

UNIVERSITY OF KWAZULU-NATAL

**INVESTIGATING THE IMPLEMENTATION OF MALNUTRITION GUIDELINES IN
CHILDREN AGED BETWEEN 6 MONTHS AND 59 MONTHS AT PRIMARY
HEALTH CARE CLINICS IN ETHEKWINI HEALTH DISTRICT, KWAZULU NATAL,
SOUTH AFRICA**

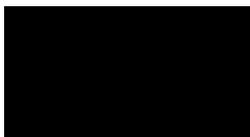
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September 2022

Submitted as partial fulfilment for coursework for a master's in public health qualification.

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DECLARATION

I, Virginia Grootboom, hereby declare that:

This Master of Public Health dissertation “**Investigating the implementation of malnutrition guidelines in children between 6 months and 59 months at primary health care clinics in eThekweni health district, KwaZulu natal**” is my work. It is being submitted in partial fulfilment for coursework in a master’s in public health qualification.

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Date: 31 March 2023

DEDICATION

This dissertation is dedicated to my family, especially my late father, Mr. Simon Nkumane who believed in good education and would have been proud when I obtained a master's degree. It is also dedicated to my husband who encouraged me all the way even when I felt overwhelmed. To my three children, my daughter, and two sons for their unwavering support and encouragement. Without their encouragement and support, I would not have been able to accomplish this work.

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My husband and children for allowing me space and time to undertake the Master of Public Health Studies.

ABSTRACT

Introduction

Malnutrition contributes directly to child mortality, as it was found to be an underlying cause of death in 30.6% of child deaths in South Africa. The severe acute malnutrition (SAM) case fatality rate (CFR) has been reported to be above the national target wherein certain provinces, recording up to CFR 11.8% which is concerning. Primary health care clinics being the entry points to the healthcare system are mandated to screen for malnutrition as part preventative and promotive focus. This study investigated whether the Integrated Management of Acute Malnutrition (IMAM) guidelines for children under five years are implemented effectively at Primary Health Care (PHC) Clinics in eThekweni Municipality. This is important as undernutrition is associated with increased child mortality and PHC is a first point of entry to the health system, closer to the community.

Study design

A mixed method research study design was employed. Both quantitative and qualitative methods were used. A cross-sectional descriptive analytical design was used for the quantitative component of the study. A generic qualitative descriptive design was adopted for the qualitative component of the study.

Population

Caregivers of infants/children between the ages of 6 to 59 months attending PHC services, PHC operational managers and nutrition advisers formed part of the study population.

Sampling strategy and size

A 30X30 cluster survey design was used, using 30 clinics, and 30 children per clinic, which were selected using stratified random sampling. A total of 844 caregivers, 22 operational managers and 10 purposefully selected nutritional advisors were included in the study.

Data collection

Researcher developed questionnaires were administered for caregivers focusing on growth monitoring, malnutrition detection and prevention. Additionally, information was extracted from the Road to Health Booklet recordings. A self-administered questionnaire to the PHC operational managers was also afforded, focusing on information regarding clinics'

administrative processes concerning nutritional prevention and management practices. Furthermore, unstructured focus group interviews were conducted for nutritional advisors. The interviews explored the nutrition advisors' level of nutrition knowledge, their observations at the clinic level, and how the system works with their introduction to the PHC service. Interview schedule was guided by questions extracted from the RTHB and KZN IMAM and from prescribed policies and guidelines. Interviews were conducted in isiZulu language.

Data analysis

Before the analysis was done, the data was checked for completeness, for outliers, missing information, etc. Any errors identified were resolved through revisiting the raw data, and the data was classified as missing data to prevent bias. Data from the questionnaires was captured on the EPI data statistical package. This was further analysed using SPSS 24 statistical package to categorise responses from the questionnaires. Descriptive statistics such as frequencies and percentages were used to summarise and present results. A comparison of the summary of the findings was undertaken to determine the accuracy of measuring weight, using chi-square (presented as bivariate graphs) and correlation analysis (using Pearson's correlation), to ascertain the accuracy of clinic weight measuring as compared to weight measuring done by researchers. The level of statistical significance was $p < 0.05$.

The interviews were audio-recorded and thereafter transcribed for the accuracy of the analysis. Content analysis was done.

