the mother/caregiver in the feeding all the time.</p> <p>4. Weigh daily and plot weight daily. Use daily weight chart for recording and monitoring weight changes.</p>
<p>9. Loving care, play and stimulation</p>	<p>1. Provide tender loving care.</p> <p>2. Help and encourage mothers to comfort, feed, and play with their children.</p>

Table 7: South African Protocol for Inpatient Management of Severe Acute Malnutrition with Medical Complications (Emergency Care and Standard Inpatient Care) (NDOH, 2015).

	<p>3. Involve mother/caregiver in all the play/stimulation exercises.</p> <p>4. Involve an occupational therapist and /or physiotherapist to plan a stimulation programmed for the ward.</p> <p>5. Give structured play when the child is well enough.</p>
<p>10. Preparation for follow-up after discharge</p>	<p>1. Investigate for TB. Repeat Tuberculin Skin Test if initial response was negative, and read it within 48 hours. Record the findings.</p> <p>2. Ensure counselling and Test for HIV was done. Record the findings.</p> <p>3. Involve mother in the discharge process and follow-up plans.</p> <p>3. Obtain information on family background and socio-economic status. Refer to Social Services (SASSA, Social Development, Home Affairs) and/or hospital social workers.</p> <p>4. Give health and nutritional education. Issue mother/caregiver with the Family Booklet for Child Health. Share educational messages about the child and self for example: Family Practices booklet containing information on when to return urgently to Clinic, hygiene, infant feeding and complementary feeding advice, stimulation, family planning, HIV, immunization, role of male partner.</p> <p>Work with Dietitian to counsel mothers/caregivers on how to modify family foods, how often to feed and how much to give.</p> <p>5. Register child on the Severe Acute Malnutrition In-Patient care register. Ensure the child is counted onto the district health information system (DHIS) admissions, discharges and/or deaths tally sheet.</p> <p>6. Establish a link with local PHC Clinic and family's local Community Care Givers (CCG's) for home follow-up.</p> <p>7. Discharge Criteria: Discharge when there are signs of improvement: Good appetite, infection resolved, oedema resolved AND consecutive weight gain for 5 days (>5-10g/kg/day).</p> <p>8. Prepare a Discharge Summary and write a brief clinical summary in RTHB.</p> <p>9. Send a referral letter to the local PHC clinic. Ensure child is enrolled on nutrition supplementation programmed at local clinic or child returns to hospital outpatient in one week.</p>

2.7.2 Outpatient management of SAM (Ambulatory)

If the patient is identified as a SAM, has an appetite, does not present with any serious medical complications or oedema, they are treated by the Outpatient Therapeutic Programme (OTP) (NDOH, 2015). Weekly visits are scheduled at a primary health care facility or hospital outpatient department as they ensure the patient is followed up and any adverse complications are quickly noted and addressed to further aid in the patient's recovery (NDOH, 2015).

Two types of SAM cases exist that require treatment as outpatients, namely: Type 1 (SAM patients who have been discharged from hospital and referred to OTP for step-down care); and Type 2 (Newly identified SAM patients that do not present with any serious medical complications and enter directly to OTP) (NDOH, 2015).

Health and nutritional status monitoring and prescribing of Ready to Use Therapeutic Feeds (RUTF) is done weekly. The patient receives RUTF given as a take-home feed (NDOH, 2015).

Table 8 below demonstrates the current South African Action Protocol in Outpatient Care (NDOH, 2015).

Table 8: Action Protocol in Outpatient Care (NDOH, 2015).

Sign	Referral to inpatient care	Require a special home visit
GENERAL CONDITION	Deteriorating	The child is absent or defaulting.
BILATERAL PITTING OEDEMA	<ul style="list-style-type: none"> • Any grade of bilateral pitting oedema. • Any grade of bilateral pitting oedema with severe wasting. • Appearance of bilateral pitting oedema. 	The child is not gaining weight or

Table 8: Action Protocol in Outpatient Care (NDOH, 2015).

ANOREXIA*	Poor appetite or unable to eat – failed appetite test.	losing weight on follow-up visits. Child has returned from inpatient care or refuses referral to inpatient care
VOMITING*	Intractable vomiting.	
CONVULSIONS*	Ask the mother if the child had convulsions since the previous visit.	
LETHARGY, NOT ALERT*	The child is difficult to wake.	
UNCONSCIOUSNESS*	The child does not respond to painful stimuli.	
HYPOGLYCAEMIA	A clinical sign in a child with SAM is eyelid retraction: the child sleeps with eyelids slightly open. Low level of blood glucose <3mmol/L	
DEHYDRATION	Severe dehydration based primarily on recent history of diarrhoea, vomiting, fever, or sweating and on recent appearance of clinical signs of dehydration as reported by the mother/caregiver.	
HIGH FEVER	Axillary temperature $\geq 37.5^{\circ}\text{C}$	
HYPOTHERMIA	Axillary temperature $< 36^{\circ}\text{C}$	
RESPIRATORY RATE	<ul style="list-style-type: none"> • ≥ 60 respirations/min for children under 2 months. • ≥ 50 respirations/min for children from 2 – 12 months. • ≥ 40 respirations/min from 1 – 5 years. • ≥ 30 respirations/min for children over 5 years. • Any chest in-drawing. 	

Table 8: Action Protocol in Outpatient Care (NDOH, 2015).

ANAEMIA	Palmerpallor or unusual paleness of skin.	
SKIN LESION	Broken ski, fissures, flaking of skin	
SUPERFICIAL INFECTION	Any infection requiring intramuscular antibiotic treatment	
WEIGHT CHANGES	<ul style="list-style-type: none">• Below admission weight on week three.• Weight loss for three consecutive visits.• Static weight for three consecutive visits.	
REQUEST	Mother/caregiver requests treatment of the child in inpatient care for special reasons (decided by supervisor).	
NOT RESPONDING	The child that is not responding to treatment is referred to inpatient care or hospital for further medical investigation.	
*Integrated Management of Childhood Illness (IMCI) danger signs.		

Once the patient meets the discharge criteria, they may be discharged from the OTP and have made a full recovery. The discharge criteria for children aged between 0 – 60 months include the following (NDOH, 2015):

- WHZ: >-2SD for two consecutive visits and/or
- MUAC: >12.5cm
- No medical complications
- No oedema

Suppose a child is diagnosed with MAM and does not present with any serious medical complications. In that case, the patient is treated and placed on the Outpatient Supplementation Program (OSP), and regular monthly follow-ups are scheduled at the primary health care clinic or hospital outpatient department (NDOH, 2015).

2.8 Global responses to tackling malnutrition

Various factors influence and enhance the development of malnutrition (UNICEF & Schultink, 2015); however, there are four primary drivers that evidence indicates have an immediate influence on malnutrition. These drivers can be changed to produce positive child health outcomes and prevent malnutrition (Hawkes *et al.*, 2020). These include early-life nutrition, diet quality, food environment, and socioeconomic factors (Bhutta *et al.*, 2008).

Policies, programmes, governance structures, funding systems, and multisectoral communities are the key areas involved in managing and implementing the actions and interventions to address malnutrition and aim to address the four immediate drivers (Hawkes *et al.*, 2020). Although interventions to improve malnutrition are vital for the child to survive, they are also indirectly valuable for economic growth within a country. Thus, six key steps that work intertwined with eradicating malnutrition effectively were identified. These steps include (Rawe *et al.*, 2012):

1. Making malnutrition visible
2. Investing in direct interventions
3. Filling the health worker gap
4. Protecting families from poverty
5. Harnessing agriculture to help tackle malnutrition
6. Galvanizing political leadership

2.8.1 Visibility

Every hour of each day, over 300 children die, globally, from malnutrition; however, it is not indicated on their death certificates resulting in the issue of under-reporting (especially stunting), and ultimately one of the reasons malnutrition has not been effectively addressed (Rawe *et al.*, 2012).

A “Policy Brief, Scaling up nutrition: A framework for Action” was released in 2010 by a coalition of the United Nations to prioritize undernutrition in international assistance and national program planning in developing countries (Darnton-Hill & Samman, 2015). The policy brief calls for a multisectoral approach and promotes scaling up nutrition programs and interventions (Gillespie *et al.*, 2015). Governments, civil society, businesses, and citizens worldwide are united with the key goal of fighting to end malnutrition and undernutrition (UNICEF & Schultink, 2015).

UNICEF is one of the organisations dedicated to scaling up the effectiveness of nutrition-specific interventions by increasing coverage and advocacy of incorporating nutrition-sensitive approaches into existing programs such as HIV treatment and prevention, social protection, and early childhood development (UNICEF & Schultink, 2015).

The 2008 Lancet consisted of numerous papers where maternal and child undernutrition (wasting, stunting, and micronutrient deficiency) were the commonly occurring subject. This led to the evaluation and analysis of the short-term and long-term consequences of these issues and an estimated reduction with the use of large-scale proven nutrition interventions (Bhutta *et al.*, 2013).

The first 1000 days were identified as a critical period in which good nutrition and growth lead to beneficial aspects throughout the individual’s life (UNICEF, 2017). A higher priority was called for national nutrition programs, forming coalitions with health programs and a centred focus on the coordination of global nutrition systems (Bhutta *et al.*, 2013).

2.8.2 Direct interventions

Promotion of: optimal nutrition, meeting micronutrient requirements, preventing and treating malnutrition, supplementation, and school feeding are all types of nutrition-specific

interventions or direct interventions established as key goals by UNICEF for nutrition programming (Bhutta *et al.*, 2013). Promotion or counselling is the main underlying approach in these interventions. They incorporate effective nutrition communication for behavioural/social change or community-based strategic approaches (Goudet *et al.*, 2017).

Nutrition-sensitive approaches focus on addressing the underlying determinants of malnutrition and may be used as platforms for nutrition-specific interventions (Goudet *et al.*, 2017). Nutrition-specific interventions focus primarily on pregnant and lactating women and children under the ages of 2 years from disadvantaged areas. If these interventions are accurately utilized, they can significantly decrease the prevalence of stunting, micronutrient deficiencies, and wasting (UNICEF, 2015b).

The 13 Lancet interventions are the most recognisable interventions that were conceptualised to improve maternal and child health. The interventions are summarized in table 9 (Maternal and Child Nutrition Study Group, 2013).

Table 9: The 13 Lancet Interventions (Maternal and Child Nutrition Study Group, 2013).

Interventions that encourage changes in behaviour to improve nutrition
<ul style="list-style-type: none"> • Promoting breastfeeding for newborns at delivery • Promoting exclusive breastfeeding for the first six months through individual and group counselling • Promoting the best foods and best ways to feed children between the ages of 6 to 24 months (i.e., complementary feeding in addition to breastfeeding) • Improved hygiene practices, including hand-washing
Interventions that increase intake of vitamins and minerals (providing micronutrients for young children and their mothers)
<p style="text-align: center;"><i>For infants and children:</i></p> <ul style="list-style-type: none"> • Increasing intake of zinc through supplementation • Therapeutic zinc supplements for diarrhea • Providing Vitamin A through fortification or supplementation • Universal iodization of salt or provision of iodized oil capsules <p><i>For pregnant or breastfeeding mothers:</i></p>

Table 9: The 13 Lancet Interventions (Maternal and Child Nutrition Study Group, 2013).

<ul style="list-style-type: none">• Improving nutrient intake through multiple micronutrient supplements• Providing iodine through iodization of salt• Providing iron folate supplementation• Providing calcium supplementation
Therapeutic feeding interventions
<ul style="list-style-type: none">• Treatment of severe undernutrition with ready-to-use therapeutic foods

Therapeutic feeding interventions are delivered through supplementation programmes (De Pee *et al.*, 2015). Fortified and nutrient-enriched maize products, ready-to-use therapeutic food, and energy- and protein-dense drinks are some of the supplements included in a supplementation program aimed at treating and preventing childhood malnutrition at the primary health care level (Steenkamp *et al.*, 2016).

With the scaling-up of nutrition-specific interventions by increasing the coverage to 90%, it is theorised that the total mortality rate in children below the ages of five will decrease by 15% (Bhutta *et al.*, 2013). An increase in economic strength has been noted with the implementation of early childhood nutrition-specific interventions, resulting in improved schooling, height, and, later, workforce earning capability (Darnton-Hill & Samman, 2015).

To successfully implement such nutrition-specific interventions, the critical need of specially trained, recruited and retained health care workers needs to be acknowledged and addressed (Watt *et al.*, 2011).

2.8.3 Filling the health worker gap

Children's lives depend on doctors, nurses, and community health care workers; however, children are dying every day due to the global health worker shortage crisis (Watt *et al.*, 2011). There is currently a global shortage of an estimated 3.5 million nurses, doctors, community health workers, and other health care professionals that play a crucial role in implementing direct interventions in the management of malnutrition (Rawe *et al.*, 2012). This health worker gap needs to be filled and can be done if governments prioritize employing more skilled professionals at the community level, where they are required.

It is estimated that to deliver quality healthcare to the world's population, there need to be at least 23 nurses, doctors, and health workers for every 10,000 people (Watt *et al.*, 2011). However, this estimate is not being reached, which leads to an extensive health worker gap in healthcare, making it one of the prominent barriers preventing nutrition-specific interventions from being adequately implemented. Governments need to prioritize addressing the health worker gap by training, recruiting, and retaining skilled nutrition professionals to address the problem of malnutrition and improve child health overall (Rawe *et al.*, 2012).

A gross shortage of health professionals hampers the South African public sector. There are 4,219 patients to every doctor compared to 243 patients to every general doctor in the private sector (Jobson, 2015). A large percentage (46%) of the South African population live in rural areas where healthcare provision relies on only 19% of nurses and 12% of doctors available (Watt *et al.*, 2011). Based on a multi-method situational appraisal conducted in the Free State to identify challenges to strengthen the public health system, staff shortage was one of the recurring themes mentioned by participants (Malakoane *et al.*, 2020).

The health worker gap was temporarily addressed by employing a significant number of community health care workers (CHCW), who would provide, home-based care, voluntary counselling, and monitoring; however, there were no significant health improvements within the communities due to a lack of training, coordination and supervision of the CHCW (Jobson, 2015). South Africa has made great progress in making medical technologies, medication, information systems readily available within the public health system; however, if the gross shortage of skilled professionals is not addressed, no positive progress can truly be achieved (Malakoane *et al.*, 2020).

There are currently 3,494 qualified dietitians (employed in the public/private sector or presently unemployed) and 229 qualified nutritionists registered with the Health Professions Council of South Africa (HPCSA) (HPCSA, 2020), however, there is still a shortage of dietitians at primary health care facilities (Tappenden *et al.*, 2013).

2.8.4 Poverty eradication

In 2000, the United Nations (UN) member states adopted the Millennium Declaration whereby eight goals were developed, publicly known as the Millennium Development Goals (MDGs). These goals were effective from 2000 to 2015 to reduce poverty, disease, and hunger around the globe. These goals were faced with challenges that continue to threaten their achievement and sustainability. The challenges faced include increased food prices, inadequate mother and child feeding practices, environmental disasters, and civil conflict (NDOH, 2015).

However, most of the goals were met, and the goal that stood out amongst the rest was the very first goal to eradicate extreme poverty and hunger (MDG1). The target of halving the rate of extreme poverty by 2015 was already met by 2012, indicating great progress and success for the MDGs (Eskelinen, 2018), which aim to address a range of challenges, including challenges related to poverty, inequality, and environmental development (FAO, IFAD, UNICEF, 2017).

In 2015, the 193 UN General Assembly adopted the 2030 Development Agenda, and 17 Sustainable Development Goals (SDGs) were developed to address challenges related to poverty, inequality, climate, prosperity, peace, justice, and environmental degradation. The aim is to achieve these goals by 2030 (FAO, IFAD, UNICEF, 2017). The SDGs that are interrelated and require nutrition-specific interventions for maternal and child health include (Ferranti, 2018):

- SDG 1: End poverty in all its forms everywhere

Personal narratives included in the book *Hunger and Poverty in South Africa: The Hidden Faces of Food Insecurity* reflect that food insecurity is multifactorial. Some of the issues noted include structural poverty, public health issues, and environmental circumstances (Hanoman, 2017). In South Africa, the Free State province has a poverty level of 61.9%, where even employed individuals receive such low salary wages that are barely sufficient to survive (Hanoman, 2017).

Black South Africans are the most vulnerable group linked to poverty due to pre-1994 apartheid-driven spatial development and education and health care divisions between ethnic groups. South Africa has since developed and initiated various programmes that aim at strengthening economic growth by providing profitable, fair, and equal opportunities for individuals, such as the Black Economic Empowerment (BEE) programme (STATSSA, 2019).

- SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

The rate of stunting in children has increased from 23.9% in 2008 to 27% in 2017, and it was noted that the prevalence is far greater in rural areas than urban areas in South Africa. To address this material concern, the SA government has proposed multiple initiatives to alleviate food insecurity, which contributes to malnutrition (STATSSA, 2019).

- SDG 3: Ensure healthy lives and promote well-being for all of all ages

Access to healthcare for mothers and children is vital for ensuring optimal health and wellbeing (Jobson, 2015). Approximately 1600 primary health clinics were constructed nationally as a strategy to deliver equitable health care to all South Africans, as stated as a basic human right by South Africa's Bill of Rights (STATSSA, 2019).

2.8.5 Harnessing agriculture

A multi-sectoral approach, including other critical sectors such as agriculture, education, and social welfare, is necessary to develop nutrition-sensitive interventions. This approach will assist with greater coverage, thus achieving optimal nutrition outcomes (UNICEF, 2015a). Education programs that invest in nutrition result in improved academic achievement. The social welfare sector can improve diet quality, quantity, diversity and decrease the risk of food insecurity by implementing social protection programs. The public health sector aids with the promotion of breastfeeding, adequate nutrition, good handwashing, and safe drinking water, and other aspects that factor in malnutrition (UNICEF, 2015a).

The Integrated Food Security Strategy (IFSS) is a South African initiative that aims to promote and support small-scale farming in rural food insecure households, which helps increase job opportunities and access to healthy, nutritious foods (STATSSA, 2019). The agriculture sector

can aid by implementing programs that boost agricultural production, increased incomes, and ensuring the food prices remain low (Nugent *et al.*, 2020). The Agricultural Policy Action Plan (2015-2019), and the Strategic Plan for the Department of Agriculture Forestry and Fisheries in South Africa, were developed to strengthen the government's commitment to small-scale farming (STATSSA, 2019).

2.8.6 Political leadership

The Food and Agriculture Organization (FAO), UNICEF, the World Health Organization (WHO), and the World Food Programme (WFP) make up the four detrimental institutional bodies that govern nutrition; however, they lack a coherent and functional strategy for improving nutrition globally (Rawe *et al.*, 2012). Governments then base policies based on the WHO strategy to address malnutrition; however, many policies fail due to multiple challenges that may arise within each country (Hawkes *et al.*, 2020).

The use of advocacy should be used as the starting point to ensure successful behaviour change communication. Politicians, decision-makers, community leaders, and business people need to be approached and informed about the identified nutrition problem or program. Successful nutrition advocacy can be divided into five stages (Steyn & Temple, 2008):

- Stage 1: Identifying the problem and ensuring prioritization
- Stage 2: Developing practicable solutions to the problem
- Stage 3: Ensuring political awareness
- Stage 4: Development of policy action
- Stage 5: Evaluating the policy action

The WHO Department of Nutrition and Food Safety administers The Global database on the Implementation of Nutrition Action (GINA), first introduced in 2012. It aims at developing, implementing, monitoring, and evaluating national policies and programmes regarding nutrition. Currently, there are 2689 policies available for 202 countries (WHO, 2021).

2.9 South Africa's response to tackling malnutrition

Feeding programs make up part of nutrition-specific interventions (De Pee *et al.*, 2015). Supplementation programs are used to treat SAM and MAM and have shown a high recovery rate (Karakochuk *et al.*, 2012). In South Africa, the Integrated Nutrition Program (INP) and Nutrition Supplementation Program (NSP) exist (Department of Health, 2013).

The Integrated Nutrition Programme consists of a multisectoral approach to tackle malnutrition, with three main components: health facility-based services, community-based nutrition programs, and nutrition promotion (Brits *et al.*, 2017). The INP was first introduced in South Africa in 1994. The vision of the INP is to ensure "optimal nutrition for all South Africans," while the mission is to "improve the nutritional status of all South Africans through implementing integrated nutrition activities" (Nutrition Directorate (Department of Health Province of Kwazulu-Natal), 2013).

The INP consists of various feeding schemes such as the Primary School Nutrition Program (PSNP), Nutrition Supplementation Program (NSP), food parcels, and community programs. The INP aims to guide health workers on health promotion, supplementary feeding, rehabilitation of malnourished patients, and continuous monitoring and evaluation of the program. In 2010 the NSP was renamed the Nutrition Therapeutic Program (NTP) to emphasize its role as a treatment in malnourished individuals and not a social welfare program (Brits *et al.*, 2017).

The INP has been used as a framework to re-evaluate and adjust the nutrition services in South Africa. It has also aided in developing and implementing micronutrient supplementation strategies and policies (Department of Health, 2013).

2.9.1 South African Health System

The South African health system remains clinically "curative" health care driven, with very little attention or resources allocated towards health promotion and prevention at a primary health care level (Dlungwane *et al.*, 2017). South Africa and the Free State province have not reached the desired goal of optimal health system performance, despite political

commitment, regulations, and concrete policy development since 1994 (Malakoane *et al.*, 2020).

South Africa is currently restructuring its health care system in preparation for the national health insurance (NHI) scheme. The primary aim of the scheme is to improve the delivery of health care to the population by improving the affordability and ease of access thereof (Zweigenthal *et al.*, 2019). However, if the quality of services provided is not equally improved, regardless of the affordability and availability, people will still choose not to use public health services (Honda *et al.*, 2015).

The national department of health (NDOH) is primarily responsible for health policy development, where 52 districts in South Africa receive public health services while under the governance of district offices within the nine provincial departments (Zweigenthal *et al.*, 2019). The South African government has chosen to implement the NHI to achieve universal coverage (UC), a priority goal mentioned in the international health policy agenda after receiving specific mention in post-Millennium Development Goals discussions (Honda *et al.*, 2015).

A multi-method situation appraisal conducted by (Malakoane *et al.*, 2020) in the Free State identified fragmentation of health services, staff shortages, and financial problems as the major health system challenges contributing to unavailable and/or poor service delivery at public health care level.

Highly skilled public health professionals in low-and middle-income countries are in demand globally, where South Africa has acknowledged its need for such professionals in the public health sector (Dlungwane *et al.*, 2017). Training of Public Health Medicine (PHM) specialists is funded by the state in South Africa; however, there are few job positions for such specialists within the health services (Zweigenthal *et al.*, 2019). Limited human resources and a poor work environment, which contributes to lesser recruitment and retention of skilled specialists, were two themes identified in a qualitative study conducted by (Zweigenthal *et al.*, 2019) aiming at identifying possible reasons why there is a lack of PHM within the public health sector.

Improving the public health sector by implementing the NHI and re-engineering primary health care are initiatives that cannot fully function without adequate human resources to support the health system at all levels (Dlungwane *et al.*, 2017).

There is limited research regarding the community and public opinion regarding the exact problems faced with public health services, despite the general population's criticism (Honda *et al.*, 2015). Insight in the general public opinion in South Africa on public health care can serve beneficial in the NHI policy development process.

2.9.2 South African policies

The South African government has developed multiple policies and strategies to improve the South African population (Department of Health, 2013). Many of these policies primarily focus on improving maternal and child health (Malakoane *et al.*, 2020), while others focus on improving household food insecurity, which greatly contributes to childhood malnutrition (STATSSA, 2019), as household food insecurity is directly linked with the prevalence of malnutrition.

The following South African policies are available on the World Health Organization (WHO) Global database on the Implementation of Nutrition Action (GINA) website (WHO, 2021):

- National Food and Nutrition Security Plan for South Africa (2017-2022)
- Foodstuffs, Cosmetics and Disinfectants Act (54/1972): Regulations relating to sodium reduction in certain foodstuffs and related matters. Regulations relating to the reduction of sodium in certain foodstuffs and related matters (2016)
- Foodstuffs, Cosmetics and Disinfectants Act (54/1972): Regulations relating to the reduction of sodium in certain foodstuffs and related matters: Amendment (2016)
- National Integrated Early Childhood Development Policy (2015)
- Strategy for the prevention and control of obesity in South Africa (2015-2020)
- National Policy on Food and Nutrition Security (2014)

- Infant and Young Child Feeding Strategy (2013)
- Regulations relating to foodstuffs for infants and young children: Amendment (R. No. 434 of 2013) (2013)
- Roadmap for Nutrition in South Africa (2013-2017)
- Strategic Plan for the Prevention and Control of Non-Communicable Diseases (2013-2017)
- Strategic Plan for the Prevention and Control of Non-Communicable Diseases (2013-2017)
- The Government of South Africa United Nations Strategic Cooperation Framework, (2013-2017)
- Foodstuff, Cosmetics and Disinfectants Act. 1972 (Act 54 of 1972) Regulations Relating to Foodstuffs for Infants and Young Children (No.R 991 of 2012) (2012)
- Strategic Plan for Maternal, Newborn, Child and Women's Health (MNCWH) and Nutrition in South Africa (2012-2016)
- South Africa Foodstuffs, cosmetics and disinfectants act: Regulations relating to the labelling and advertising of foodstuff (2011)
- Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act no. 54 of 1972): Regulations Relating to Trans-fat in Foodstuffs (2011)
- Regulations amending the Regulations relating to the fortification of certain foodstuffs (No. R. 1206 of 2008) (2008)
- Infant and Young Child Feeding Policy (2007)
- Regulations relating to the fortification of certain foodstuffs (No. R. 504 of 2003) (2003)
- Basic Conditions of Employment Amendment, Act No. 11 of 2002 (2002)

- Integrated Nutrition Programme. Strategic Plan 2002/03 to 2006/07 (2002-2007)
- Unemployment Insurance Act 2001 of 13 January 2001, Act No. 63 of 2001, as amended by the Amendment Unemployment Insurance Act (2001)
- Regulations relating to food-grade salt (No. R. 184 of 2007) (2007)

2.10 Challenges in implementing intervention programs

In an ideal world, the best thought-out nutrition intervention would be flawless, resulting in the fast eradication of malnutrition; however, challenges exist. Some of the challenges faced during the implementation of nutrition intervention programs include inadequate human resources and capacity, shortage of funds, inappropriate strategies, and policy implementation and adherence (Prudhon *et al.*, 2006).

The lack of integration of treatment of SAM in health systems; the lack of training and capacity-building of Ministry of Health staff; the lack of monitoring of the nutrition situation by the Ministry of Health; the lack of community participation and involvement; the lack of access to affordable RUTF and the lack of integration with other components related to nutrition such as education are all challenges identified for scaling up nutrition and the sustainability thereof (Darnton-Hill & Samman, 2015; Prudhon *et al.*, 2006).

Darnton-Hill & Samman (2015) further categorises challenges as immediate and long-term barriers. The immediate barriers include individual factors that contribute to inadequate health care, such as poor feeding patterns and poor sanitization, which contributes to undernutrition; biological and genetic factors that predispose an individual to certain diseases such as diabetes mellitus or obesity; and access and availability of reliable measuring tools to record biomarkers reflecting the individuals nutritional status and socio-economic structure, which is a determinant of health based on the conditions in which people are born into, live and grow (Darnton-Hill & Samman, 2015). Long-term barriers include international trade, which is directing South Africa into the nutrition transition it is currently in; staff shortages in public health sectors as more health workers are immigrating to more affluent countries; and environmental changes resulting from climate change, leading to droughts and ultimately a rise in food prices for the consumer (Darnton-Hill & Samman, 2015).

Further exacerbating the challenge faced by the country in terms of malnutrition prevention and management is the fact that malnutrition is not often considered the cause of death and does not appear on death certificates. This is one of the factors which renders malnutrition invisible (Rawe *et al.*, 2012).

2.11 Nutrition communication

Nutrition communication can be defined as “the process by which nutrition knowledge is converted into dietary change”(Rayner, 2003). Within nutrition, communication is nutrition education which involves informing and empowering people with nutrition information. The starting point for successful and effective nutrition communication involves including evidence-based dietary goals for the population and food-based dietary guidelines for individuals. An individualistic approach may seem to be more efficient when compared to a population-based approach; however, both are efficient and demand equal attention to ensure that the nutrition-related information is conveyed effectively to ensure successful nutrition communication (Tappenden *et al.*, 2013).

2.11.1 The use of media in conveying nutrition-related information

Mass media to convey nutrition-related messages holds many advantages. These include the message reaching a large number of people; ensuring frequency of the message communicated; creating a demand for the services and/or product; reinforcing important messages conveyed through interpersonal communications; ensuring timely information, and initiating and sustaining new social norms (Steyn & Temple, 2008).

2.12 The role of a dietitian in tackling malnutrition

Nutrition is regarded as a vital factor in health care; however, if the main roles of the health workers and professionals in the health care system, who are devoted to nutrition are considered, it would be found that these individuals hold a position of less status and power when compared to medical care personnel (Prudhon *et al.*, 2006). There has been a rise in the training of nutrition specialists, such as dietitians and community-based nutritionists. For the last 25 years, medical doctors and nurses are also being trained in terms of nutrition.

Although more medical professionals are being trained, there is still a great need for more (Jobson, 2015).

Dietitians serve as the authority for "all things nutrition" related. They are trained in providing nutritional counselling to patients at the hospital and community levels. They offer evidence-based therapeutic nutritional care to patients and aid in effective nutrition communication (Tappenden *et al.*, 2013).

Dietitians are often given the sole responsibility of patients' nutritional care. They complete nutrition assessments and develop evidence-based interventions accordingly; however, many institutions lack adequate dietitian staffing (Tappenden *et al.*, 2013).

2.13 Conclusion

Malnutrition is a condition which has been studied and scrutinized through various lenses for many years. With the vast magnitude of research and literature, the pathophysiology of malnutrition, the causes, the long-term consequences and the preventative measures needed, are all well understood. Global policies and protocols have been meticulously drafted based on the scientific evidence and research available, in order to address the global problem of malnutrition. However, the rate of malnutrition remains alarmingly high.

Dietitians are professionals trained in nutrition, including malnutrition, and are valuable assets as skilled health workers. However, when dietitians are considered, there is a staffing shortage of dietitians at health care institutes. Other health workers who are not equally equipped to treat malnourished patients are prioritized and utilized in facilities. Dietitians need to be prioritized for community-based and facility-based treatment of malnutrition. They will aid in filling the health worker gap, one of the identified key steps in tackling malnutrition. Malnutrition needs to be made visible by bringing it to other populations and individuals who do not work directly in the health sector. Spreading knowledge and awareness with the use of mass media, like a documentary, can aid in distributing nutrition education and assist in early identification, ultimately lowering malnutrition rates altogether. The use of media is a feasible way to get the health messages across to a larger population and ensures greater coverage.

Chapter 3 : METHODOLOGY

3.1 Research design and approach

A typical descriptive qualitative design was used as it aids in detecting, comprehending, and correctly unravelling the correlation between various phenomena as experienced within an individual's reality (Botma *et al.*, 2010). Descriptive research describes that which exists to gather new information and understanding (Burns & Grove, 2016).

A research design is a carefully thought-out strategic framework with logical arrangements so that the researcher can implement a study. A research design adds value to a study in that it assists the researcher in planning and arranging the study in the best suitable way to achieve the main study objective (De Vos & Schulze, 2002).

Qualitative research aids in giving different perspectives to existing or emerging concepts (Botma *et al.*, 2010). Contextual conditions are often strong influences of human events. Such conditions, including social, institutional, and environmental conditions, are covered within a qualitative research study (Yin, 2011). A qualitative research approach is deemed appropriate for this study to study participants' views and perspectives within living and work settings (Creswell, 2007). The information captured and studied using the views and perspectives of participants is known as phenomena, and it may be used to explain social processes that occur in a natural setting (Yin, 2011).

Paradigm refers to “a system of ideas, or world view, used by a community of researchers to generate knowledge. It is a set of assumptions, research strategies and criteria for the rigour that are shared, even taken for granted by that community” (Fossey *et al.*, 2002). Botma *et al.* (2010) define a paradigm as a set of perceptual views that direct research and characterize how such inquiry may be understood and addressed.

Constructivism is built on the social construction of reality (Baxter & Jack, 2008). The truth is relative and dependant on the individual's perspectives which create such a reality; these realities can be explored by the researcher when the participants tell their personal experiences (Baxter & Jack, 2008).

Methodology refers to the sequential strategic framework that can be followed to collect the data from the participant (Botma *et al.*, 2010), while axiology refers to how the researcher can go about collecting the knowledge, which is already known to the researcher, in an ethical manner (Aliyu *et al.*, 2015).

Information gathered from health professionals who are responsible for the management and treatment of childhood malnutrition is critical. Doctors, dietitians, and other health care professionals who work at health facilities have a direct working relationship with patients they had treated for or are treating for malnutrition. Thus, their experiences could provide an even better understanding of any potential challenges that are being faced.

3.1.1 Study population

“The study population should be defined in advance, stating unambiguous inclusion (eligibility) criteria. The impact that these criteria will have on study design, ability to generalize, and participant recruitment must be considered” (Friedman *et al.*, 2015).

The target population for this study comprised health care professionals (i.e., registered dietitians, medical doctors, registered nurses, and assistant nurses) working in health care facilities in the Xhariep district in the Free State, South Africa.

The Xhariep District is made up of three local municipalities, namely Kopanong, Letsemeng, and Mohokare. These subdistricts include rural farm towns such as Jagersfontein, Koffiefontein, Trompsburg, and 13 others, where each town has its own local primary health care (PHC) clinic. There are four district hospitals within the Xhariep District, namely Albert Nzula District Hospital (located in Trompsburg), Diamant District Hospital (located in Jagersfontein), Embekweni District Hospital (located in Zastron), and Stoffel Coetzee District Hospital (located in Smithfield).

Primary health care (PHC) clinics form the foundation of the public health system, offering patient services for free. It is also the first line of access for individuals requiring health care support (Jobson, 2015). Preventative health care and health education are two of the main objectives at PHC clinics to provide the best accessible health care services to the surrounding community (Jobson, 2015). Prevention, health promotion, curative and rehabilitative services

form part of the comprehensive, integrated nutrition interventions and services required to be rendered at primary health care facilities (Department of Health, 2013).

Health professionals rendering services to the primary health care clinics in the Xhariep District, i.e., doctors, registered nurses, and dietitians, were considered to participate in the study. Only participants that manage childhood malnutrition from a clinical perspective, on a regular basis, were considered for this study. The researcher identified the health professionals working with children at risk of- or diagnosed with malnutrition with assistance from the PHC clinic's manager. The operational managers at the PHC facilities are the most equipped in identifying exactly which of the staff members work directly with malnourished children on a daily basis. The potential participants identified were contacted telephonically before the interviews, and they were invited to participate in the study. Once participation was confirmed, informed consent processes were obtained before commencing with the interviews.

3.1.2 Sampling method

Purposive sampling was used for this study. Health professionals working with children at risk of- or those diagnosed with malnutrition in the Xhariep district health care centres from the facilities mentioned above were invited to participate. The health professionals invited to participate included medical doctors, registered nurses, registered dietitians. A total of six participants chose to participate.

When a portion of the population is selected for a study, this is known as sampling (Niewenhuis, 2016; Leedy & Ormrod, 2016). Some of the challenges associated with sampling are knowing exactly which population needs to be selected and why, how many people from the population need to be included in the study, and justifying why that unit was chosen (Yin, 2011).

When a sample is chosen deliberately for a specific purpose, the process used is known as purposive sampling (Yin, 2011). To avoid bias within the study, one should deliberately select participants who might offer contrary evidence or views on the study topic (Yin, 2011).

3.1.3 Data collection

Four data collection methods exist for qualitative studies, namely interviewing, observing, collecting and examining, and feeling (Yin, 2011). For the purpose of this study, the data collection method that was used was interviewing.

In-depth interviews are useful in collecting detailed information about an individual's ideas and behaviours and allowing the researcher to explore new ideas in depth (Boyce & Neale, 2006). Once the interviewees were identified based on purposeful sampling, private semi-structured narrative interviews were conducted, following an interview guide.

An interview guide helps conduct semi-structured interviews as it assists the researcher in keeping track of thoughts by following the predetermined open-ended questions that will be asked to the participant, following planned out headings, concluding ideas, and remembering to thank the respondent's participation (Creswell, 2007). It also aids in ensuring all participants be interviewed in an equal manner.

Language is the data collected when conducting interviews and engaging in conversations. The data will comprise the individual's behaviour, beliefs, and opinions based on recollection of a lived experience (Yin, 2011). Every interview was audio-recorded (with verbal consent), correctly labelled, and stored. The audio data collected was kept for analysis, review, and transcribing once the fieldwork was completed.

It is important to choose a location that is most desired and comfortable for each participant. These locations can include a participant's home or place of work (Yin, 2011). For the purpose of this study, a quiet space that allowed for adequate social distancing identified by the participant was used.