Results

The findings demonstrated that only 9.7% of children attended clinics for growth monitoring, the majority attended for immunization or for illness. Almost 28% of children's weights were not plotted; the meaning of the plot was explained in only 33% of caregivers. Mid-upper arm circumference (MUAC) was measured in only 27% of children; nutrition advice was given to only 18.6% of caregivers. The clinic weights were the same as the assessor's weights in almost two thirds of the children weighed; 100% of clinics had a baby scale and only 18.8% had a toddler scale, only 18.2% of clinics had a service plan for the children's scale; 100% of children had MUAC tapes; IMAM guidelines were available in 95% of clinics. A Nutrition Advisor was available in 90.9% of clinics but 60% of clinics have experienced stock-outs of food supplements in the past year. Although 59% of clinics reported having functional Phila-mntwana

Centres, only 27.3% of clinics reported having community structures that support child malnutrition.

Conclusion

Despite the IMAM guidelines having been available since 2015, this study proved that implementation challenges exist both in the clinic and at community level. Recommendations to strengthen the programme should be targeted at the operational and administrative supervisory function and resourcing at various PHC levels.

Keywords: Malnutrition, Primary Health Care clinic operational managers, integrated management of acute malnutrition, nutritional advisors, children under five years.

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LIST OF ABBREVIATIONS

ART	Antiretroviral therapy
CFR	Case Fatality Rate
CGSA	Child Gauge South Africa
CHC	Community Health Centre
CHWs	Community Health Workers
CMAM	Community Management of Malnutrition
CNP	Clinical Nurse Practitioner
DoH	Department of Health
FANTA	Food and Nutrition Technical Assistance project
FGD	Focus Group Discussion
GM	Growth Monitoring
GMP	Growth Monitoring and Promotion
GOBI	Growth Monitoring, Oral rehydration, Breast-feeding and Immunization
HCWs	Health Care Workers
HIV	Human Immunodeficiency Virus
ICMV 19	Ideal Clinic Manual Version 19
IYCF	Infant and Young Child Feeding
IMAM	Integrated Management of Acute Malnutrition
IMCI	Integrated Management of Childhood Illnesses
INP	Integrated Nutrition Programme
IYCF	Infant and Young Child Feeding
KZN	KwaZulu-Natal
LFED	Lactose free energy drink
MAM	Moderate Acute Malnutrition
MDG	Millennium Development Goal

MDT	Multi-disciplinary team
MUAC	Mid Upper Arm Circumference
NA	Nutrition Advisors
NS	Norms and Standards
NdoH	National Department of Health
OM	Operational Manager
OSS	Operation Sukuma Sakhe
PHC	Primary Health Care
PMTCT	Prevention of Mother to Child Transmission of HIV
PNs	Professional Nurses
QIP	Quality Improvement Plan
RTHB	Road to Health Booklet
RUTF	Ready to Use Therapeutic Feed
SA	South Africa
SACG	South African Child Gauge
SAM	Severe Acute Malnutrition
SAVACG	South African Vitamin A Consultative Group
SDG	Sustainable Development Goal
SOP	Standard Operating Procedures
UNICEF	United Nations Children’s Fund
WHO	World Health Organisation
WBOTS	Ward-based outreach teams

DEFINITION OF TERMS

Anthropometry:

Anthropometry is the use of body measurements to assess the nutritional status of an individual. Body measurements include age, sex, weight, height (or length in children under 24 months or under 87 cm in height), and mid-upper arm circumference (MUAC). Nutritional indices are calculated by comparing an individual's measurements with that of a reference population. The nutritional indices commonly calculated for young children are, weight for height – a measure of wasting or acute malnutrition; height for age – a measure of stunting or chronic malnutrition; weight for age – a measure of underweight or wasting and stunting combined (WHO, 1995)

Under-nutrition:

Undernutrition is defined as the outcome of insufficient food intake (hunger) and repeated infectious diseases. Undernutrition includes being underweight for one's age, too short for one's age (stunted), dangerously thin (wasted), and deficient in vitamins and minerals (micronutrient malnutrition) (Ntenda et al., 2018).

Chronic malnutrition:

Chronic malnutrition is defined as a persistent lack of access to necessary vitamins and minerals in early childhood, leading to health problems later in life, even if the patient later receives adequate nutrition. Between the ages of eight and 20 months, children are especially vulnerable and can develop chronic malnutrition if their dietary needs are not met (Rahman & Chowdhury, 2007).

Clinical nurse practitioner (CNP):

CNP/Advanced Nurse or Midwife Specialist is defined as “An advanced nurse specialist (ANS) is a specialist clinician with a broad autonomous practice managing a specific caseload. This advanced nurse specialist may function as the first entry-point and needs the knowledge and expertise to be able accurately to assess, diagnose and manage the patient population in the speciality area. This may include being able to make a “medical diagnosis” and prescribe treatment. This usually requires expertise in diagnostic testing and treatment beyond the normal practice of the nurse/midwife. In South Africa, she/he may practise as a private practitioner, but

this is not exclusive to this category” (Duma et al., 2012) The CNP at the PHC level, has a university qualification of a Diploma in diagnosis, assessment, and management of diseases. This diploma includes Integrated Management of Childhood Illnesses (IMCI).