3.1.4 Data gathering procedure

A research method is determined to establish which way will be the best way to collect the required data for the project (De Vos & Schulze, 2002).

The identified participants were contacted telephonically, and they were invited to participate in the study. Each participant was informed about the study, including what the

study entails, its purpose, and main objectives, using an information document (Addendum B). Participation was voluntary without any coercion.

Upon confirming participation in the study, an appointment was made, indicating the participant's preferred location, date, and interview time. On the day of the arranged interviews, the participants were required to sign an informed consent form (Addendum C).

Addendum A was used as an interview guide and included the central questions which were asked. The main questions were occasionally followed up with an additional question or two depending on the participant's answer.

Due to the current global health pandemic, COVID-19, it is of great importance that social distancing and the correct infection prevention control measures are practised. Therefore, the researcher and participant ensured that hands were sanitized continuously, face masks were worn at all times, and no direct physical contact was made.

Open-ended questions in qualitative research give value to the study in that they give an interest to the participants' words and ideas rather than collecting numerical data (Yin, 2011). The researcher can dissect the answers in depth when a complex answer is required from an open-ended question (Kross & Giust, 2019). The research question should be an unambiguous form of a statement that describes the phenomenon being investigated (Kross & Giust, 2019). Subsidiary questions can be used to gain information on specific aspects that originate from the original question (Kross & Giust, 2019).

Each interview lasted between 10 to 30 minutes, and a voice recorder application was used to record the interview. The advantage of this interview is that insightful, detailed data was collected to help explore healthcare professionals' individual experiences when working with malnourished children. The other advantage is that there was no direct contact between the researcher and participant, and any unclear information could be addressed and elaborated on immediately. The disadvantage to this interview is that it is time-consuming for the participant.

If one-on-one interviews could not be conducted or if the participant preferred, video call (Zoom) interviews would have been conducted instead and recorded accordingly. If the

participant was unable to video call, then a telephonic interview could also have been conducted. The disadvantage to this type of interview is that the researcher cannot observe the participant's body language.

The participants also had the option of having the questions included in the interview guide emailed to them to complete them in their own time and their own space and email them back to the researcher within two weeks. This was only applicable if one-on-one interviews and video calling interviews were not feasible.

The interviews were recorded, and the researcher used non-directive probes to ensure participants elaborated on their answers, providing in-depth information with a clear understanding of the message they were trying to portray.

The researcher transcribed all recordings and field notes for data analysis.

3.2 Data analysis

Data analysis within qualitative research is defined as interpretation and critical observation/examination of non-numerical data to determine underlying relationships between certain aspects investigated (Yin, 2011).

The process of analysing qualitative data involves a five-phased cycle: compiling (1), disassembling (2), reassembling (3), interpreting (4), and concluding (5). It is an ongoing process that involves interpreting audio-visual material, images, and text data to formulate ideas derived from the collected data (Botma *et al.*, 2010).

The audio recordings from this study were first transcribed (compiling). The transcriptions were then used to identifying similar words or thought patterns through coding (disassembling). Once coding was done, themes and sub-themes were identified and further categorised (reassembling). The themes and subthemes identified were then interpreted based on the context of the questions (interpreting). The final step within qualitative data analysis includes concluding by forming connections between the themes and subthemes identified.

To accurately describe an individual's contexts, places and events, field actions, objects, specific opinions, explanations, and other views expressed by the participants, content analysis is used in qualitative studies (Niewenhuis, 2016; Yin, 2011). To avoid any inconsistency or inaccuracy during data analysis, the researcher must refer back to the original data as often as needed to ensure the topics are a true representation of the original data (Yin, 2011).

Data were coded by the researcher and an experienced qualitative co-coder. Following this, codes were grouped into categories, and the categories were then further organized into themes (Yin, 2011). This process ensures more manageable data that can be easily retrieved.

Microsoft Word and Microsoft Excel were used to manually code and analyse the data collected.

3.3 Trustworthiness

Three objectives that need to be considered to build trustworthiness and credibility include transparency, methodic-ness, and adherence to evidence (Yin, 2011).

Transparency refers to ensuring that the entire study is accurately documented, such as the procedure, and all the data collected is available for inspection. This is done so that others can review the study and provide criticism, support, or refinement (Yin, 2011). Methodic-ness refers to ensuring the qualitative research is conducted methodically following an orderly procedure that offers enough room for discovery and enough space for any unforeseen events (Yin, 2011). Empirical research is reflected in the third objective, which states that qualitative research needs to adhere to evidence. Qualitative studies aim to collect and analyse data fairly and accurately to draw conclusions (Yin, 2011).

3.3.1 Credibility

To ensure credible results, the audio-recorded data collected was listened to by the researcher, supervisor, and co-supervisor to ensure a uniform understanding and member checking. An experienced co-coder assisted with data analysis as well as co-coding. The audio-recorded data was transcribed and sent to each respective participant via email, so that they

could confirm that what was collected and analysed was the message they intended to articulate during the interviews.

3.3.2 Transferability

All procedures were followed methodically, and adherence to the steps to collect and analyse the qualitative data was ensured to improve trustworthiness and provide accuracy. All interviews were conducted using the standardised interview protocol.

3.3.3 Dependability

For the purpose of this study, all interviews were conducted in the same manner, with the same interview protocol to ensure the stability and quality of the data collected remained consistent throughout the data collection period.

3.3.4 Confirmability

The researcher remained transparent regarding all information, aims and objectives of the study when engaging participants. The researcher would always confirm the participants' responses to ensure no analysing of information that was not stated. Member checking entails the participants reviewing the transcribed documents to verify that what was transcribed is what they said was done to ensure that data was transcribed accurately and truthfully.

3.4 Exploratory interviews

An exploratory interview was conducted on one health care professional (doctor, nurse or dietitian) working in the Xhariep district health facilities. The interview was audio-recorded using a cell phone voice recording application to explore the viability and envisioned feasibility of the study. The research question was tested to ensure clarity and understanding. The methodology of the study was also tested. The participant interviewed during the exploratory interview became part of the main study as there was no need for any amendments.

3.5 Ethical considerations

In qualitative studies where social research is involved, ethical issues need to be outlined and upheld to ensure no data collected is obtained at the expense of a human being (De Vos & Schulze, 2002).

Before the study commenced, permission was obtained from the following relevant parties:

- Approval was received by the Head of Department at the Free State Department of Health.
- Ethics approval was obtained from the Health Sciences Research and Ethics Committee of the Faculty of Health Sciences at the University of the Free State.

Ethical clearance number: UFS-HSD2020/1703/2601

3.5.1 Scientific integrity

This research methodology was carefully and meticulously compiled by cross-referencing and researching similar scientific literature/research so that the process of the study could be methodically followed and did not cause the participants or anyone else any harm.

3.5.2 Fair selection of participants

Participation was based on the purposive sampling criteria. No participant was turned away from the study if they meet the sampling criteria, based on any of the following ethical grounds of discrimination: race, sexual orientation, religious belief, disability, pregnancy, marital status, ethnic or social origin, conscience, belief or language.

3.5.3 Informed consent

Registered dietitians, medical doctors, and registered nurses received an information letter (Addendum B) detailing the study's aims and the description of the study. Once they had read through the information document, they were asked to provide informed consent (Addendum C) to participate in the study.

3.5.4 Ongoing respect for enrolled participants

The participant has the right to privacy and confidentiality. The participant was informed beforehand that no particulars of the participants would be shared. Confidentiality was upheld at all costs. Data stored under lock and key, and all data stored on the computer was safeguarded with a password. Raw data was only known by the researcher, co-coder, supervisor and co-supervisor.

Once audio data was transcribed, the transcribed material was shared with each participant respectively, so they could approve that they meant to articulate and data collected is true, and no false alterations have been made.

3.5.5 Researcher competence and expertise

The researcher is a qualified registered dietitian who conducted the study with the necessary supervision and guidance from the Department of Nutrition and Dietetics at the University of the Free State. Whether positive or negative, all findings and results were disseminated by the principal investigator in a timely, accessible, responsible and competent manner. This included sharing all findings with the participant communities.

Chapter 4 : RESULTS

4.1 Introduction

In this chapter, the results from the data analysis will be discussed. A brief description of the sociodemographic characteristics of the participants is presented, followed by the themes and subthemes identified from the participants' responses to the questions asked by the researcher. To ensure anonymity, each interviewee was given a code (ITV) followed by a number.

An interview protocol was used to ask each of the participants five primary questions and ensure the questions were asked equally. During some interviews, non-directive probes may have been used to get the participant to elaborate further with his/her response to get more detailed data.

4.2 Sociodemographic characteristics of the participants

A total of six participants were included in the study, which met the calculated sample.

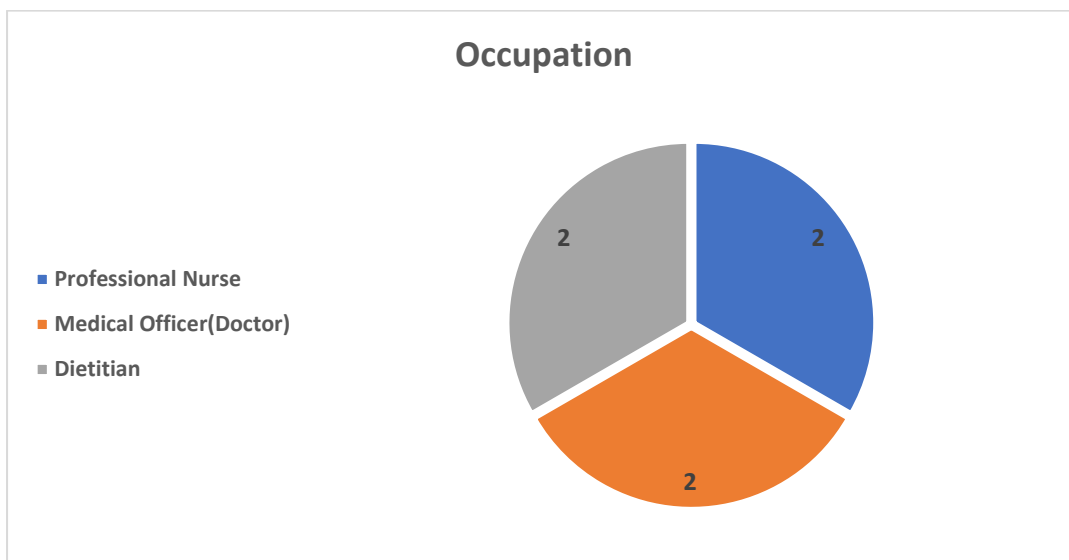


Figure 4: Occupation of the participants

Of the six participants, two were medical officers (doctors), two were professional nurses, and two were registered dietitians.

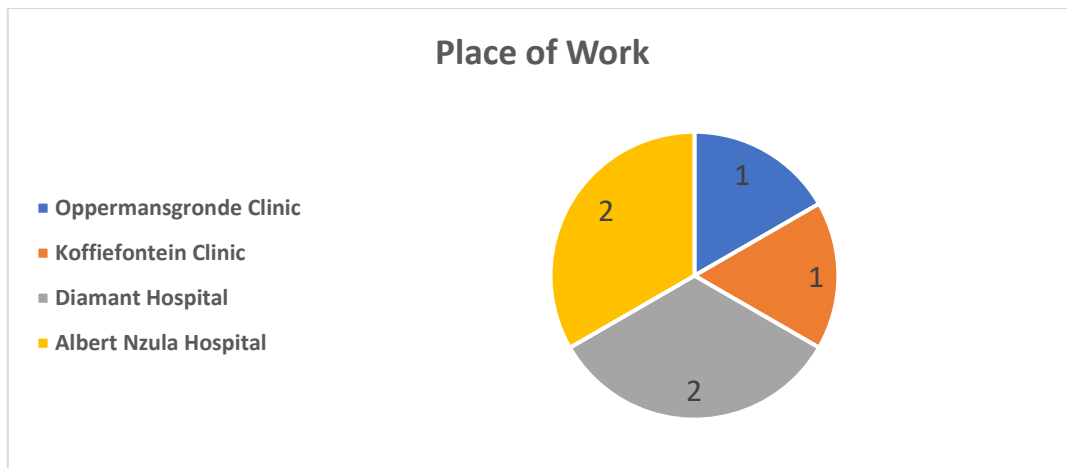


Figure 5: Place of work of the participants

Four of the participants were based at two of the four district hospitals in the Xhariep District. Two of the participants worked at Diamant District Hospital in Jagersfontein, and another two worked at Albert Nzula District Hospital in Trompsburg. Although these participants were based at hospital facilities, they were also required to render their services to the surrounding Primary Health Care (PHC) facilities by doing community outreaches. Community outreaching forms part of a government-initiated strategy that aims to assist the population overcome poverty-related barriers to healthcare and strengthening primary health care by providing home-based care and health promotion by state-employed health professionals (Nxumalo *et al.*, 2013). Two of the participants were based at PHC facilities. One participant worked at the Oppermansgronde clinic, while the other worked at a Community Health Centre (CHC) in Koffiefontein, Ethembeni Clinic.

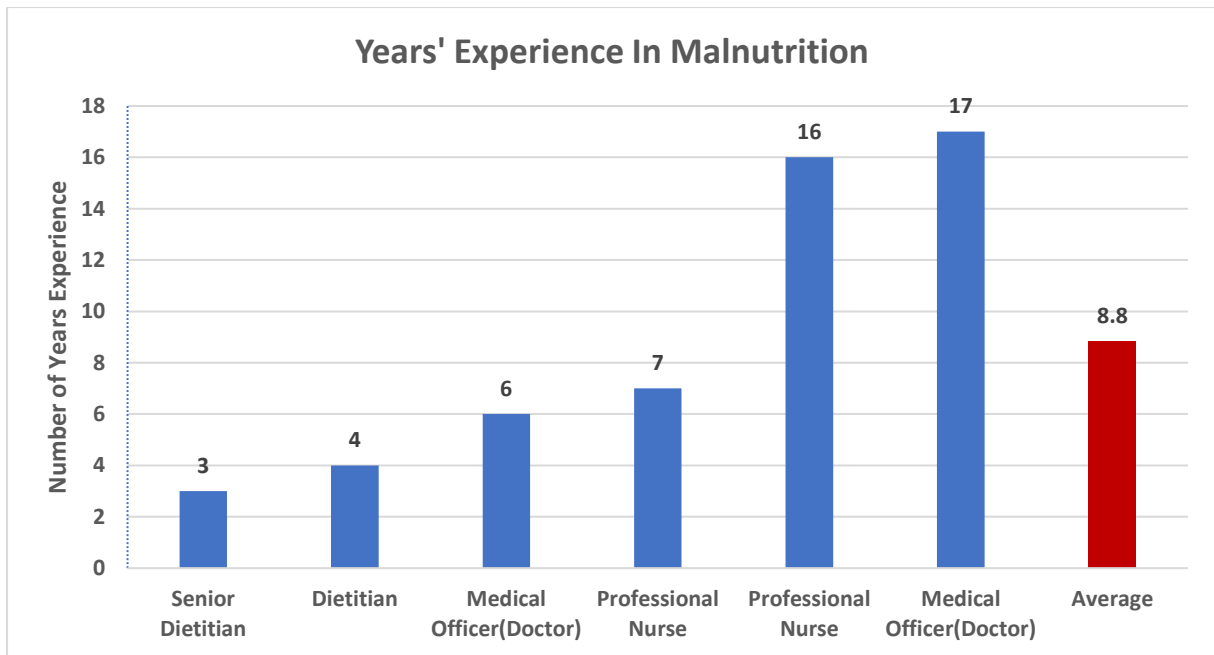


Figure 6: Participants' number of years' experience in treating malnutrition

All the interviewees had experience in malnutrition, ranging from 3 years up to 17 years. The average number of years' experience in treating malnutrition is 8.83 years.

4.3 Themes

Multiple themes emerged from the data collected and questions asked. A total of two themes emerged from question one; four themes emerged from question two; four themes emerged from question three; five themes emerged from question four and three themes emerged from question five. The themes and sub-themes are indicated and arranged below according to the question that was asked.

4.3.1 Question 1: "What do you understand under the term malnutrition?"

Question 1 was used to determine the participants' understanding of the term malnutrition. Two specific themes arose from the participants' responses, including several sub-themes, as shown in table 10.

Table 10: Themes and sub-themes identified in the participants' responses to question 1

Question 1: "What do you understand under the term Malnutrition?"	
Theme	Sub-theme
Insufficient intake of nutritious food	<ul style="list-style-type: none"> • Lack of proper nutrition • Not having enough to eat • Lack of sufficient nutrients • Imbalance in body due to micronutrients and macronutrients • Deficiency of vitamins and minerals inside the body • Quantity, quality and variety of food taken in • Condition caused by decrease in food intake • Bad feeding of children • Over feeding or under feeding of child
Weight related illnesses, caused by insufficient nutrition	<ul style="list-style-type: none"> • Patient who is overweight or underweight • Illness resulting in severe weight loss • When weight and height ratio of child is below 3 • Patient presenting with bilateral pitting oedema

4.3.1.1 Insufficient intake of nutritious food

One of the two themes that emerged from the analysis is the "Insufficient intake of nutritious food". Quality, quantity and variety were the three factors mentioned that affect the intake of nutritious foods. According to ITV001,

"I think it is a lack of the proper nutrition, usually caused by not having enough to eat."

ITV002 refers to malnutrition as a *"deficiency or imbalance in the body due to micronutrients or macronutrients"*.

ITV003 addresses the issue of lack of variety in the food that is taken in by stating,

“Sometimes they eat enough but just from one food group, like just carbs, but they don’t get the other things with like veggies or fruits or proteins to get that micronutrients and all those things”.

ITV006 supports the theme of insufficient intake of nutrition food by stating,

“Malnutrition could be, in my understanding, the bad feeding of a child or children. It could be over feeding or under feeding the child”.

4.3.1.2 Weight-related illnesses caused by insufficient nutrition

Respondents recognized that an insufficient intake of nutritious foods could lead to weight loss and other weight-related problems. This is supported by ITV004, who asserts,

“To me, malnutrition is a medical or nutritional or social condition that is caused by a decrease in intake of food or, a decrease in food consumption, and/or an illness resulting in severe weight loss or bilateral oedema”.

By performing different calculations, on weight and height, it can be determined whether a patient suffers from malnutrition. ITV005 states that,

“Malnutrition can be a patient who is overweight or underweight. We see the overweight by taking weight-for-height”.