A Nurse Practitioner:

A Nurse Practitioner is an Advanced Practice Nurse who integrates clinical skills associated with nursing and medicine to assess, diagnose and manage patients at PHC settings and acute care for populations, as well as ongoing care for populations with chronic illness. Her training includes IMCI amongst other relevant PHC courses.

Community health workers (CHWs):

CHWs can be defined as health workers who have been trained to some extent but do not possess a formal professional certificate, of whom many live and work in the community. It encompasses a wide range of health workers, paid and unpaid, professional and lay, experienced and inexperienced, including traditional birth attendants, village health workers, peer supporters, community volunteers, and health extension workers (Witmer et al., 1995). In KZN, the CHWs are also referred to as Community Care Givers. The words are used as synonyms.

Exclusive breastfeeding:

Exclusive breastfeeding means that the infant receives only breast milk. No other liquids or solids are given – not even water – except for oral rehydration solution, or drops/syrups of vitamins, minerals, or medicines (WHO, 2019a).

Growth monitoring and promotion:

Growth monitoring and promotion (GMP) is a prevention activity that uses growth monitoring (Klingman, 1999) i.e. measuring and interpreting growth, to facilitate communication and interaction with the caregiver and to generate adequate action to promote child growth, through Increased caregiver’s awareness about child growth; Improved caring practices; Increased demand for other services, as needed (UNICEF, 2007b).

Health facility:

Health facilities are places that provide health care. They include hospitals, clinics, outpatient care departments, and specialized care centres, such as maternity hospitals, and psychiatric care hospitals, etc. (WHO, 2009a).

Integrated Nutrition Programme:

A SA Government (Govt) programme aimed to facilitate a coordinated, inter-sectoral approach to solving nutrition problems (Labadarios, 2005).

Micronutrient:

Micronutrients are also known as vitamins and minerals. They are essential components of a high-quality diet and have a profound impact on health. While they are only required in tiny quantities, micronutrients are the essential building blocks of healthy brains, bones, and bodies (WHO, 2018a).

Malnutrition:

According to WHO, malnutrition is defined as “deficiencies, excesses or imbalances of intake of energy or nutrients”. It is classified into three broad groups, namely, undernutrition, overweight and obesity, and micronutrient-related malnutrition (Adewuyi, 2019).

Operation Sukuma Sakhe:

Operation Sukuma Sakhe is a programme aimed at building the fabric of society by promoting human values, fighting poverty, crime, diseases, deprivation and social ills, ensuring moral regeneration by working through effective partnerships. Partnerships include civil society developments partners, communities and governments to provide a comprehensive integrated service package to communities (Ndlovu & Msweli, 2016)

Peri-urban:

These areas are located outside the urban areas, they are mostly informal settlements in nature. Their existence as people from homelands gets closer and on the periphery of urban areas in search of work opportunities. Because they don't own a formal house in townships, they tend to build on vacant land closer to work (Macagnano, 2002).

Primary Health Care:

According to WHO, PHC is defined as meeting people's health needs through comprehensive promotive, protective, preventive, curative, rehabilitative, and palliative care throughout the life course, strategically prioritizing key health care services aimed at individuals and families. This is achieved through primary care and the population using public health functions as the central elements of integrated health services, by systematically addressing the broader determinants of health (including social, economic, environmental determinants, as well as people's characteristics and behaviours). This is addressed through evidence-informed public policies and actions across all sectors; and by empowering individuals, families, and communities to optimize their health, as advocates for policies that promote and protect health and well-being, as co-developers of health and social services, and as self-carers and caregivers to others (Phillips Jr & Bazemore, 2010).

Rural areas:

Like most definitions of areas, the definition of the rural area is evolving. The characteristics of a rural area are mainly, large tracts of vacant land, low population density, communal land tenure and villages made up of scattered homes/homesteads, lack of services such as water and electricity, poor transport infrastructure, mostly are in the areas previously classified as homelands. They usually have one small town to service residents (Atkinson, 2014).

Severe acute malnutrition:

Severe Acute Malnutrition (SAM) is defined by very low weight for height (below -3 z scores of the median WHO growth standards), by visible severe wasting, or by the presence of nutritional oedema (Daelmans, 2009).

Stunting:

Stunting is defined as impaired growth and development in children that may be caused by inadequate nutrition, recurrent infections, and poor psychosocial stimulation. It is characterized by height-for-age that is more than standard deviations below the WHO Child Growth Standards median (Hilmy, 2021).

Township:

In the SA context, a township is defined as “an underdeveloped and racially segregated urban area that from the 19th century until the end of apartheid were reserved for non-whites, that is Indians, Africans, and Coloureds” (Pernegger & Godehart, 2007).

Undernutrition:

Is defined as a lack of proper nutrition caused by inadequate intake of food containing nutrients required for proper growth. It is divided into 3 categories, namely wasting, stunting, and micronutrient deficiency (Micha et al., 2020).

Urban:

In the context of this research, I used the old version of the definition, which is a definition before the 1994 democratic govt in SA. Urban areas are those areas historically reserved for white people. These areas were far from where none-whites lived; they were also separated by large buffer zones to separate whites from blacks. These areas are better resourced with services, transport, water, electricity, etc. After 1994, most areas are occupied by mixed racial groups, and townships are now better developed. The word urban is used in the historical sense (Baffi et al., 2018).

Wasting:

WHO defines wasting as “a reduction or loss of body weight to height”. Wasting can be defined as moderate acute malnutrition (MAM) manifesting as mid-upper arm circumference (MUAC) equal to or between 115mm and less than 125mm; or severe acute malnutrition (SAM) manifesting as low weight for height and or MUAC less than 115mm. It is caused by infections and poor or inadequate diet (WHO, 2014).

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STUDY OUTLINE

The study is presented in the following five chapters:

- Chapter 1. Introduction, background and rationale for the study, research question, aims and objectives.
- Chapter 2. Literature Review: this chapter reviews the literature on the recent current trends, regarding child malnutrition, causes, consequences, policies, situation globally and South Africa etc.
- Chapter 3. Methodology: this chapter describes the research study design, the method that was used to gather and analyse the data.
- Chapter 4. Results: this chapter provides the presentation of the results of the study findings with respect to the four study objectives.
- Chapter 5. Discussion: this chapter discusses the results presented in Chapter 4, specifically with respect to the study Objectives.
- Chapter 6. Conclusion: this chapter summarises the findings and makes recommendations to authorities and recommendations for further study.

1 INTRODUCTION

In this chapter an overview of malnutrition in the global, African, and South African context is explored. Outlining the extent of the phenomena in the current scenario, multiple intervention strategies implemented in the past as well as what is currently practiced in a form of policies and guidelines informed by the World Health Organisations and National Department of Health directives. Common types of malnutrition as also discussed including, stunting, wasting and severe acute malnutrition. Furthermore, the aim, the objectives, questions of the study would be discussed.

1.1 Background and rationale

The World Health Organisation (WHO) has reported that approximately 149.2 million children globally under five years are stunted, whilst 45.4 million were wasted in 2020 (WHO, 2021a). Stunting is defined as having a height-for-age z score i.e., $HAZ < -2$ standard deviations (SD). HAZ is calculated by subtracting an age- and sex-appropriate median value from a standard population and dividing by the SD of the standard population (WHO, 2014). The consequence of stunting is poor brain development which may lead to poor cognitive development, and failure for children to reach their full height (Woldehanna *et al.*, 2017). The causes of stunting have been attributed to poor nutrition in utero and early childhood, in the first 1000 days of life. South Eastern Asia (SA) and sub-Saharan Africa (SSA) are areas reported to have the highest stunting prevalence respectively (Akombi *et al.*, 2017; Lim *et al.*, 2012; Ssentongo *et al.*, 2021).

Wasting is defined as a more severe and life-threatening form of malnutrition caused by inadequate food intake (Bhutta *et al.*, 2017). This can lead to a weakened immune system. In severe cases, wasting can lead to death (WHO, 2021a). Fortunately, Southern Africa has a low prevalence of wasting (WHO, 2019b). The other form of malnutrition is overweight. This problem has been emerging over time. Currently, there are approximately 39 million children globally under the age of five years, who are overweight. This study, however, will focus on undernutrition and its detection and management at Primary Health Care (PHC) clinics of eThekweni District, in KwaZulu Natal (KZN), South Africa (SA).

According to Mangusho, (2013) and Muthayya *et al.*, (2013), hidden hunger is caused by the consumption of low-micronutrient-containing food and is more prevalent in low-income countries, such as in SSA and South Asia. It is less overtly visible, yet its effects can be devastating.