When certain measurements of a child fall into a certain threshold, they are classified as malnourished. ITV004 states that,

“But in simple terms, according to the WHO, it says it’s when the weight of the child, the weight-for-height of the child, is below -3 on the Road to Health Booklet”.

4.3.2 Question 2: Why do you think the rate of malnutrition in South Africa is still high?

Question 2 was asked to help describe the participants' perspectives regarding the state of malnutrition within South Africa, based on their personal experiences and opinions. Four distinct themes arose from the participants' responses, including several sub-themes, as shown in table 11.

Table 11: Themes and sub-themes identified in the participants' responses to question 2

Question 2: "Why do you think the rate of malnutrition in South Africa is still high?"	
Theme	Sub-theme
Substance abuse	<ul style="list-style-type: none"> • Alcohol abuse during pregnancy • Postnatal substance abuse • Alcoholism
Lack of knowledge	<ul style="list-style-type: none"> • Poor diet during pregnancy • Not enough dietitians in public healthcare • Poor food choices • Ignorance • Lack of education
Economic constraints	<ul style="list-style-type: none"> • Misuse of grant money • Patients don't have money to buy correct foods • Unavailability of correct foods • Poverty
Social problems	<ul style="list-style-type: none"> • Negligence from mother • Mental health • Inadequate support for mothers • Denial of problems by mothers

4.3.2.1 Substance abuse

The abuse of alcohol and other substances by pregnant mothers emerged as one of the themes explaining the persistently high malnutrition rate in South Africa. ITV001 states that,

"The mothers still using alcohol. That's a main thing also. In pregnancy, using alcohol".

This view is supported by ITV002, who asserts,

“The main problem for me is the social problems. My experience is that especially when it comes to substance abuse, and when we now have with the grant. Some of them also misuse the grant. So, they supply their needs but they won’t supply the child’s needs.”.

According to ITV004,

“So, the alcohol is also, it’s taking us back, because with the little that they get, the SASSA amount that they get, they use it to buy alcohol instead of buying groceries”.

4.3.2.2 Lack of knowledge

The lack of nutrition knowledge results in poor diet during pregnancy. This is supported by ITV004 who states,

“It is lack of knowledge, remember, the first 1000 days of life, it starts with pregnancy but with our people, if you don’t get it right from there, then the chances are we won’t get the good outcomes”.

Respondent ITV005 supports the theme of lack of education, saying,

“Lack of education in the parents or the caretakers. They don’t have enough information. And then you will find the ones who have the information but don’t want to apply the information”.

This indicates negligence from the parents. ITV004 further states that,

“They get SASSA, but because of lack of knowledge, the food choices become a problem”.

This is consistent with ITV006’s assertion that,

“I think the parents’ education is the leading one”.

ITV006 goes on further and elaborates that,

*“Parent’s education is like; some parents would feed the child one, pap almost every day.
And from pap you don’t get all the nutrients for the child to grow healthy”.*

Respondents alluded to lack of knowledge due to ignorance, lack of education, and dietitians' shortage in public healthcare. ITV004 asserts,

“Yes, we have a lot of dietitians by now in South Africa, I think we have produced enough, but the job opportunities, especially in government, because our people don’t really afford to go in private to see private consultants”.

4.3.2.3 Economic constraints

Financial constraints due to misuse of grant money, lack of funds, poverty and lack of variety results in parents settling for the cheapest alternatives. ITV002 states that,

“Some of them also misuse the grant. So, they supply their needs but they won’t supply the child’s needs”.

ITV001 asserts that,

“At this stage, I feel it’s mostly, I would say, due to the main thing poverty”.

This view was supported by ITV003, who mentions that,

“First, I would say economics is a big factor. So, patients don’t have the money to buy the correct foods, so they would buy the cheapest foods, which is usually carbs like ‘meel’ or porridge. Sometimes they would usually just eat that. Sometimes they eat it just with water because they don’t even have money for milk or they don’t have access to fresh milk”.

4.3.2.4 Social problems

Social issues such as unsupportive husbands often leave mothers overwhelmed by the lack of spousal support, sometimes leading to stress and depression. According to ITV004,

“If a woman is stressed or depressed, the chances of looking after the baby are very, very little”.

Although some women have the necessary information, they might choose denial and fail to apply their knowledge. This view is supported by ITV005, who asserts that,

“If you advise them that you must breastfeed your child for six months exclusively, they will tell you no, the baby is getting hungry, and how can the baby survive without water or food”.

4.3.3 Question 3: How do you experience treating children with malnutrition?

Question 3 was asked to describe the participants’ personal experiences while working with childhood malnutrition and help identify any potential challenges that the participants may face. Four themes were identified from the participants’ responses, including several sub-themes, as shown in table 12.

Table 12: Themes and sub-themes identified in the participants’ responses to question 3

Question 3: “How do you experience treating children with malnutrition?”	
Theme	Sub-theme
Shortage of stock	<ul style="list-style-type: none"> • Supplement porridge not enough • Lack of stock
Uncooperative patients	<ul style="list-style-type: none"> • Mothers reprimand and swear • Mothers don’t listen to staff • Mothers refusing to breastfeed • Mothers are in denial • Parents don’t follow instructions • Alcoholism by parents • Parents should react early • Uncooperative mothers • Unwillingness to change diet • Patients missing appointments
Mismanagement by staff	<ul style="list-style-type: none"> • Sisters(nurses) not following instructions

Table 12: Themes and sub-themes identified in the participants' responses to question 3

	<ul style="list-style-type: none"> • Doctors overstepping by prescribing feeds • Older doctors not used to working collaboratively with dietitians • Social worker not always available • Mismanagement by social workers
Emotional challenges	<ul style="list-style-type: none"> • Emotional burden of seeing malnutrition children

4.3.3.1 Shortage of stock

Sometimes the supplement porridge that is given to the patients is not enough to last the whole month. Due to a lack of financial resources, some patients or caregivers rely solely on this fortified porridge to feed the children. According to ITV005,

“There is sometimes where the stock isn’t there. You have some of the other caregivers. Like I know, there is two other ladies that are fostering children now due to the parent’s situation, social problems. They are taken away, and then you will find that they do come, but then at the end, there is no nutritional supplements”.

ITV005 goes on to say,

“So, there is a problem when there is no stock, and there is nothing else to give”.

ITV001 supports the view, stating,

“The other thing is also regarding the supplement porridge also we are normally giving two. We give the porridge and the Imunut. The total that's given usually is not enough. It is not enough for the whole month to give to that mother”.

4.3.3.2 Uncooperative patients

There is overall low cooperation from mothers and patients, in the form of swearing at staff, refusing to listen to staff, refusing to follow instructions, missing appointments and a refusal to make a dietary change. This is also made worse by alcoholism by the parents, which results in neglectful parenting. ITV001 asserts that,

“It is either the mother does not understand, or maybe she does understand, but she doesn’t understand the severity of the situation, but she’s not cooperating that well. Here, especially in the rural areas, we have the type of mentality of, if you try to steer them in the right direction, they are a bit hard-headed”.

There is also a need for parents to react early and bring their children to the hospital before getting sick. This is according to ITV006 who states that,

“Children are arriving at our hospital in a bad condition. And to reverse the nutritional status becomes tedious and difficult. So, it would be best if parents could react early and not really wait for the child to get sick. And also, we use the home-based carers to pick those children”.

Meanwhile, ITV002 asserts that,

“It is a bit tough. You will find that the mother, from past experiences, you don’t really know what is going on in the household because they won’t really give you a clear picture of what’s going on. They will just tell you, ‘No. I don’t have money to buy this and this and that’, but then you find out that there is a SASSA grant there, and maybe there is more than three children that she’s having”.

4.3.3.3 Mismanagement by staff

Some of the staff management issues highlighted were the unavailability of social workers and nurses, not following instructions, and territorial conflicts between dietitians and doctors. According to ITV001,

“So human resources are a problem, and with this lockdown thing, I don’t even remember when last the social worker was here. So, I think we really need more. More resources”.

Meanwhile, ITV002 states that,

“You call in the social workers, and you ask their opinions, and you also give the child over to the social worker, but then I don’t know if there is some kind of mismanagement there

because you don't find that the social worker will come back with a decent report or also to say, 'this is what we have implemented'".

ITV004 further supports the issue of mismanagement of staff whereby the nurses do not follow instructions or common protocols by stating,

"So, in that case, I give them to the Sisters, but tomorrow morning when you come, you just find the supplements still there; the very same volume you left is still there. So, I think that's the other challenge I had, and I've had a lot of fights about it. They are not doing their duty, and it's part of their duty to make sure that the patient is receiving whatever was prescribed."

4.3.3.4 Emotional challenges

The emotional burden of dealing with childhood malnutrition was an issue that arose as ITV003 asserts that,

"One of the things I think is emotionally. If you have a child and you see a child that's almost the same age. You think, okay, this child is the same age but 10kgs lighter than my child. How is it possible? So, emotionally is one of the big things for me".

4.3.4 Question 4: How do you overcome the challenges you deal with when treating a child with malnutrition?

Question 4 was asked to identify how patients may overcome any challenges they potentially face while treating childhood malnutrition. The question also aided in identifying further challenges that were not mentioned within the context of question 3, that the participants may have encountered within their personal experiences. Five distinct themes arose, with several sub-themes, as seen in table 13.

Table 13: Themes and sub-themes identified in the participants' responses to question 4

Question 4: "How do you overcome the challenges you deal with when treating a child with malnutrition?"	
Theme	Sub-theme
Additional assistance for patients	<ul style="list-style-type: none"> • Administer Vitamin A and deworming program • Assist mothers with psychological problems • Suppress emotion and get help to the patient • Provide counselling for mother • Nutrition supplement programs, once a month
Get community support	<ul style="list-style-type: none"> • Get community involved • Getting the family involved • Report cases of neglect to the South African Police Services
Source additional stock	<ul style="list-style-type: none"> • Report stock shortage • Request surplus stock from other facilities
Education campaigns	<ul style="list-style-type: none"> • Alcohol and diet education for pregnant mothers • Homebased carers distributing pamphlets • Use billboards and radio to educate community • Giving the health education to the mother
Additional human resources	<ul style="list-style-type: none"> • OT needed especially because they are behind in milestones • Send patients directly to the hospital for quicker service • Involve the OT, physio and the speech therapist • More human resources • Social worker takes care of the social problems • More job opportunities for dietitians at PHC facilities

4.3.4.1 Additional assistance for patients

Additional interventions are introduced to overcome the challenges experienced when treating children with malnutrition. Some of the interventions include administering Vitamin A and deworming program, assisting mothers with psychological problems and providing nutritional supplements monthly. According to ITV001,

“We try to overcome and try to help by giving the health education to the mother, from our side. Try to get them involved. Try to get the community involved. Try to get the surrounding community of people of the mother involved, like the family”.

According to ITV006,

“The same home-based carers will be distributing pamphlets and educating parents. Not deep education on nutrition, just photos and all those things. Basic education. You give to the parents to look for danger signs and not to wait until it is too late.”

4.3.4.2 Get community support

Another intervention is getting the community involved in helping the mothers with malnourished children where they can. This includes the wider community and the family of the patient. The community involvement also extends to law enforcement, where necessary. ITV002 indicated that,

“And then when it comes to the social problems like I mentioned is that I would inform the social worker and also at other times when there is neglect, we inform the South African Police Service as well”.

According to ITV001,

“We try to overcome and try to help by giving the health education to the mother, from your side. Try to get them involved. Try to get the community involved. Try to get the surrounding community of people of the mother involved, like the family. Try to get them also involved.”

4.3.4.3 Source additional stock

This intervention involves reporting stock shortages to the relevant authorities or requesting surplus stock from other similar facilities. According to ITV005,

“For the budget, it is in the NSP, the Nutritional Supplementation Programs. Sometimes we do run out of the supplements, but with the other clinics that have enough supplements, we make sure to help the ones that don’t have supplements”.

This is supported by ITV002 who says,

“If there is no stock, we report that there is no stock, and we also try and ask from other facilities as well to assist us with that”.

4.3.4.4 Education campaigns

Several initiatives have been introduced to educate the parents, focusing on mothers during pregnancy and after giving birth. ITV006 mentions that,

“The same home-based carers will be distributing pamphlets. Educating parents. Not deep education on nutrition, just photos and all those things. Basic education”.

These campaigns are rolled out in pamphlet distribution, using billboards and radio to educate the community. ITV006 goes on to say that,

“Billboards can also help. And radio. The favoured radio for that community. Getting health education to a larger group of the community”.

ITV003 asserts,

“So, you have to just push through and get the right treatment to the patient. And you try to counsel the mother, like we say, educate her”.

4.3.4.5 Additional human resources

Another intervention is getting additional human resources with specialised skills to assist the patients. These resources included Occupational Therapists, Physiotherapists, Speech Therapists and Social Workers. ITV003 states that,

“And you go through all the clinical things which you can and get all the allied health specialities which you can. It’s not just sometimes the dietitians; the OT is also needed especially because they are behind in milestones due to them not having any energy to do anything”.

Additionally, ITV002 states,

“So, like I said, social worker, SAPS, yes, the social worker will take care of the social problems. More human resources. Especially when it comes to the two main problems I just mentioned. The social and the alcohol”.

4.3.5 Question 5: How do you feel about the current protocols and programs in place to help treat childhood malnutrition?

Question 5 asked participants to describe their personal experiences and opinions of the current protocols and programs that are currently in place that are meant to be used in treating malnutrition and aid in alleviating the burden of malnutrition in South Africa. Three themes were identified along with relating sub-themes, as shown in table 14.

Table 14: Themes and sub-themes identified in the participants’ responses to question 5

Question 5: “How do you feel about the current protocols and programs in place to help treat childhood malnutrition?”	
Theme	Sub-theme
Protocols and programs are good	<ul style="list-style-type: none"> • The protocols are good • The medical treatment works well • Protocols in hospital are useful • The protocols and programs are helpful

Table 14: Themes and sub-themes identified in the participants’ responses to question 5

	<ul style="list-style-type: none"> • Its good when it comes to supply of supplements.
The protocols and programs are poor or non-existent.	<ul style="list-style-type: none"> • The implementation of the protocols is lacking • Not enough or non-existent programs • Sometimes doctors don’t follow protocols • Need good communications • Limited time to check everything
The protocols and programs are lacking resources.	<ul style="list-style-type: none"> • Not enough dietitians based at clinics • Lack of funding for programs • Frustrated by lack of stock • Need more people involved • There is a shortage of supplements

4.3.5.1 Protocols and programs are good

The protocols and programs are, for the most part, good and useful. ITV002 states that,

“I feel like, when it comes to the supply of the nutritional supplements. It is good. We do receive a lot, and the patients really do like it. So, when it comes to that, it is a good program”.

ITV004 states that,

“In hospital, the protocols are really useful. They give us guidance as health care workers on how to treat malnourished children”.

Meanwhile, ITV006 indicates that the protocols are flawless, stating,

“The protocols are perfect. Once you get a child with malnutrition without other complications, it works perfectly”.

4.3.5.2 The protocols and programs are poor or non-existent

While the protocols and programs might be good, there are problems such as implementation and communication, posing a challenge. As stated by ITV001,

“It is good protocols, but I think it’s the implementation of it. Sometimes, we professional nurses are trained on the protocols, but we don’t implement it as it should be”.

ITV003 supports the feeling that the protocols are good; however, some areas are lacking and need to be worked on by stating,

“And, I think we need good communication between all of us because you will find that, for instance, there is the Zero Hunger Project of SASSA. You will find that you are identifying patients, but you don’t know what’s going on”.

The poor implementation of the protocols and programs is both by the nurses and doctors, with ITV005 asserting that,

“They do help a lot. Even though some doctors don’t follow the protocols and misdiagnose the patients. That’s where we miss the correct diagnosis for malnutrition”.

4.3.5.3 The protocols and programs are lacking resources

Another shortcoming identified with the protocols and programs is the shortage of resources, including human and financial resources. ITV003 supports the feeling that the protocols are good; however, some areas are lacking in terms of resources, by stating,

“And for me, it’s just basically that the whole program is lovely. It’s beautiful. I think we just need more people to be involved in this whole process”.

ITV004 states that,

“The protocols are really helpful because they give guidance, but sometimes you’re supposed to give ‘this’ to a patient, but you don’t have due to budget”.

Chapter 5 : DISCUSSION AND LIMITATIONS

5.1 Introduction

This study aimed to describe the experiences of health care professionals during the management of childhood malnutrition. This was accomplished by describing the health professional's understanding of malnutrition, exploring the health professionals' views regarding the high rate of malnutrition in South Africa, and further investigating each health professionals' personal experiences while treating childhood malnutrition. By exploring the health professionals' personal experiences, commonly occurring challenges or gaps in the treatment/management of childhood malnutrition were identified.

5.2 Discussion of sample

Medical officers (doctors), professional nurses, and registered dietitians were specifically identified as the main health professionals to be included in the study. They are the professionals that treat malnutrition on a more regular and direct basis in hospital facilities and PHC facilities. Medical doctors provide patients with evidence-based medical treatment and assistance after assessing and identifying the disease/illness. The role of a medical officer during the treatment of malnutrition is to implement the national inpatient SAM protocol at the hospital level and sign off and authorize the implementation of the prescribed nutrition care plan (Tappenden *et al.*, 2013). A nurse is a health professional that provides patient care around the clock with continuous interaction with the patient and the family/caregivers. The role of a nurse regarding nutrition is to monitor the patient's nutritional intake and tolerance (Tappenden *et al.*, 2013).

These healthcare workers are valuable in identifying any "gaps" in the current protocols and programs in treating malnutrition. The experiences provided by these healthcare workers are based on their personal experiences while treating childhood malnutrition in the Xhariep district in South Africa, where malnutrition is a persistent challenge.

Medical doctors and nurses do not often prioritise nutrition during patient care as they receive limited nutrition education during training (Tappenden *et al.*, 2013); therefore, it is necessary to identify the level of understanding regarding the term malnutrition.

5.3 Understanding of malnutrition

Each participant in this study had at least three years of experience treating malnutrition. The findings showed the participants had between three to seventeen years of experience and the average was 8.8 years. This is a fair amount of experience, and the participants' responses to the first question showed that there was a general understanding of the term as evidenced by the sub-themes in table 10, which are concordant with the definitions of malnutrition provided by ASPEN and the WHO (Mehta *et al.*, 2013).

Some of the participants' understanding of malnutrition was in line with the World Health Organization's assessment criteria for assessing severe- and moderate acute malnutrition, which states the assessment of body or anthropometric measurements in children between 6-59 months, and plotting them in the appropriate growth charts (WHO, 2013).

A study conducted between 2015 and 2017, which aimed to assess the effectiveness of a Malnutrition eLearning Course for health professionals, found that only 36.73% of 1059 participants knew the WHO guidelines on malnutrition before accessing the eLearning course (Choi *et al.*, 2018).

Most healthcare professionals understood malnutrition regarding the immediate causes, such as insufficient intake of nutritious food and weight-related illnesses caused by inadequate nutrition. UNICEF's conceptual framework mentions inadequate dietary intake and disease as the two distinct immediate causes of malnutrition (UNICEF, 1990).

A health care professional's knowledge and understanding of malnutrition are of dire importance as the 2013 Lancet Series identified scaling up the management of SAM as the nutrition intervention with the greatest potential of reducing child mortality rates (Bhutta *et al.*, 2013). However, a lack of human, financial and medical resources results in poor operational capacity, which encumbers the scaling up of management (Jackson *et al.*, 2014).

5.4 Views on the high prevalence of malnutrition in South Africa

This study found four common views amongst the participants regarding their personal opinions on why they believe childhood malnutrition is still high in South Africa. The four factors based on the health professionals' views include substance abuse, lack of knowledge, social problems, and economic constraints by caregivers and mothers. Based on the respondents' responses, these four factors are interlinked and negatively affect one other.

5.4.1 Substance abuse

The health professionals' personal beliefs on why the malnutrition rate is still high in South Africa were unanimous when discussing alcohol and substance abuse. Every participant discussed having had a personal experience regarding one or multiple parents, a child with malnutrition, and alcohol/substance abuse. It is noteworthy to distinguish between alcohol abuse and alcohol dependency/addiction. When the individual is aware of the adverse effects of drinking and continues to drink recklessly regardless of the consequences, it is known as alcohol abuse. In contrast, if the individual feels mentally and physically in need of alcohol to function, it is known as alcoholism (Hanoman, 2017).

Risky drinking is defined by STATS SA as "drinking five or more standard measures of alcohol in a single occasion within the last 30 days", where 5% of women and 28% of men in South Africa were found to be risky drinkers. STATS SA reported that one in four women (26%) from the age of 15 and older has drunk alcohol (Department of Health, Statistics South Africa, South African Medical Research Council & WDP 2010, 2019) ever.

The general message conveyed is that there is a high alcohol and substance abuse rate, even (if not especially) in smaller outlying rural communities. This is due to the extensive, readily available access to alcohol, whether at a liquor store, shebeen, or homemade brew. The participants also mentioned that the patients perceive alcohol as cheaper than most nutritious foods available in the surrounding area.

The participants' responses regarding parents choosing to buy alcohol rather than nutritious food as they perceived it to be cheaper ties in with the lack of knowledge regarding healthy

eating practices. It also relates to the literature's economic constraints and social problems (Hanoman, 2017) as the priori themes identified (Table 11).

Parents that are uneducated regarding healthy, affordable food choices, especially if they also suffer from social problems and/or household food insecurity, may prioritise buying alcohol before healthy food for the child (Maluleke, 2016; Hanoman, 2017). Such alcohol abuse can be related to a lack of education and therefore lead to a redirection of funds.

Some participants mentioned that the mothers have a poor attitude and/or ignored the advice given by the health professionals, even after they have been given health education regarding healthy eating and the dangers of alcohol abuse, especially during pregnancy and lactation. Therefore, alcohol abuse was identified as the dominant type of substance abuse detected that impacts malnutrition.

5.4.2 Lack of knowledge

Participants mentioned that patients lack nutrition-related knowledge, as identified in the sub-themes (Table 11). Nutrition education is a necessary intervention to better improve individuals' nutrition knowledge to make healthier food choices, leading to a healthier lifestyle (Faber & Wenhold, 2016). Nutrition promotion and education, focusing on complementary feeding, is a key intervention to help reduce childhood malnutrition (Department of Health, 2013).

The shortage of staff at PHC facilities was identified as a challenge contributing to poor service delivery (Malakoane *et al.*, 2020). The responsibility and duty of providing nutrition-related health education are falling in the hands of the already over-burdened nurses. There is a limited number of nurses for the patient load at the PHC facilities (Jobson, 2015). This response relates to the challenge of inadequate human resources and capacity (Prudhon *et al.*, 2006).

A dietitian is a health care professional thoroughly trained in providing evidence-based nutritional counselling to patients through nutrition-specific education and promotion (Tappenden *et al.*, 2013); however, many institutions lack adequate dietitian staffing. The

participants indicated that they feel there are not enough dietitians at the PHC facilities to assist with education and counselling, which is consistent with the literature.

Based on these findings, it can be expected that patients will continue to make uneducated nutrition-related health choices, resulting in poor diet during pregnancy and poor food choices, with the lack of professional capacity and skills in PHC facilities identified as sub-themes in the interviews (Table 11).

5.4.3 Social problems and economic constraints

The four main themes that arose when participants were asked why they think the rate of malnutrition is still high in South Africa, included: substance abuse; lack of knowledge; economic constraints and social problems, of which all are interconnected.

In 1998 the child support grant (CSG) was introduced in South Africa to assist households by alleviating the income poverty that many children experience (Maluleke, 2016). The CSG is a key policy instrument aimed at reducing childhood poverty, and it is the largest cash transfer grant delivered by the South African Social Services Agency (SASSA) (Zembe-Mkabile *et al.*, 2016), reaching 12 945 505 children at the end of 2020 (SASSA, 2020). The current amount of R460.00, as of April 2021 (SASSA, 2021), is paid out per child; however, even though the grant is dependent on eligibility criteria, it is calculated independent of food price inflation (Zembe-Mkabile *et al.*, 2016).

A cross-sectional analysis study was conducted to assess the impact of CSG on child health in South Africa. The study found no improvement in child health, specifically the stunting rate, amongst participants receiving the CSG (Zembe-Mkabile *et al.*, 2016). The study's findings suggested that food price inflation and the lack of other necessary auxiliary social and health services, such as nutrition education and promotion, may contribute to the lack of child health improvement, regardless of whether the household receives the CSG (Zembe-Mkabile *et al.*, 2016).

Participants mentioned how mothers abuse the South African Social Services (SASSA) CSG. Instead of buying healthy food for the child, they choose to purchase alcohol for themselves,

resulting in negligence. This, too, ties in with alcohol abuse (Section 5.3.1), lack of education (Section 5.3.2), and poor social circumstances.

The Free State is currently facing multiple disease burdens, i.e., the HIV-TB epidemic, high maternal and child mortality, and increased rates of chronic illnesses and mental health issues (Malakoane *et al.*, 2020). One health professional in the study expressed the belief that mothers' poor attitudes to the advice given by the health professionals are related to poor mental health conditions, which can be aggravated with the already existing social problems at the home level and alcohol abuse.

All of the reasons provided by the health care professionals, as reasons for the high rate of malnutrition, can be considered to have an interlinking effect on one another, with the primary link being poverty (Hanoman, 2017). Poverty is one of the main factors repeatedly mentioned in the literature that has proven to show a direct correlation with the manifestation of malnutrition (UNICEF, 2017; Hanoman, 2017; Eskelinen, 2018)

There is an evident connection between poverty, a lack of education, poor social circumstances, which also links to food insecurity and, ultimately, malnutrition (Faber & Wenhold, 2016).

It is important to notice the hidden pattern that emerges when all economic and social constraints are considered, resulting in a "vicious cycle of malnutrition". Figure 7 is a self-conceptualised impression based on the long-term effects of malnutrition mentioned in the literature, the underlying causes of malnutrition and the findings within this study regarding the participants' beliefs as to why the rate of malnutrition is still high in South Africa (Dewey & Begum, 2011; Singh *et al.*, 2018).

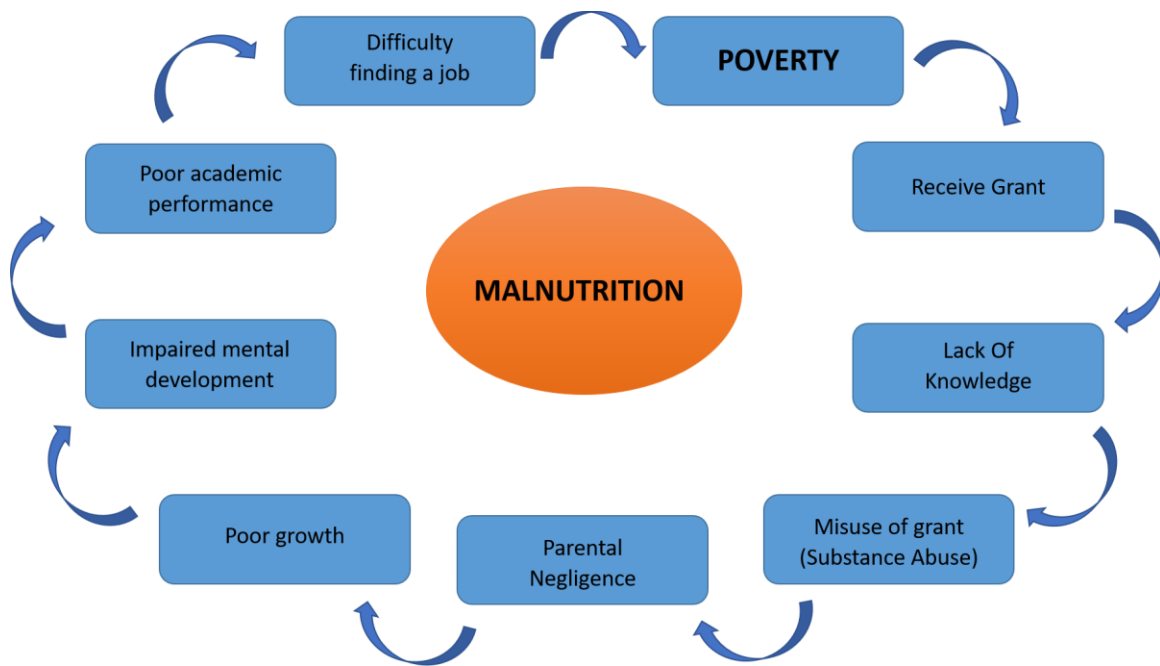


Figure 7: The Vicious Cycle of Malnutrition

5.5 Challenges and experiences of HCPs with the management of childhood malnutrition

No participant included in the study indicated having experienced no challenges during managing a child with malnutrition. The medical officers suggested that the basis of their professional experience with treating a child with malnutrition is primarily at hospital facilities; however, their services are also rendered to the surrounding PHC facilities. Therefore, their experiences are mainly based on (but not limited to) the inpatient treatment of malnutrition. A malnourished child would not be referred to a medical officer at the PHC facility unless they presented with other health complications.

Participants mentioned numerous challenges that they face during the management of childhood malnutrition. Four distinct themes arose from the data, which can be discussed as the four primary challenges faced by the participants. These four challenges are discussed further.

5.5.1 Shortage of stock

The Nutrition Therapeutic Program (NTP), previously known as the National Supplementation Program (NSP), is used to therapeutically address malnutrition through supplementation and continuous weight and general health monitoring of the patient (Brits *et al.*, 2017). According to government protocols, children receive supplementation according to their age groups and eligibility criteria to enter the program (NDOH, 2015). The supplements consist of fortified energy- and protein-dense maize meal, infant formula or infant cereal. The availability of selection depends on government tenders (Brits *et al.*, 2017).

Evidence indicates a positive effect of therapeutic supplementation on malnourished children as a viable and dependable intervention to improve child health, on the condition that the interventions are executed accurately (Bhutta *et al.*, 2013). A retrospective, descriptive cohort study conducted in the Free state, which aimed to assess the effectiveness of the INP Supplementary Feeding Programme at PHC facilities, found evidence that if the implantation of the intervention is followed out appropriately, the children can greatly benefit from the programme (Brits *et al.*, 2017).

Supplement porridge not enough and a lack of stock are the two sub-themes identified within this challenge. Participants mentioned that there is occasionally a shortage of stock due to a lack of funds to procure more supplements. This results in the patients not receiving the correct prescribed number of supplements, as indicated in the Nutritional Supplementation Program protocols, for the month. If the patients do not receive the prescribed amount of supplementation, there will be no weight or health improvement in the malnourished patient.

Based on an assessment of PHC facilities in the Free State, it was found that one of the major challenges that the facilities face is inadequate funding (Malakoane *et al.*, 2020). The report indicated a lack of financial autonomy as the provincial treasury is responsible for allocating funds according to the provincial government's priorities. Currently, education is the top priority in the Free State, while health comes in second (Malakoane *et al.*, 2020).

The challenge of shortage of stock can thus be attributed to the lack of fund allocation by provincial treasury due to the priority of healthcare being overlooked.

5.5.2 Uncooperative patients

“Uncooperative patients” was a recurring theme among all of the participants. The sub-themes identified that create the priori theme include: mothers’ reprimand and swear; mothers don’t listen to staff; mothers are refusing to breastfeed; mothers are in denial; parents don’t follow instructions; alcoholism by parents; parents should react early; uncooperative mothers; unwillingness to change diet, and patients missing appointments. This poses a major challenge as health professionals are unable to create behaviour changes within the reluctant mother to improve feeding practices that will show positive effects on the child’s health. An uncooperative caregiver is reluctant to learn any new valuable information and unwilling to make the necessary changes.

Participants believed that the mothers’ poor attitude is related to their poor mental health status. Depression and anxiety manifest in a household that is food insecure (Schwarzenberg *et al.*, 2015). There is a lack of mental health service provision at PHC facilities, especially in smaller rural areas, which attributes to the high prevalence thereof (Jobson, 2015).

Another participant indicated that the poor attitude within the community could be related to poor service delivery or the unavailability of access to healthcare. Other challenges identified in the assessment of PHC facilities in the Free State was that of a lack of safety for the patients and staff; inadequate appointment of skilled staff due to poor retention strategies; and the unavailability of necessary medical equipment due to insufficient funding (Malakoane *et al.*, 2020). The patients become discouraged and develop a “what is the point” attitude, and this may be why they do not follow instructions as given by healthcare professionals.

Alcohol abuse is another possible cause attributing to the patient’s uncooperative attitude. Section 5.3.1 elaborates on the relationship between alcohol abuse and the patient’s poor attitude and decision making.

5.5.3 Mismanagement by staff

One of the challenges identified by the participants was that of the mismanagement of malnutrition by staff, emphasised by experiences that included: nurses that are not following

given instructions; the older doctors not working collaboratively with the dietitians; the social worker not always being available when required; as well as the mismanagement by social workers.

Due to an increase in patient load and the shortage of skilled staff members at healthcare facilities (Jobson, 2015), the staff has a surplus workload, resulting in misdiagnosis and inadequate healthcare provision to each patient (Malakoane *et al.*, 2020). Participants indicated that instances have occurred where malnourished patients were not accurately identified or necessary treatment was overlooked due to the excessive workload. A shortage of skilled social workers within the area to refer patients to was also noted in the participants' responses. Thus, the shortage of social workers can be linked to the poor social circumstances of the patients and attributed to their poor mental health status, as discussed in section 5.3.3.

Malnutrition requires a holistic approach where various programs and components work collaboratively to improve the patient's health status (Rawe *et al.*, 2012; Department of Health, 2013). Instances where the different programs and components are not communicating efficiently with each other, can thus result in the mismanagement of treating a patient with malnutrition.

5.5.4 Emotional challenges

The fourth challenge that was identified is that of the emotional burden that is placed on healthcare professionals that treat malnutrition regularly. One participant noted the emotional stress that they feel while comparing the health of their child and that of the malnourished patient.

Although it was not identified as a sub-theme, the increased workload pressure that was identified due to a shortage of staff (Jobson, 2015) can be inferred to also contributing to the healthcare professionals' emotional capacity. The healthcare professionals can thus suffer burnout, and their productivity will be poor, consequently affecting the quality of care the patients receive (Dall'Ora *et al.*, 2020).

5.6 Overcoming the challenges identified

It can be noted that every participant remained positive and mentioned various methods that they have either personally used to overcome the challenges that they have experienced or stated potential ideas for overcoming the challenges faced in future.

5.6.1 Additional assistance for patients

Administering vitamin A and deworming program; assist mothers with psychological problems; suppress emotion and get help to the patient; provide counselling for mother; assist with the nutrition supplement program once a month are some of the identified sub-themes within the participants' responses. Although the facilities may be understaffed, the participants mentioned that they would take on additional duties to provide quality care for the patients. Even though the efforts are good-natured and well-intended, this can lead to emotional burnout of staff, which, in turn, may lead to mistreatment of patients (already been identified as a challenge, as discussed in section 5.4.3).

5.6.2 Community support

Various participants indicated that by getting the wider community, extended family and even law enforcement involved in helping mothers with malnourished children, it is believed that it can greatly help decrease the rates of malnutrition.

A multisectoral approach aids in involving all the necessary departments, including social development and basic education, to work in unison with the Department of Health. This approach aids in ensuring a larger coverage of health education, raising awareness and getting more family and community members involved (UNICEF, 2017).

The South African Police Services (SAPS) are contacted by health professionals when there is a case of child abuse or neglect noted while treating a child with malnutrition. Participants also mentioned referring the patient to a social worker or to social development to evaluate the patient's home environment and establish if there is a case of substance abuse or neglect by the parents or caregivers. Although this is an intervention that was stated, it is also part of the challenge of mismanagement of staff discussed in section 5.4.3. The social worker may

not always be available to receive the patient referral. Or, as it was also identified, there is a lack of communication between the components. The patient will be referred to the social worker, or social development, by the nurses and staff; however, no feedback or communication is delivered back after investigation. All the components are fully aware of the current situation and status of the malnourished patient.

5.6.3 Source additional stock

The challenge whereby the PHC facilities experience a lack of stock is overcome by reporting the low stock levels to the appropriate management and requesting assistance from other surrounding PHC facilities with additional stock to share. This intervention only becomes impractical when there is a district-wide shortage of stock.

5.6.4 Education campaigns

Participants indicated that a potential intervention to help improve mothers' education on nutrition related topics would be to spread more health-related messages through pamphlets, radio talks and health promotion.

Health campaigns show a positive result in spreading health messages with a larger population and community coverage and should therefore be encouraged (Gualano *et al.*, 2015). Promoting health education to pre-and ante-natal mothers promotes the first 1000 days with special attention to promoting safe breastfeeding practices (UNICEF, 2017).

A common response between the participants was the need for health education to the mothers in particular. Interventions identified that are used to overcome the challenges faced included alcohol and substance abuse during pregnancy education for the mother, the promotion of safe, exclusive breastfeeding practices and other basic health education given to the community by the community healthcare workers.

One participant suggested using media, such as radio interviews and billboards, to try and spread health education with greater population coverage.