SA was involved in solidarity towards preventing malnutrition with other countries and subscribed to the targets of the Millennium Development Goals (MDGs) and has signatory status. The more specific goals are MDG 4, which aimed at reducing child mortality by two thirds by 2015, and MDG 1, which aimed at addressing poverty and hunger (WHO, 2005). SA is also a signatory to the Sustainable Development Goals (SDGs) which replaced MDGs, specifically SDG 1- No Poverty, SDG 2 - Zero Hunger, and SDG 3 - Good Health and Wellbeing (Dora *et al.*, 2015; WHO, 2005).

It is therefore important to address issues of malnutrition as this is one of the main contributors to child mortality. It has been found that in over 50% of child deaths, malnutrition was found to be the contributing cause of death (Black *et al.*, 2013b; Caulfield *et al.*, 2004; Gutiérrez-Jiménez *et al.*, 2017; Pelletier *et al.*, 1994; Rice *et al.*, 2000). Preventing avoidable deaths, some caused by malnutrition, is important to reduce the levels of child mortality. Currently globally, under-five mortality is 39 per 100 live births, however, in sub-Saharan Africa, the mortality rate is 78 per 1000 live births (Van Malderen *et al.*, 2019). Over the years various policies aimed at improving child nutrition and addressing child malnutrition have been developed. Such policies are informed by research and new evidence. One such change was the policy that recommends exclusive breastfeeding for at least six months even when the mother is known to be HIV positive, with the necessary precautions being followed to prevent HIV transmission (Doherty *et al.*, 2011).

Breastfeeding is promoted to ensure that the child receives adequate nutrition from breast milk and to prevent or reduce child morbidity and mortality. Breastfeeding is inexpensive. Even poorer sectors of the population can afford it. Bottle-fed infants are more at risk of diarrhoea than those breastfed. Morbidity has been shown to be increase in children who were bottle-fed. Exclusive breastfeeding can therefore reduce morbidity and mortality (Issaka *et al.*, 2017; Joseph *et al.*, 2013; Nkoka *et al.*, 2019; Rahman *et al.*, 2020).

The infant and young child feeding guidelines are available. They provide guidelines on child feeding (WHO, 2021b; WHO, 2009b). The guidelines commence during pregnancy but extend to early childhood. Good nutritional management of the mother during pregnancy has been found to reduce low birth weight and the chances of a child becoming malnourished/underweight. As part of the guidelines, nurses at PHC clinics are expected to provide nutrition counselling to pregnant women and mothers of young children and in so doing, contribute towards the reduction of child mortality and improving child survival.

Previous studies have focussed on various aspects of child nutrition over the years. A few have focussed on PHC nurses' reasons for not detecting malnutrition at an early stage. However, not many studies have focussed on the implementation of Integrated Management of Acute Malnutrition (IMAM) at PHC clinics. In 2015, KZN developed Guidelines on IMAM to deal with the challenge of child malnutrition (DoH, 2015).

Growth monitoring is one of the most essential strategies that can contribute to the early detection and reduction of the incidence of malnutrition in young children. It is important to investigate whether malnutrition detection and management guidelines are implemented according to the IMAM guidelines at PHC level. Do nurses understand the importance of detecting and managing malnutrition? Are these guidelines being implemented correctly? This research intends to investigate the practice, and factors that contribute to implementation or no implementation.

Reports from various studies and audits show that malnutrition is sometimes not detected by nurses at the PHC level. A study conducted in Limpopo in 2013 revealed poor detection. The reasons given by nurses for the poor detection were staff shortages, lack of equipment, and work overload, amongst others. The study also found that nurses had poor knowledge of how to identify malnutrition (Kitenge & Govender, 2013).

A different study was conducted in Johannesburg. The study sought to investigate the quality of care given to children attending PHC clinics. The study found that the examinations were poorly done, as triage and danger signs were missed. Health promotion and growth monitoring were not done when children were brought to the clinic for illness. Both growth monitoring and nutrition counselling were found to be

poorly done and inadequate. The study also found that of the eleven (11) children who required nutrition supplements, none received them (Thandrayen & Saloojee, 2010).

Some children are diagnosed with malnutrition when they are admitted to the hospital for conditions other than malnutrition. It is concerning that although some of the children who present at hospitals are fully immunized, however, growth monitoring has been missed out. (This was reported at Malnutrition meetings held in one of the eThekweni referral hospitals during 2017). It is important to identify the reasons for this practice and implement remedial steps to change this trajectory.

This study will investigate the detection and management of malnutrition in children between 6 to 59 months, the implementation of the malnutrition guidelines in children diagnosed with undernutrition, administrative factors that contribute to the successful/unsuccessful implementation of guidelines, and the perceptions/attitudes of caregivers regarding the use of nutrition supplements.