5.6.5 Additional human resources

Participants in this study mentioned that they are overburdened with the number of patients they have to treat in a short amount of time, and that this can cause them to misdiagnose or mistreat a patient that would otherwise require more attention. Participants also mentioned that certain staff, such as a dietitian or social worker, are not always available in order to refer the patients to.

A malnourished child has developmental delays, which can be seen by assessing their developmental milestones (Maluleke, 2016). Working collaboratively with an occupational therapist (OT) and social worker is necessary for treating a malnourished child to assist with developmental delays and ensure all the patients' special needs are met (Faber & Wenhold, 2016). The sub-themes that arose from the participants' responses included: OT needed especially because they are behind in milestones; send patients directly to the hospital for quicker service; involve the OT, physiotherapist and the speech therapist; more human resources; and the social worker takes care of the social problems.

Employing more human resources and skilled professionals at PHC facilities was one of the main themes identified in the participants' responses. To scale up the Lancet interventions, increasing human resources and addressing nutrition-related problems such as malnutrition is of dire importance (Rawe *et al.*, 2012). This theme links to the discussion on the challenges faced with a shortage of skilled professionals at the PHC facilities, as seen in section 5.4.3. The general understanding is that the employment of more skilled professionals at the PHC facilities will aid in resolving a majority of the challenges faced regarding the management of malnutrition and thus support improving the rate of malnutrition nationally.

The patient's nutritional care is most often seen as the dietitian's responsibility; however, there is a severe lack of adequate dietitian staffing at institutions to properly address all patients (Tappenden *et al.*, 2013). Another sub-theme that was identified was the need for more job opportunities for dietitians at PHC facilities. Participants recognise that dietitians play a critical role in the treatment of malnutrition and noted that because of the shortage of dietitians at the PHC facilities, the patients would only be able to be referred to the dietitian once a month when community outreaches are scheduled. These infrequent consultations

also pose a risk to the malnourished patient who requires more frequent follow-ups to ensure weight and health improvement.

5.7 Opinions on the current protocols and programs in place to help treat malnutrition

The general opinion regarding the protocols and programs currently in place to help treat childhood malnutrition is that they are good and useful. If implemented correctly, improvement in the patient's health is seen almost instantly. However, most participants felt that the implementation and lack of human and financial resources cause the protocols and programs to fail.

A study found that nutrition interventions, including school feeding programs, supplementation programs and the promotion and treatment protocols of acute malnutrition, were seventy-three percent effective (Goudet *et al.*, 2017).

It was mentioned that some of the doctors and nurses do not follow the protocol as they should, which leads to misdiagnosis and mistreatment and links with the challenge of mismanagement by staff. The other challenge was the lack of resources regarding the insufficient stock of supplementation and the lack of adequate staffing of dietitians at the PHC facilities.

Regular monitoring and evaluating the implementation of nutrition-related interventions is necessary to ensure the smooth running of the programs and to identify any shortcomings early on (Tappenden *et al.*, 2013).

5.8 Limitations

Limitations of the study include that the sample size was relatively small, and more participants could have been included in the study to give a broader consensus regarding the experiences and challenges identified. A homogeneous sample of participants in a rural setting was used where a heterogeneous sample could have served fruitful in comparing the rural and urban groups.

Another limitation was that the participants were aware of the researcher's professional title as a dietitian. This could have influenced the participants to respond with answers they thought the researcher would favour. The researcher intended to avoid this by not asking the participant leading questions that could alter the responses.

Chapter 6 : CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The rate of childhood malnutrition is still an ongoing issue in South Africa, where many challenges exist regarding management. To overcome these challenges, they must first be identified. This study aided in describing the experiences of healthcare professionals that treat malnutrition and identifying the challenges that are currently being faced.

It was advantageous to notice how, even though the participants come from three different components with varying responsibilities within the health setting, they all experienced similar challenges. Each of the participants mentioned similar perspectives on why they believe the rate of childhood malnutrition is still alarmingly high, with alcohol abuse, social problems, lack of knowledge, economic constraints, financial constraints within institutions and a lack of human resources, all being interwoven and affecting progress being made.

The challenge of limited financial resources at health care facilities greatly impacts both the availability of supplement stock and the human resources available, further leading to a snowball effect of challenges as evidenced by the other challenges identified. With limited financial resources, the facilities are unable to appoint the required skilled workers. Medical resources are also limited as there are limited funds allocated for the procurement of consumables. The shortage of staff places stress and anxiety on the current employees to perform extra duties. The overworked employees are exposed to emotional burnout, and their work productivity is lessened, with an increase in the probability of misdiagnosis and mismanagement of patients. This can then lead to poor staff morale, which greatly influences service delivery. The shortage of medical resources and supplements also contributes to poor service delivery.

The poor service delivery can, in turn, leave the patients feeling discouraged and unsatisfied with their help, adding to the emotional stress and anxiety they may already experience due to poor social circumstances. Without enough mental health services available in the

communities or enough professionals to give the necessary education, the patients are left unassisted and turn to dangerous and harmful practices.

In the case of malnutrition, the mothers become uncooperative and difficult to deal with. And suppose the mother is unwilling to cooperate. In that case, the child's health will not improve, no matter how much health education is given, how many supplements are available, or how many skilled workers there are to assist.

It is of dire importance that the PHC facilities improve the quality-of-service delivery to the patients by acknowledging and addressing each of the issues and challenges mentioned. Only once we have improved the quality of care given to the patients will the malnutrition rate truly start to lessen.

6.2 Recommendations

The following recommendations were developed based on the outcomes of this study:

Recommendations for policy review:

- Alcohol abuse is a serious issue in rural communities that poses one of the major challenges health professionals face when managing a child with malnutrition. Policy review regarding the sale of alcohol and the ratio of alcohol sale outlets to population density within an area to limit the ease of access are two recommendations that can assist in alleviating the problem.
- Health education promotion and campaigns that have more extensive coverage of the community, with relevant nutrition-related education specific to the communities and topics identified, can significantly help lower the rate of malnutrition.
- Strict and frequent monitoring and evaluating of the implementation of nutrition interventions need to be reported to ensure protocols and programs are implemented correctly by the health professionals. By doing so, any challenges regarding the protocols can be addressed and pose as motivation for improving the programs and protocols.

- Replacing the child support grant (CSG) with food coupons can help prevent the misuse of the grant by negligent parents who would choose to buy alcohol rather than nutritious food for the household.
- Regular home-based visits by community health care workers can greatly assist in the early identification of malnutrition and reporting home environments and social circumstances.
- Multiple sectors and disciplines should be encouraged to be involved during health education promotion and campaigns. Each sector needs to be informed and understand the duties and responsibilities of each component and enhance communication to form cooperative relationships.
- Submissions and motivations, such as the findings of this study, can be sent to the provincial treasury to discuss a possible restructuring of priorities for allocating funds to better improve service delivery at the PHC facilities.
- The findings of this study can also serve as motivation for job creation for more skilled professions, such as nurses, social workers and dietitians, at PHC facilities where there is a dire need, as identified in this study. Institutions should also review their retainment strategies to ensure their skilled professionals do not resign and seek greener pastures.

Recommendations for future studies:

- Future studies can focus on research done on a wider sample of health professionals from rural and urban areas from different provinces in South Africa to compare the different experiences regarding the management of childhood malnutrition.
- More research needs to evaluate exactly why mothers are uncooperative when listening to health professionals and following the advice given to them. Once the root cause is identified, strategies can be put in place to tackle this issue.

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ADDENDA

INTERVIEW GUIDE

ADDENDUM 1: Interview Guide

Interview Protocol Project: Experiences of health care professionals working with childhood malnutrition in the Xhariep district, Free State

Date: _____

Place: _____

Interviewer: _____

Interviewee: _____ Email: _____

Questions:

1. *“What do you understand under the term Malnutrition?”*

2. *“Why do you think the rate of malnutrition in South Africa is still high?”*

3. *“How do you experience treating children with malnutrition?”*

ADDENDUM A

4. *“How do you overcome the challenges you deal with when treating a child with malnutrition?”*

5. *“How do you feel about the current protocols and programs that are in place to help treat childhood malnutrition?”*

(Thank the participant at the end of the interview. Assure him or her of confidentiality of responses)

INFORMATION SHEET

ADDENDUM 2: Information Sheet

Title of research: Experiences of health care professionals working with childhood malnutrition in the Xhariep district, Free State

Principal investigator: NAB de Figueiredo

Project Co-ordinator: NAB de Figueiredo

Good day,

Research is just the process to learn the answer to a question. In this study I would like to research the opinions, beliefs and experiences of health professionals that have experienced or treated children with malnutrition first hand. The study aims at exploring the experiences of health care professionals while treating childhood malnutrition at ground level. With a better understanding of their experiences, more viable solutions can be identified and implemented.

Invitation to participate: You are invited to take part in the research study.

What is involved in the study: You will be asked questions by the researcher about your personal experience with dealing/handling malnutrition and your opinions, beliefs and attitudes regarding the state of malnutrition in South Africa. An individual interview will be scheduled and conducted, at your preferred location, date and time. The interview will last approximately 30 minutes to an hour and will be audio recorded, with your consent.

There are No Risks involved in taking part in the study.

Benefits of being in the study are that your voice will be heard. Your experiences and conditions will be put together with others and this information will lead to better future solutions in tackling malnutrition.

Participation is voluntary. If you do not wish to take part in the study it will not be held against you. You can also decide to stop taking part in the study at any time. The study will not cost and you will not be paid to take part either.

Confidentiality: Your personal information will not be shared with anyone else. The audio recordings will be transcribed after the researcher has collected all the data. The transcript of your interview will be shared with you to ensure all the information provided was true and

ADDENDUM B

accurately transcribed. The results of the research may be presented at conferences and in articles (publications). We will only share your personal information if required by the law.

Contact details of researcher – for further information

Natasha de Figueiredo, Tel: 074 706 6626 or Email: tashdefig@yahoo.com

Contact details of Health Sciences Research Ethics Committee Secretariat and Chair – for reporting of complaints/problems :(051) 401 7795

CONSENT TO PARTICIPATE IN RESEARCH

ADDENDUM 3: Consent Form

Title of research: Experiences of health care professionals working with childhood malnutrition in the Xhariep district, Free State.

I have been invited to participate in this research study.

I have been informed about the study by

My participation in this research is voluntary, and I will not be penalised or lose benefits if I refuse to participate or decide to terminate participation. If I agree to participate, I will be given the participant information sheet, which is a written summary of the research. I understand that I will not receive remuneration for participation in this study and it will not cost me anything.

The research study, including the above information has been verbally described to me. I understand what my involvement in the study means and I voluntarily agree to participate. I have received the Information sheet and understand the content.

Signature of Participant: _____

Date: _____

ETHICS APPROVAL LETTER

ADDENDUM 4: Ethics Acceptance Letter



Health Sciences Research Ethics Committee

08-Jan-2021

Dear **Miss Natasha De Figueiredo**

Ethics Clearance: **EXPERIENCES OF HEALTH CARE PROFESSIONALS WORKING WITH CHILDHOOD MALNUTRITION IN THE XHARIEP DISTRICT, FREE STATE**

Principal Investigator: **Miss Natasha De Figueiredo**

Department: **Human Nutrition Department (Bloemfontein Campus)**

APPLICATION APPROVED

Please ensure that you read the whole document

With reference to your application for ethical clearance with the Faculty of Health Sciences, I am pleased to inform you on behalf of the Health Sciences Research Ethics Committee that you have been granted ethical clearance for your project.

Your ethical clearance number, to be used in all correspondence is: **UFS-HSD2020/1703/2601**

The ethical clearance number is valid for research conducted for one year from issuance. Should you require more time to complete this research, please apply for an extension.

We request that any changes that may take place during the course of your research project be submitted to the HSREC for approval to ensure we are kept up to date with your progress and any ethical implications that may arise. This includes any serious adverse events and/or termination of the study.

A progress report should be submitted within one year of approval, and annually for long term studies. A final report should be submitted at the completion of the study.

The HSREC functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act. No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; The International Conference on Harmonization and Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH Tripartite), Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the HSREC of the Faculty of Health Sciences.

For any questions or concerns, please feel free to contact HSREC Administration: 051-4017794/5 or email EthicsFHS@ufs.ac.za.

Thank you for submitting this proposal for ethical clearance and we wish you every success with your research.

Yours Sincerely

Dr. SM Le Grange
Chair : Health Sciences Research Ethics Committee

Health Sciences Research Ethics Committee

Office of the Dean: Health Sciences

T: +27 (0)51 401 7795/7794 | E: ethicsfhs@ufs.ac.za
IRB 00011992; REC 230408-011; IORG 0010096; FWA 00027947

Block D, Dean's Division, Room D104 | P.O. Box/Posbus 339 (Internal Post Box G40) | Bloemfontein 9300 | South Africa



TRANSCRIPTS

ADDENDUM 5: Interview Transcripts

CODE: ITV001

Place: Oppermansgronde Clinic

Interviewee 1: Transcript

Researcher: Good morning. My name is Natasha and I am the researcher doing the research on the "Experiences of Health care professionals working with childhood malnutrition in the Xhariep district, Free State." And I have my first interviewee. I would just like to confirm that you did give consent to participate in this study?

Interviewee 1: Yes.

Researcher: And you are willing to answer these five questions that I have for you?

Interviewee 1: Yes.

Researcher: Okay. So firstly, I just want to ask you to state your profession and how long you have been in your profession.

Interviewee 1: Currently it has been 16 years in my current profession as a professional nurse at this primary health facility.

Researcher: How many years of experience have you had with working with childhood malnutrition?

Interviewee 1: I would say round about plus minus 16 years. With 4 years before that as well but that was working in hospital.

Researcher: So, you have a good amount of experience? More than 15 years of experience working with childhood malnutrition?

Interviewee 1: Yes.

Researcher: So, first question, what do you understand under the term malnutrition? What is your understanding of it?

Interviewee 1: I think it is a lack of the proper nutrition, usually caused by not having enough to eat. Also lack of sufficient nutrients, causes malnutrition.

Researcher: Okay. And why do you think the rate of malnutrition in South Africa is still high?

Interviewee 1: At this stage I feel it's mostly, I would say, due to the main thing poverty. And usually also the mothers. The mothers still using alcohol. That's a main thing also. In pregnancy, using alcohol. Not eating well. Sometimes also due to poverty. Alcohol and poverty being the main thing I would say the rates are still high.

Researcher: Okay. And how do you experience treating children with malnutrition?

Interviewee 1: My experience is mostly I would say the mothers, because you are trying to help out the mother, you are trying to help the child, with giving now daily porridge but due to, I would say, the mother, not looking after the child as well, or the mother, here by us, I would say, the few that I have now, are mostly this thing with the alcohol. The mother is not drinking well, leaving the child with the neighbour. So, she isn't looking after the child really. And I know that the problems with our children here, or the few that I know that are malnourished, is this trying to get the mother to come to the clinic. My CHW's, they come in daily and go to the mother and go to get the mother, but some of the mothers don't want to come to the clinic. Or they (the CHW's) are struggling. Or they really have a problem with mothers because the mothers reprimand and swear. They don't want to listen to us. If we are trying to help them, I know I had one mother, that she came here to reprimand and swear at us because we are sending her people after her. Because every time we have to call her to bring the child for the weight. Or bring the child for immunization. She doesn't want to listen or she doesn't want us sending people to them like the CHWs. So, some of them really don't want to listen to us.

The other thing is also regarding the supplement porridge also, we are normally giving two. We give the porridge and the Imnut. The total that's given usually is not enough. It is not enough for the whole month to give to that mother. Because there is some that you can see they are really looking for this porridge, because they don't have an income really, only these child grants, so this porridge is sometimes the only thing mostly that they can give the child after pay time. Like in the second week of the month, they don't have money, so they are relying on this porridge. And maybe it will only last for the week because they have to give to the other children also. So sometimes we are sitting with children not getting enough. I think sometimes this porridge isn't enough that's given to the children. We need to get more. More involved or more people involved or more to help them. More to help the mother get more food or more sectors coming together to help. Because the social worker is also involved and also trying, but due to all the things, the constraints, or they sometimes can't come out. Or they only come once a month or sometimes twice a month, or once in two months. So, we refer them to the social worker also, but it's not all the time that the social worker can come out to see this. So human resources are a problem and with this lock down thing, I don't even remember when last the social worker was here. So, I think we really need more. More resources. Human resources and supplements. To get involved there.

Researcher: Okay. Next question. So mainly with these challenges that you have just mentioned while dealing with malnutrition, how do you overcome the challenges you deal with when treating a child with malnutrition?

Interviewee 1: We try to overcome and try to help by giving the health education to the mother, from your side. Try to get them involved. Try to get the community involved. Try to get the surrounding community of people of the mother involved, like the family. Try to get them also involved. Or to get this mother to really look after this child or try to do the utmost so that she can feed this child well. I think the main thing is really this health education that we are trying to give them. And continue to try give this child the Vitamin A and deworming program. Try to involve them to get the CHWs to get this patient, the baby, every six months. So, I think we need to try continue giving these programs.

Education is a problem. And some of the mothers you tell them you need to come every six months but they just don't care or they forget regarding this immunization. If you as the health care worker don't try to give the health education, the mother themselves, they don't care.

Researcher: Why do you think that is with the mothers?

Interviewee 1: They don't want to learn. The ones I have a problem with specifically, it's the alcohol. Alcohol is a main problem of this community, especially where the malnutrition is involved. Because they are getting now that SASSA grant, but the grant is now more for them, than it is for the child. Like I said they will come get the porridge after getting the grant, for the reason that they now don't have anything in the house, but they did have the money. Like now this week is SASSA week, so we will get them next week coming to get the porridge. They prioritize getting alcohol over getting food for the child.

Researcher: Is there any other ways you try to overcome your challenges?

Interviewee 1: We try to continue to support the mother. Like try get her involved and just to come. We involve everyone, the entire community, to help. But really, it's still problematic. Because like I told you, I have this one child specifically that has been on the program since birth, I would say. And this child is almost four or five years old and still the same things. Still the same problems. Still struggling with the child. The mother continues with her alcohol. She even sees the dietitian. But still this mother still goes on. I won't say that the child has malnutrition due to disease or that. That isn't the main problem. It's mostly the alcohol.

Researcher: Okay. And how do you feel about the current protocols and programs that are in place to help treat childhood malnutrition?

Interviewee 1: It is good protocols, but I think mainly it's the implementation of it. Sometimes us professional nurses are trained on the protocols but we don't implement it as it should be. A child can come into the clinic for a minor thing but the nurse doesn't check his immunization records and see if it is up to date, or how is his weight doing. It can be a burden of a lot of patients coming in and not have time to check. Limited time to check everything. I think also we not always getting the porridge. We are sometimes struggling with the PEM scheme because of not enough stock. Or stock not coming on time for us. So sometimes we are sitting here with children that are coming to get their pap and there's no pap to give them because there is no stock. Sometimes there is a lack. Lack of resources again.

Researcher: But you do think the protocols are good?

Interviewee 1: Yes, yes. I do. It's just the implementation of the protocols. I think that's the main issue.

Researcher: Is there any other experiences that you would like to mention?

Interviewee 1: I can't think of something right now.

Researcher: Alright. So, I just want to thank you again for participating and I just want to reassure you that everything that you have mentioned is going to remain confidential, and I will have it typed up and emailed to you.

Interviewee 1: Okay. Thank you.

Place: Koffiefontein Clinic

Interviewee 2 Transcript

Researcher: Good afternoon. My name is Natasha and I am the researcher for this project on the experiences of health care professionals working with childhood malnutrition in the Xhariep district, Free State. I also just want to confirm that you have given consent to participate in this study.

Interviewee 2: Yes.

Researcher: And you are willing to answer these five questions for the project?

Interviewee 2: Yes.

Researcher: Ok. Thank you very much. So firstly, I would like to ask you what is your profession and how many years have you been serving in your profession?

Interviewee 2: I am a professional nurse and I have been serving 7 years.

Researcher: And how many of those 7 years have you been dealing with malnutrition specifically?

Interviewee 2: 6 years.

Researcher: Right. So, first question, what do you understand under the term malnutrition?

Interviewee 2: Okay. Malnutrition, for me, is when there is a deficiency or imbalance in the body due to micronutrients or macronutrients. So, there is a deficiency of the vitamins and the minerals inside the body. So that is what I understand with it.

Researcher: And why do you think the rate of malnutrition in South Africa is still high?

Interviewee 2: The main problem for me is the social problems. My experience is that especially when it comes to substance abuse, and when we now have with the grant. Some of them also misuse the grant. So, they supply their needs but they won't supply the child's needs. For me it's mainly the social problems.

Researcher: Alright. So, in your profession, how do you experience treating children with malnutrition?

Interviewee 2: It is a bit tough. You will find that the mother, from past experiences, you don't really know what is going on in the household because they won't really give you a clear picture of what's going on. They will just tell you "no. I don't have money to buy this and this and that", but then you find out that there is a SASSA grant there, and maybe there is more than three children that she's having. And all three are getting the SASSA grant and then you will find that she's given the nutritional supplements because you can identify that there is a problem in the nutrition of the child. You do your social intervention. You call in the social workers and you ask their opinions and you also give the child over to the social worker, but then I don't know if there is some kind of mismanagement there because you don't find that the social worker will come back with a decent report or also to say "this is what we have implemented". And then you will find that the child does

also receive the nutritional supplements, but does not really gain weight or does not really improve. So, there I have a big question mark there.

Researcher: Why do you think that might be?

Interviewee 2: It is either the mother does not understand or maybe she does understand but she doesn't understand the severity of the situation, but she's not cooperating that well. Here, especially in the rural areas, we have the type of mentality of, if you try steer them in the right direction then they're a bit hard headed. You don't really know if they fully grasp it or what's going on in their head. I have a specific patient that I had today that she hasn't really progressed on the nutritional supplementation program. When she comes to collect the supplements then she's not on time when she collects it. Like it's maybe two or three weeks after you have given the first initial supplements. But then she will come, and come with a (I don't know how to say). I don't know if she's depressed or what but her whole, what do you call it. She's not really cooperative. Let me rather say that.

Like there is not enough money and she doesn't have this. And the other thing is that she took the child too early from the breast. And we explained to her that she is also RVD reactive. We explained to her the whole process. You cannot, when you started with exclusive breastfeeding, decide that you now want to switch because you feel like your breasts are painful. So, you find that the majority of them are not exclusively, or they start being exclusively breastfed, but then at the end they are going to be switched because of some other reason. Maybe the breast is sore or some silly reason, like the breastmilk is not enough whatsoever. So now we have a situation now. The child needs to be fed and the mother is refusing to breastfeed. So now what's going to happen now? The child is not gaining weight. Actually, losing weight because you are monitoring this child. And at the end we have to give the nutritional supplements and she's not cooperating with that as well. So, there's a lot of challenges there.

Researcher: Why do you think the mothers don't want to cooperate?

Interviewee 2: You give education. We honestly sit with them and we talk to them. We outline all the dangers, but at the end there's just no progress. So, I don't know if you can say that it's due to a social circumstance that she feels like "I don't have the money. I don't have this. I don't have that which the others are having". I don't know if she's looking at that. Or is it something else because we also have a problem with alcohol abuse in our community. So, I have also seen that the mothers neglect their children. That I have seen personally. They neglect their children. Their children will be with them at the beer spot, wherever they are buying their homemade beer, and they will sit there the whole day. And the child has not eaten anything and obviously there is no attention there. The child is not thriving so full cycle. That's my main two problems. It's the alcohol and the social.

Researcher: Any other experiences you can think of?

Interviewee 2: There is sometimes where the stock isn't there. You have some of the other caregivers. Like I know there is two other ladies that are fostering children now due to the parent's situation, social problems. They are taken away and then you will find that they do come but then at the end there is no nutritional supplements. So that also causes a setback. I can think of one particularly, she comes every month but when there isn't any, the child's weight will drop because she says the child will rather eat that with the other foods. But she likes this pap. And I'm telling you, the day I gave her the pap she ate that pap immediately. So, she had that Yabantwana immediately. So, there is a problem when there is no stock and there is nothing else to give.

Researcher: Okay. Next question. So how do you overcome these challenges you face when dealing with a child with malnutrition?

Interviewee 2: If there is no stock, we report that there is no stock and we also try and ask from other facilities as well to assist us with that. And then when it comes to the social problems like I mentioned also is that I would inform the social worker and also at other times when there is neglect, we inform the South African Police Services as well. And we also try to assist the mother when it comes to the whole psychological problems because you never know what it could be or what could cause her to have that type of care. So, we also try to help her with that. So, like I said, social worker, SAPS, yes, the social worker will take care of the social problems. More human resources. Especially when it comes to the two main problems I just mentioned. The social and the alcohol.

The alcohol! If we can get just a bit of a breakthrough with that and what we can do just to change the whole setup, because really, the children are suffering when both the parents or whomever in the house has got a substance abuse, and especially when there is no employment there. There is no income. So basically, the social problems and alcohol abuse, go hand in hand. That's a big, big problem in the rural areas.

Researcher: Okay. And with regards to the protocols and programs that are currently in place, like the national supplementation program, how do you feel about them? How do you feel about the protocols and programs in place to help treat childhood malnutrition?

Interviewee 2: I feel like, when it comes to the supply of the nutritional supplements. It is good. We do receive a lot and the patients really do like it. So, when it comes to that it is a good program, because I think it really helps a lot because there is a lot of positives instead of the negatives when it comes to the supplementations. So, you will find that there are some patients that are really doing good and their health also improves when they are on the supplements. There is just sometimes, like I say, that you will find that there is a time where there is no stock there, so we can look a bit more into that. And for me it's just basically that the whole program is lovely. It's beautiful. I think we just need more people to be involved in this whole process. And, I think, we need good communication between all of us, because you will find that, for instance, there is the Zero Hunger Project of SASSA. You will find that you are identifying patients but you don't know what's going on. Like if they really receiving it or not receiving it, if there is improvement or not improvement. The same with the social worker. You don't know what's going on. Is there any difference helping, or is there something new that they have done? So, I think just those small problems. And yeah, a referral. Especially with patients that need, like the mothers, or you will find that some of them are with grandmothers because they can't cope because of some or other social problem. So, a referral to the correct people like the psychologist and so on, just to help them with their emotional status.

Researcher: Why do you think that could be with the referrals?

Interviewee 2: There isn't anyone to really refer to here in the district and it is so difficult to refer. You find it a bit challenging as well. Sometimes a person is available. Sometimes the person isn't available. Sometimes it's the patient's self that will show all the social or emotional problems, but then at the end they are not committed enough to go to the respective person that you sent them to. And I think if we can get that one right as well because if we talk about this cycle, if we can just break this cycle in the mentality of how our circumstances is. Like for instance, if I live now in poverty, I don't have all that I have but I can try to by going to school, so you can actually achieve something. So, if we can just change the mind-set with education, then maybe yeah, we can win this thing. But when it comes to education, while we talking about it, we don't know if they fully grasp it.

ADDENDUM E

You can sit with the patient. You tell them and outline the dangers. You give them the nutritional supplements, but whether they grasp it you're not really sure, because you don't really see the participation from them. The mother or whoever is taking care of the child.

Researcher: Why do you think could be the reason that they are not grasping the education being given to them?

Interviewee 2: It can be like your home mentality, like the way you feel. You will also not grasp if I am talking here and at the end there's no food at home, there's no money coming in. So obviously you will be sitting there judging, saying yeah you can talk there, but in the end, I don't even have a file. Then the other thing that I have also experienced, here where we are, is that there is not a variety of foods and the prices are really pricey. So, you don't have that money to go to Bloemfontein to go and buy the necessary foods that we are giving the basic education of. So, it makes it very difficult. Accessibility to the correct foods, the money. The distance of the farmworkers to get to the clinic and town is also a problem. What we do have, what we have implemented basically is the mobile clinic so that is doing good, but sometimes you might find that here and there, there is a little bit of issues where the patient/person would have to come in by themselves to the facility. So, you will find that transport is an issue there. It is far and obviously on the farms there is no shops there that you can say you gonna go buy whatever the dietitian or the sister told you to buy. So that is a challenge as well. So obviously the consistency won't be there. This month the person will come in, but next month they won't be able to come in due to the distance. They have to hike from there which is also not safe.

Researcher: Is there anything else that you would like to add for any of the questions?

Interviewee 2: No. That's all.

Researcher: So, I just want to thank you very much for being part of the interview and I would just like to assure you that all the information you have given me will be confidential, transcribed and I will email it through to you.

Place: Diamant Hospital

Interviewee 3 Transcript

Researcher: Good afternoon. My name is Natasha and I am the researcher for this project on the experiences of health care professionals working with childhood malnutrition in the Xhariep district, Free State. And I am busy with interviewee number 3. For the purpose of this interview, I would just like you to state your profession and the number of years you have been working in your profession and specifically how many of those years have you worked with malnutrition.

Interviewee 3: I am a medical officer, having an MBChB degree, and I have been clinically dealing with malnutrition patients for the past 6 years which is also the clinical years that I have worked. The student years you really just learn so I haven't counted the student years. So, I would say 6 years and of those 6 years I have dealt with malnutrition patients for 6 years.

Researcher: Okay. And I would also just like to confirm that you have given consent to participate in the interview?

Interviewee 3: Yes.

Researcher: And are you also willing to answer these next 5 questions?

Interviewee 3: Yes.

Researcher: So, first question, what do you understand under the term malnutrition?

Interviewee 3: I would say malnutrition is not just the quantity of food that you take in but also quality and variety of different food groups that you take in. So, because usually they say malnutrition is that they're not eating enough but sometimes they eat enough but just from one food group, like just carbs, but they don't get the other things with like veggies or fruits or proteins to get that micronutrients and all those things. So, it's not just not eating enough food, but not eating the right variety of foods.

Researcher: Why do you think the rate of malnutrition in South Africa is still high?

Interviewee 3: First I would say economics is a big factor. So, patients don't have money to buy the correct foods, so they would buy the cheapest foods which is usually carbs like "meel" or porridge. So, they would usually just eat that. Sometimes they eat it just with water because they don't even have money for milk or they don't have access to fresh milk. So, that's why I would say the economics because they don't get to buy the variety of foods and the availability of the foods. I mean like veggies, especially fresh ones, is not always available. You might get frozen ones which is not always that nutritional value is not always that good from the frozen foods. Fresh fruits are not there. And sometimes they would take fruit juices which is not always good because it's pumped full of sugar and then they don't have the vitamins either. Some might have some vitamins, like vitamin C but like I mean you can't just give juice because it's basically just sugar, so I'm not a fan of fruit juices because you're just drinking sugar, you can just as well drink coke. So yes, it's the availability and economics.

Researcher: Okay. How do you experience treating children with childhood malnutrition?

Interviewee 3: One of the first things I think is emotionally. If you have a child and you see a child that's almost the same age. You think, okay this child is the same age but 10kgs lighter than my child. How is it possible? So emotionally is one of the big things for me. So, then you start going through the things in your head, like is this mother not looking after the child? Maybe she can't afford it so even if she tries her best, she can't afford it. And the other thing is this mother not maybe neglecting the child and maybe that's why the child is having malnutrition. So, all the reasons are going through your mind. So that's why I'm saying it has a big emotional factor. And then you have to go and look at the clinical things now. Look at, measure the MUAC and all those things and you can't believe that it's 11cm. You can't imagine it but then you see it in front of your eyes. Doctors are actually, we are more clinical than the other professions. Because the others would now say, other professions are, I wouldn't say more holistic, but they work directly more with the patient's feelings. Where doctors just prescribe and you continue. But there was definitely a change after my child was born, especially working with children. Even paedcs, other diseases, you have this emotional factor. Your child is here in the back the whole time.

Researcher: So emotional is how you experience it. Have you had any type of experience, good or bad with regards to the treatment of the child?

Interviewee 3: Usually I am not dealing with the SAM or malnutrition children that much, so I go and look up what I should give them every time. Start with this or this. So, if you start with the F75 and now all your micronutrients and when to add it, what antibiotics to give. So, I usually read it up. So, with the treatment it's not really a challenge to me, but usually we have to follow up the patient to see what is happening with the patient to really see what's going on. I know in Pelonomi when we were in the wards for the malnutrition ward. There you would see if you weigh the child every day, then yes, this child is definitely gaining from this. So, the treatment is definitely working. So, I won't say the protocol for the treatment is wrong or it's bad or there's something that's not fitting there. So, it's definitely working if done correctly. So, if given every day, if the patient is weighed every second day they definitely improve. And even a lot. So, it's astonishing to see.

Researcher: So, I just want to confirm that you are mainly talking from an in-hospital treatment basis? And in primary health care?

Interviewee 3: Yes. Not really in primary health care with it, we have more experience with it in adults below a certain weight then they get supplements. The other ones (children) I normally see them when they are already on the programs for getting supplements. Most of the times, it's only for referrals to if they need to go to neurology clinics at Pelonomi. So, I don't really see them for the malnutrition, more for other problems occurring with the malnutrition.

Researcher: Okay. So, how do you overcome any of the challenges you deal with when dealing with a child with malnutrition?

Interviewee 3: Well, the emotional one is quite difficult. So, you have to just push through and get the right treatment to the patient. And you try to counsel the mother, like we say, educate her. And you just go through all the clinical things which you can and *get all* the allied health specialities which you can. It's not just sometimes the dietitians, the OT is also needed especially because they are behind in milestones due to them not having any energy to do anything. They don't walk. They don't even sit up. So usually, they are delayed because of not getting the right nutrition, so then you involve all the clinic people. And then obviously your treatments would help you. And if you see the patient is gaining weight you will obviously your emotional factor would be better.

Researcher: So, just with regards to the other professions, have you ever experienced any particular challenges?

Interviewee 3: In the hospital it is not really a problem. In the clinics they not always there on that date. So, they came only once a month. So okay, now they were here yesterday, now this patient has to wait another month to see a dietitian or whatever, the OT. Now it feels like you can't let this patient wait another month. So sometimes I try to send them directly to the hospital to see them quicker but that is also not how they work. Because they have certain dates. They are only there some days at the hospital, so then they send the patient back and fro to get treatment. And I'm like, I can't let them wait for a month. So usually if it is something I can sort out at the clinic I will try do it as quick as possible, like supplements is easy. Or here the treatment is easy, and usually at the hospital level, the allied health is available every day or at least every second day, but at the clinics it is a challenge.

Researcher: So, how do you feel about the current protocols and programs in place to help treat childhood malnutrition?

Interviewee 3: The medical treatment, when admitting a patient, works well. I won't say there's a problem there. The logistics at the clinic, like I said I'm not really working in that line of logistics, getting the treatment of supplements to the patients. So, I'm not really sure who gets what, but I have been incidences, even in adults, even if I want to give them supplements because they weigh 40kgs or 37kgs, there is no supplements. So, I have to tell this person, Okay, go try and buy Movite which might be like a supplement exchange or something, because we have to make a plan, but even the patient doesn't have the money to go and buy that Movite or any other thing to help them. So, in private, or in the ideal world, usually I would suggest something like Ensure or something for extra supplementation if they are low in weight. Obviously in malnutrition you can't just have one supplement, they have to go and get the right foods as well. So, in the ideal world you can maybe get them to buy more expensive products but here don't have that. They can't buy it. They don't have the money. They leave their food and they say they would rather go and buy alcohol and cigarettes and leave the food and only buy porridge. So, in the ideal world, I would rather spend more on my food, than on alcohol or cigarettes. So that is a problem, but that is a patient problem then. But then the other problem is that, if there is nothing available, and they don't have the money, then they sit there and you don't go forward with the treatment. So, the protocols and programs work well, but there's problems within the programs like the shortage, that hinders them from being successful.

Researcher: Thank you very much. I just want to thank you again for your participation. And just assure you that everything that you have mentioned will remain confidential. I will type up the manuscript and email it to you to ensure that everything is accurate.

Place: Albert Nzula Hospital

Interviewee 4 Transcript

Researcher: Good morning. My name is Natasha and I am the researcher doing the research on the "Experiences of Health care professionals working with childhood malnutrition in the Xhariep district, Free State." I am currently busy interviewing interviewee number 4. I firstly just want to ask you that you have given consent to participate in this study?

Interviewee 4: Yes.

Researcher: Can you please state your profession and how many years you have been working within your profession.

Interviewee 4: I am a dietitian and I have been working as a dietitian for 3 years, but I started treating malnutrition cases while I was still in varsity. So, I might say that it has been 4 years of experience working with malnourished children.

Researcher: Alright. And is it alright if I ask you these next 5 questions?

Interviewee 4: Yes, ma'am.

Researcher: So, the first question, what do you understand under the term malnutrition?

Interviewee 4: To me malnutrition it's a medical or a nutritional or a social condition, that is caused by a decrease in intake of food or, a decrease in food consumption, and/or an illness resulting in a severe weight loss or a bilateral pitting oedema. But in simple terms according to the WHO it says it's when the weight of the child, the weight-for-height of the child, is below -3 in the Road to Health Booklet. Or the patient, the MUAC is less than 11.5cm or the patient is presenting with the bilateral pitting oedema. Then yes, that's malnutrition.