Further evidence from previous studies shows that a well-implemented infant/child feeding program improves child survival. Such programs include balanced energy and protein supplements during pregnancy, promotion of breastfeeding, complementary feeding support, and food fortification with micronutrients (Bhutta *et al.*, 2008).

1.2 Problem statement

Child mortality remains a worldwide problem, especially in the developing world. Most countries have been working towards achieving the MDGs, where the most important ones were Goal 4, which sought to reduce child mortality by two thirds by 2015, and Goal 1, which sought to eradicate poverty and hunger (WHO, 2010b). South Africa SA, as a developing country and one of the signatories to the United Nations' MDGs, has been implementing strategies to achieve these targets.

Malnutrition is an underlying cause in 52% of child deaths especially in developing countries, including SA (WHO, 2010b). It is therefore important to address child malnutrition to prevent unnecessary and preventable child deaths. Policies and guidelines are in place, however, child malnutrition although decreasing, is still a problem (DoH, 2015).

The identification and management of malnutrition should be done at PHC clinic level where it is vital as it assists in the screening of children at risk of malnutrition and provides a simple method of monitoring child health (Kitenge & Govender, 2013). Unfortunately, some children present at hospitals with severe malnutrition that is missed at the PHC level.

1.3 Research questions

- (i) Are malnutrition guidelines for children 6 to 59 months implemented properly at the PHC level?
- (ii) How is the management of child malnutrition at the PHC clinics implemented?
- (iii) What are the factors that promote and those that negatively affect the proper implementation of child malnutrition guidelines?

1.4 Aim of the study

The study aimed at investigating whether the integrated management of acute malnutrition IMAM guidelines are implemented to manage malnutrition in children between 6 to 59 months attending PHC clinics in eThekweni District.

1.5 Objectives:

- (i) To investigate if growth monitoring guidelines in the Road to Health Booklet are adhered to, including the accuracy of weight measurement.
- (ii) To investigate if administrative factors support/influence the implementation of the Integrated Management of Acute Malnutrition.
- (iii) To determine mothers'/caregivers' perceptions and attitudes towards nutrition supplements.
- (iv) To determine the nutrition advisors' knowledge of the malnutrition management programme.

1.6 Scope of the study

The study was conducted at 30 randomly selected PHC facilities within the eThekweni district and the study sample were children between 6 and 59 months of age and 30 randomly selected children per clinic were invited to participate. The study included clinic managers as well as a group of Nutrition advisors (NAs).

2 LITERATURE REVIEW

This chapter follows the previous chapter whereby the malnutrition phenomenon was introduced. In this chapter, comprehensive literature review was undertaken on the topic of malnutrition looking at the global state of undernutrition and a specific focus on the South African context, growth monitoring and promotion strategies. Interventions, policies, and guidelines addressing malnutrition in children was discussed. Malnutrition detection at the primary health care level was also discussed in this chapter as the study setting is based at the primary health care clinics as the entry points to the healthcare system. The health care system issues are also discussed in detail. The researcher aimed to find literature which is not older than 5 years where possible.

2.1 Introduction

This literature review will focus on factors that contribute to malnutrition; the global policies and guidelines and initiatives aimed at improving child nutrition including growth monitoring, the state of under-nutrition in children 0-59 months, the consequences of under-nutrition, the interventions aimed at addressing malnutrition and previous studies conducted on malnutrition and their outcomes. As mentioned above, KZN IMAM are guidelines that are aimed at addressing malnutrition. These will be the focus as they are intended to be implemented at various levels of health care. In this study, we will focus on the PHC level.

2.2 Growth monitoring and promotion (GMP) strategy

UNICEF is a staunch advocate of growth monitoring. In the 1980's UNICEF introduced a primary health care strategy that promoted Growth monitoring, oral rehydration, Breastfeeding, and Immunization (GOBI) (UNICEF, 1985). This was followed by the GMP program being implemented at health facilities. Unfortunately, GMP programmes did not have the desired effect, mainly due to insufficient funds and resources to implement them fully.

GMP is an intervention used worldwide to identify and reduce the incidence of undernutrition. GMP has been implemented in SA for many decades with the findings being recorded in the Road to health booklet (RTHB). The main purpose of GMP is to

identify/screen for inadequate growth early, thus allowing for necessary preventive actions to be undertaken, thus preventing/averting under-nutrition by teaching caregivers about proper child feeding. Its focus is mainly preventive and promotive (Liu et al., 2021). However, GMP is not being implemented as well as it should thus failing to detect growth faltering and malnutrition timeously. Some of the reasons attributed to poor outcomes are insufficient funding and resourcing.