Researcher: Why do you think the rate of malnutrition in South Africa is still high?

Interviewee 4: Lack of knowledge. I think lack of knowledge plays a big role. Yes, we have a lot of dietitians by now in South Africa, I think we have produced enough, but the job opportunities, especially in government, because our people don't really afford to go in private, to see private consultants. So, they don't have that knowledge about nutrition. It is lack of knowledge, remember, the first 1000 days of life, it starts with pregnancy but with our people, if you don't get it right from there, then the chances are we won't get the good outcomes. So, our people really lack knowledge. So, if we can have lots of dietitians, especially in the PHCs that's where I think we will overcome the malnutrition. I know poverty plays a big role, but at least they get little from Social Development like SASSA. They get SASSA but because of lack of knowledge, the food choices become a problem. They do have little money, so if we have lots of dietitians, they will assist our patients in making choices, like the food choices based on the little that they have.

And then the other one I think is inadequate care for women. If you are stressed. If a woman is stressed or depressed, the chances of looking after the baby are very, very little, minimal. So, I think if our Africans, our South African men, can support their wives, can support their spouse (It doesn't have to be if the relationship failed, but if you are the father, you ARE the father). So, they must continue supporting. They must take responsibility on that, because the ladies alone are failing. So, if

we can support them, we will overcome. And then, especially with the experience that I have in the area that I'm working at, it's a lady has a kid. She is alone in that. She's stressed and she ends up abusing alcohol. So, the alcohol is also, it's taking us back, because with the little that they get, the SASSA amount that they get, they use it to buy alcohol instead of buying groceries. And then the other one, poverty, it plays a big role. SASSA is assisting but it is very little. Because you will find that they have in the family and then they are dependent on that R400, all of them. So, it really isn't enough. That is why they end up just giving soft porridge only.

In other cases, you will find that it is negligence. I remember I had a mother who, when I was interviewing her, she had been a bit drunk since pregnancy. So, even during and after delivery, she was breastfeeding but she was still drinking. That's negligence to me. At least she got that little bit of information at the clinic because they do for antenatal visits at the clinic. When they are pregnant, they tell them, you are not supposed to do this, but if you are drinking alcohol and while you are pregnant and then you have the information, even the little information, it should change your behaviour. It is not lack of knowledge or lack of education because the education was at least provided, even just a bit, but they are not practicing it. I think that's negligence.

Researcher: How do you experience treating children with malnutrition?

Interviewee 4: Let me start with my experience from the mother's side or the caregiver. Most of the care givers or the mothers are in denial if you tell them that this is malnutrition and then the results, or the child is like this because of 1 2, 3. Then the mother, when you tell them it's a social problem or you tell them it's a nutritional condition, they are against you. They are against that. So, that is one of the changes we have because you have to change the mind-set first before you implement or before you treat that baby, because if the mother isn't involved then you will not be able to do anything. So, that's the other challenge that we have.

The other challenge is with our health care workers, especially our nurses. Remember, we as dietitians we are not in the hospital 24 hours, but the nurses, they are there with the patient every time. So, sometimes you prescribe the amount or you prescribe whatever feed and then you even take it to the wards sometimes. Because with myself, I do take them to the ward. Then I say to the Sisters, these are the feeds for the patient. I will also try to educate the mother, because I give it to the mother and I say 1 2,3. I give instructions, but I also give the Sisters those exact instructions, because I know the mother is sometimes, they don't understand. So, the Sisters can assist. But our Sisters sometimes they don't do that. Especially if, let me say, the other mothers you can see during your trainings and education, you can see that this mother, the IQ is not good. So, in that case, I give them to the Sisters, but tomorrow morning when you come, you just find the supplements still there, the very same volume you left is still there. So, I think that's the other challenge I had and I've had a lot of fights about it. They are not doing their duty and its part of their duty to make sure that the patient is receiving whatever was prescribed. Myself, I feel like, that's why in some cases I just give it to the mother. I feel like the mother must take responsibility as well. So, she must practice. If she can start in the hospital, they will take it home, that's why I start with the mothers. But, as I said, sometimes based on the IQ of the mother, you can see you're trying to do this but it's not working with the mother so you explain to the nurses. So, nurses, the same problem happens. It's a challenge.

Also, the other challenge, with our colleagues, the doctors. Because myself, I feel offended if you, a doctor, can write feeds in a file, I feel greatly offended sometimes. So, that's the fight that I'm always fighting. If I am here, no one should prescribe any feeds. So, the doctor sometimes they just write on their prescription give F100, or F75, but when you go and see the patient and you do the assessments you see this patient isn't even supposed to get that particular feed. Sometimes they

ADDENDUM E

give F75, and with the patient, if the appetite is good, the patient has been eating. You can't start with F75 in that case, but sometimes you find the patient is meant to be on F100, or the patient is on F100 and the patient is meant to be on F75, or the amounts are very high or they're too little. So, it's a challenge as well with the doctors.

Researcher: Why do you feel like that is, with regards to the doctors?

Interviewee 4: I think it's mainly our old doctors. They were not used to working with dietitians, they were used to do everything on their own. I think that's the problem because with my experience, where I did my comserve, at least I was working with the comserve doctors, so they understood our duties. So, every patient with SAM, every patient that needs feeds, they will consult you. But with the old doctors, it's a big challenge because I think they were used to work alone. They were used to do everything, so they just prescribe feeds.

Researcher: So, regarding these challenges you've mentioned, how do you overcome the challenges you deal with when treating a child with malnutrition?

Interviewee 4: Let me start with the doctors and the nurses. What I did is, I always try give presentations on the management of SAM and just to make them aware that we can worsen the situation if we are not really following the right protocols. If we are just doing things the way we think, we might worsen the condition or the situation. So, I do that in the form of presentations. And also, if I see in the patients file that they did whatever I don't like, I attend it immediately.

In terms of mothers, it's when we engage the social workers. I engage other health care workers just to assist us. Especially the social worker. And then when we have a malnourished child, the delayed development, it also becomes a problem. There's a delay in the development so that's why I say we engage other health colleagues. So, the OT, the physio, the speech therapist, they all come in and we work as a team. So that at least the mother understands, and then she can also see that we are trying to support her. I sometimes feel like the mothers feel like we are downgrading them because it's like we tell them otherwise your child is malnourished. So, just to give them the support that is where we engage other colleagues.

Researcher: So, to clarify, this is within a hospital setting?

Interviewee 4: Yes.

Researcher: And if you go towards the primary health care?

Interviewee 4: With my clinics I normally say to the community health care workers, go to those households, because I train them, I also give them training on malnutrition and stuff so I tell them to go and do food security surveys in that household, so we also showing them support. And also check because it is sometimes common in malnutrition that mothers, that's why I'm saying it's negligence. They don't come for follow ups. We have to run around looking for them. So, I think if we, our community health care workers, they are always going to their house, then the mothers will realize this is a serious thing now and take responsibility as well.

And the other thing is in terms of supplements. When the community health care workers go into those households, that's when they can see that the mothers really are giving the supplements. Our communities, we are in rural areas, so we find sometimes the whole family, they eat them. They think it's food, and its supplements. It's for that particular patient. It's just like medicine. That's why we have problems in our community. They even sell ARV's so supplements are very easy. If you give

them formula, it's very easy for them to sell. So, it's a challenge. It's really a challenge. But, with the support of the community health care workers at least it helps, and even ourselves. I know myself, I do home visits, but here. I never did them. But when I was still doing my comserve I used to do home visits together with the social worker just to analyse the situation at home. So, I saw it working because they really, the patients, they see the person or these people, they really care for us.

Researcher: With regards to the protocols and the programs in place, how do you feel about them? How do you feel about the current protocols and programs in place to help treat childhood malnutrition?

Interviewee 4: In hospital, the protocols are really useful. They give us guidance as health care workers on how to treat malnourished children. However, we still have to individualize the cases, because cases are always different, people are different with different problems so we have to individualize.

In the PHCs that's where it becomes a challenge because you are not always there. Sometimes we do train the nurses but it's not their focus so they sometimes, somewhere, they lose it. So that's where it's a challenge. But if we can have the dietitians based at the clinics, I think we will really win this battle.

The protocols are really helpful because they give guidance, but sometimes you're supposed to give "this" to a patient, but you don't have due to budget. So, that's a problem as well. Budget problems. Because you really want to give "this", the protocol says you must give it, but you don't have that particular supplement. That's where you improvise but sometimes you improvise but then you find that whatever you're improvising with it's not really "good" for the patient. It's not really benefitting that much.

When it comes to programs, I myself feel like they are not enough, because the only program we really have or that's more active is only to give supplements. Other programs are not really... they're actually not there. So, if we can have other programs, if we can engage other stakeholders, they can really assist us. Like the Department of Agriculture, they must play a part, because as we said earlier, that poverty is also playing a big role in malnutrition. So, if we can engage the Dept. of Agriculture, so that they can at least do gardens in the community. Develop the community in terms of gardens so that our mothers, if there's a mother with a malnourished child, we can encourage the mothers to go and work there at least get some veggies. So, I think if we can do that, the Dept of Agriculture can come in. And also, previously in the district, we had the Zero Hunger Program. It was helping and it was not helping. Because sometimes it's there and sometimes it's not. But at least it was benefitting the community. You receive this food parcels, plus R400, at least then the whole family will benefit, because they want to benefit all of them. You can't separate the child and the entire family. So, at least if they were getting that R400 and the food parcels they can all benefit from that. But now we don't have that program anymore.

Researcher: What happened to that program?

Interviewee 4: I'm not sure. Social Development, they don't have money. That's how departments complain if they want to drop something. They will say there's no money. That's the other problem. So, I think, if those two departments can come in, then we will really, there will really be a difference in our communities in terms of malnutrition.

Researcher: Anything else that you would like to mention?

ADDENDUM E

Interviewee 4: My worry is just the appointment of dietitians. It's really bad, because we have a lot of graduates, but the job opportunities in government, they are not there. And the people are suffering out there. So, I think, if our government can move away from that thinking of "the facility, a health facility, can be run by a doctor or a nurse" then we can get somewhere. They just need to change that mind set, because they think the only important people are the nurse and the doctor, but they saw previously, they have been there, but the problem has remained. In fact, it has even gotten worse. They are not solving the problem. Malnutrition has been there and the number have been increasing. So, if they can just change their mind-sets; lets hire more dietitians, so that they can assist in this. Let's hire more social workers so they can play a part. Because like I said, malnutrition isn't only a medical condition, actually it's a nutritional condition. Nutrition plays a big part, then a medical and then a social. So, if they can understand those levels, then we will do better.

Researcher: I would just like to thank you again for participating in the interview, and I would like to assure you that all the information you have shared with me today will remain confidential. I will also have the interview typed up and emailed to you so that you can check that the information is accurate and that I have not changed anything. Thank you very much.

Place: Albert Nzula Hospital

Interviewee 5 Transcript

Researcher: Good morning. My name is Natasha and I am the researcher doing the study on the "Experiences of Health care professionals working with childhood malnutrition in the Xhariep district, Free State." I am currently busy interviewing interviewee number 5. I firstly just want to ask you that you have given consent to participate in this study?

Interviewee 5: Yes. I did.

Researcher: I would also just like to ask what is your profession and how long have you been working in your field?

Interviewee 5: I am senior dietitian and I will be doing this, dietetics, for 3 years. With malnutrition I have worked with malnutrition patients for three years.

Researcher: And are you okay with me asking you these next five questions, regarding malnutrition?

Interviewee 5: No problem at all.

Researcher: What do you understand under the term malnutrition?

Interviewee 5: Malnutrition can be the patient who are overweight or underweight. We see the overweight by doing/taking weight-for-height. And if the weight-for-height is over or +3, then it is obesity. And if the patient's standard deviation is below -3 then it is malnutrition. Severe acute malnutrition. Between -2 and -3 it is moderate acute malnutrition.

Researcher: Okay. And why do you think the rate of malnutrition in South Africa is still high?

Interviewee 5: Number 1: ignorance. Lack of education. And the other ones are in denial.

Researcher: Can you elaborate a little bit more? Who is ignorant? Or where is there a lack of education?

Interviewee 5: Lack of education in the parents or the care takers. They don't have enough information. And then you will find the other ones who have information but they don't want to apply the information. For example: If you advise them that you must breastfeed your child for 6 months exclusively, they will tell you no, the baby is getting hungry and how can the baby survive without water or without food.

And then the ignorance, the one who has the information is the one with the ignorance. And the other one, denial. It falls under ignorance as well. And the lack of information: the mothers who are staying in the rural areas, you will find, that they don't go often to the clinics, and then they don't have enough information.

Researcher: Why do you feel they don't go to the clinics?

ADDENDUM E

Interviewee 5: Sometimes, in the rural areas, they will say they don't have money for the transport to go to the clinics. If the mobile clinics doesn't come to the farms, they don't have the money to go to the clinics.

Researcher: Alright, and then in your personal experience, how do you experience treating children with malnutrition.

Interviewee 5: It is difficult because you repeat the same information over and over and then they don't listen to that information.

Researcher: What type of information are you giving them?

Interviewee 5: Like how to increase the energy dense food in the children's diet, and they still do the opposite. You will explain to them that you must have at least 5 meals a day. Your 3 main meals and 2 snacks, and they will still feed the baby the food that is not meant to be fed.

Researcher: Why do you think they are not listening?

Interviewee 5: The problem is that they will tell us, "our grandmothers raised us this way and we still survived". So it's the beliefs. The budget as well. They will tell you they do not have enough money. And the alcohol. There is a lot of alcohol consumption. It is high in our areas. Because the mother and father will get drunk and forget to give the children food or the babies.

Researcher: So, regarding these challenges you've just mentioned, how do you overcome the challenges you deal with when treating a child with malnutrition?

Interviewee 5: At the clinics we have nutrition supplement programs, where the child will come to the clinics once a month and get the supplements. And we also have the SASSA Zero Hunger, but it has stopped now for some reasons. So, it was helping a lot. And then while the mothers are still pregnant, when they come to the clinics, we do the education on alcohol and eating healthy. For the budget it is the NSP, the Nutrition Supplementation Programs. Sometimes we do run out of the supplements, but with the other clinics that have enough supplements, we make sure to help the ones that don't have supplements.

Researcher: How do you feel about the current protocols and programs in place to help treat childhood malnutrition?

Interviewee 5: They do help a lot. Even though some doctors don't follow the protocols and misdiagnose the patients. That's where we miss the correct diagnosis for malnutrition.

Researcher: Why do you think they miss the diagnosis?

Interviewee 5: Lack of education, because we (dietitians) are the ones that are specializing in malnutrition. And they don't have enough training on malnutrition.

Researcher: So I just want to thank you again for participating in the interview and I want to assure you that all the information you have given is confidential. I am going to type up everything and I will send you a copy of the transcript so that you can ensure that all the information you have said is correct and I have not altered anything, and I'll have it emailed to you. Thank you.

Place: Diamant Hospital

Interviewee 6 Transcript

Researcher: Good morning. My name is Natasha and I am the researcher doing the study on the "Experiences of Health care professionals working with childhood malnutrition in the Xhariep district, Free State." I am currently interviewing interviewee number 6. So, firstly, for the purpose of this interview, could you please state your profession

Interviewee 6: I am a medical doctor, graduated MBChB.

Researcher: And how many years have you been working in your profession?

Interviewee 6: I have worked as a Doctor for 17 years now.

Researcher: And of those years, how many years have you been working with childhood malnutrition?

Interviewee 6: I think throughout my career I have been encountering children with malnutrition and treating them. So, 17 years.

Researcher: Is that primarily in-hospital treatment or even at primary health care facilities?

Interviewee 6: I have not done much of primary health care. It's mostly at the hospital.

Researcher: I just want to confirm that you have given consent to participate in this study?

Interviewee 6: Yes. I do.

Researcher: Are you willing to answer these next 5 questions?

Interviewee 6: Yes.

Researcher: First question: what do you understand under the term malnutrition?

Interviewee 6: Malnutrition could be, in my understanding, the bad feeding of a child or children. It could be over feeding or under feeding the child.

Researcher: Why do you think the rate of malnutrition in South Africa is still high?

Interviewee 6: I think parent's education is the leading one. And also, if you go to small places, like here in Jagersfontein, the rate of unemployment is very high and there's no money to buy the children food. Parents can't afford to buy children food, so children basically starve.

Researcher: Regarding the parent's education, can you elaborate just a little bit?

Interviewee 6: Parent's education is like, some parents would feed the child one, pap almost every day. And from pap you don't get *all* the nutrients for the child to grow healthy. It is not a diverse diet.

Researcher: How do you experience treating children with malnutrition?

Interviewee 6: It is a mixed bag, because I am working at a district level. Children are arriving at our hospital in a bad condition. And to reverse the nutritional status becomes tedious and difficult. So, it would be best if parents could react early and not really wait for the child to get sick. And also, we use the homebased carers to pick those children.

Researcher: And what are your experiences with the home-based carers?

Interviewee 6: The home-based carers on the one part, they have identified some, then they miss some, but they are doing a very good job.

Researcher: Regarding the challenges you just mentioned, how do you overcome the challenges you deal with when treating a child with malnutrition?

Interviewee 6: The same homebased carers will be distributing pamphlets. Educating parents. Not deep education on nutrition, just photos and all those things. Basic education. You give to the parents to look for danger signs and not to wait until it is too later. Also, billboards. Billboards can also help. And radio. The favoured radio for that community. Getting health education to a larger group of the community.

Researcher: How do you feel about the current protocols and programs in place to help treat childhood malnutrition?

Interviewee 6: The protocols are perfect. Once you get a child with malnutrition without other complications, it works perfectly. They recover within 14 days. You see there's a gain of weight. Unless the child arrives here with other comorbidities, then it becomes very difficult, for the protocols not to be successful on treatment. There are no issues, except for when sometimes there is no supplements at the hospital. And even when they arrive, the staff does not know if it is here, so they do not give it. It is not given to the child.

At the primary health care, I have worked very little. They basically use the same protocols and education of the sisters to pick up before they get to SAM. At the time when they are underweight, just to pick them up at that point. Early identification.

Researcher: Is there anything else you would like to add for any of the questions or regarding malnutrition?

Interviewee 6: Nothing really just that with malnutrition they get exposed to other illnesses and then the child is very vulnerable.

Researcher: Alright. I would just like to thank you again for your time, and I would like to assure you that everything we have discussed will remain confidential and I will have the transcript typed up and emailed to you to ensure it is accurate. Thank you.