It is important to note the difference between Growth Monitoring and Growth Monitoring and Promotion. Growth monitoring is defined as “a process of following the growth rate of a child in comparison to a standard by periodic anthropometric measurements to assess growth adequacy and identify faltering at early stages. Assessing growth allows capturing growth faltering before the child reaches the status of under-nutrition”, while GMP is defined as “a prevention activity that uses growth monitoring (Feleke et al., 2017; Klingman, 1999), i.e. measuring and interpreting growth, to facilitate communication and interaction with the caregiver and to generate adequate action to promote child growth through increased caregiver’s awareness about child growth, improved caring practices, etc.” Further, the GMP process includes three stages namely, measuring, and interpreting growth adequacy, analysis of the reasons for adequate or inadequate growth, and appropriate counselling. This corresponds to the triple-A approach (Assessment, Analysis, and Action). This process requires active engagement/participation of the caregiver in problem-solving about the child’s growth (WHO, 2007b).

It is understood that for growth monitoring and promotion programmes to be effective this requires commitment, capacity building, and strengthening of the health systems. Training, supervision, and support of health workers and capacity building of Health Care Workers (HCWs), on key issues such as relevant knowledge and communication skills to promote healthy growth, will need major improvement.

2.3 GMP: review of the evidence of impact

The current RTHB was introduced in SA in 2011, replacing the Road To Health Chart (Win and Mlambo, 2020). It is based on the WHO growth standards. According to the RTHB, children should visit the clinic every month until they are 12 months old. During all clinic visits, the child should be weighed, and the weight plotted in the RTHB to assess growth and provide nutrition counselling. The RTHB provides relevant advice on

nutrition for children of different ages (Mandiwana, 2021). HCWs can use this information for nutrition counselling, not only to prevent growth faltering but for preventive and promotive care. The number of clinic visits recommended by the RTHB has been explained above. The frequency is such that there is regular contact with the health facility at short intervals for children under 12 months, and less frequently for children from 12 to 24 months, and even less frequently for children between 24 to 59 months.

A study conducted in 2016 in the West Rand, Gauteng, found that the RTHB was not fully utilized (Mudau and Human, 2017). One positive finding of that the study found that the weight for age plotting was done well, with 81% coverage even though sections of the card were poorly done. The study recommended training to improve better utilization and completion of the card. Further emphasis was made on the importance of the card as a simple tool that if used properly can have a positive impact on morbidity and mortality (Naidoo et al., 2018; Win, 2016).

Another study confirms that the RTHB is not fully utilised for growth monitoring. This study was conducted in Makhado, Limpopo Province. The study found that nurses had poor knowledge of how to identify malnutrition. Most nurses did not know how to interpret the growth curve, leading to poor identification of malnutrition. Reasons given by nurses for their poor knowledge and implementation of RTHB were staff shortages, high workload, and inadequate/unavailability of essential equipment, amongst other reasons (Blaauw et al., 2017; Kitenge, 2013; Naidoo et al., 2018).

2.4 Causes of malnutrition

Malnutrition is a complex problem caused by multiple and interrelated factors. Efforts to address malnutrition should, therefore, be multifaceted. Although malnutrition affects the health of populations, the causes are not only health-related, but can be indirectly influenced by societal, economic, and other factors (Boulom *et al.*, 2020; Singh *et al.*, 2019)

According to the UNICEF framework on the causes of malnutrition, the immediate causes of malnutrition include inadequate dietary intake and illness. These two causes create a vicious cycle as one has an impact on the other. Inadequate dietary intake results in malnutrition. Malnourishment affects the body's immune response. A child

with a lowered resistance tends to get infections easily and frequently (Bhutta et al., 2017). The episodes of illness become longer and more severe. When a malnourished child gets ill, malnutrition tends to get worse. This leads to further problems as illness causes loss of appetite and malabsorption, which may cause more weight loss in a child (Singh et al., 2019).

Underlying causes of malnutrition include inadequate access to food at the household level, poor access to food, or food insecurity (Drammeh et al., 2019; Mkhize & Sibanda, 2020). The latter refers to poor access to safe food that is of good quality and quantity. Such food includes protein, energy, and micronutrients. Children may become malnourished due to the insufficient daily intake of the quality and quantity of food. For unknown reasons, food production by families such as the planting of vegetables is no longer done. This, coupled with unemployment/poverty, results in poor access to food due to a lack of money to buy food (Gaitán-Rossi et al., 2021).

Poor access to health services, safe water, and sanitation may adversely affect children's health. Children should have access to quality preventive and curative health services. Public health services in South Africa are free, and therefore should be accessible to all. However, some communities such as rural communities have poor access to health services as they have to walk long distances to a health centre, or the health service is a mobile service that comes only on specific days (Massyn et al., 2016) Preventive care such as growth monitoring coupled with nutrition counselling should receive attention at every visit. Poor access to health services deprives children of the opportunity for nutrition education and screening (Meiklejohn et al., 2016).

An unhealthy environment, poor sanitation, and a lack of safe water supply may lead to diseases such as diarrhoea. In SA, most communities have access to safe drinking water and sanitation. However, certain communities do not have access to these services, thus increasing the risk of exposure to diseases, especially diarrhoea. Poor hygiene and unhygienic conditions also contribute to diseases such as diarrhoea and worm infestation which commonly affect children. It is important to address issues of water and sanitation in all communities to reduce the incidence of diseases (Mkhize & Sibanda, 2020).

Inadequate care for mothers and children as well as poor childcare practices may adversely affect children's health. Children can be malnourished when feeding and nurturing are inadequate, even when resources are adequate. Caring for children in families is important, and it is not only the responsibility of the mother. Caring translates available food and health resources into good child growth and development. When mothers are cared for, they, in turn, become better carers of their children (Rosen et al., 2020). Mothers must be relieved of strenuous work for them to find time to dedicate themselves to caring for their children. Caring for children includes feeding, protection from diseases including immunization, emotional support, and cognitive stimulation. There is a positive link between cognitive stimulation and growth rate (Rosen et al., 2020)

The basic causes of malnutrition include issues such as political, cultural, and legal factors. These include issues of the protection of the rights of girls and women by law and by custom. It also includes issues of the political and economic system that determine women's rights as well as economic freedom and access to jobs (Angulo-Guerrero et al., 2017). It is therefore important that the political systems, legal systems, and cultural factors are stable and supportive, for children to grow in a conducive environment.

2.5 Global State of under-nutrition in children from 0 – 59 months

The number of children under five years of age that are underweight remains unacceptably high, despite the decline in numbers between 2000 and 2018 (WHO, 2021a; WHO, 2020). As discussed in the introduction, according to (WHO, 2020) the level of malnutrition is declining, however, it remains a problem, especially in developing countries. Globally approximately 149 million children were stunted, 49 million wasted and 17 million severely wasted in the 2018 report. The slow progress is of great concern and shows that we are unlikely to achieve the Sustainable Development Goals set for 2030, as well as the World Health Assembly Targets set for 2025 (Pelton & Madry, 2020; WHO, 2015) Some of the pertinent goals in the SDGs are goals 1, 2 and 3. Other goals are also important as they are integrated, in that action taken in one area affects outcomes in another area, such as reducing inequality, gender equality, quality education, etc. Some of these goals have been mentioned above as indirect

causes of malnutrition. It is hoped that if achieved, they can reduce some factors that contribute to under-nutrition.

Goal one of the SDGs aims at reducing poverty. About 10% of the world population still lives in poverty with most of them living in sub-Saharan Africa. Approximately one in five children live in extreme poverty (WHO, 2015). Poverty can lead to food insecurity and malnutrition. Goal two is linked to goal one and aims to reduce hunger. Approximately 8.9% of the world's population are hungry, and, according to the United Nations (UN), the world is not likely to achieve zero hunger by 2030 (WHO, 2015) Goal three aims to achieve good health. Good nutrition is necessary for good health (WHO, 2015).

The continents with the highest undernutrition burden are Asia and Africa. The highest prevalence of stunting is found in Asia, where approximately half of all stunted children are found (55%). Africa has approximately one-third of the world's stunted children (39%) (WHO, 2020) It is a great concern that Africa has seen an increase in the number of stunted children, an increase from 50.3 million in 2000 to 58.8 million in 2018 (WHO, 2020) Severe wasting is also found to be more prevalent in Asia where approximately two-thirds (68%) of the world's wasted and severely wasted children live, followed by Africa where one-third (28%) of wasted and severely wasted children live (Prost et al., 2019)

Another important factor is that children from low to middle-income countries fare worse than middle and upper-middle-income countries, which have lower rates of undernutrition and have made significant improvements since the year 2000. Poorer populations are twice as likely to be stunted as those from the richest quintile (Chao et al., 2018; UNICEF & Bank, 2014). One would assume that children from poorer communities are most likely to be malnourished (Prost et al., 2019). This is an important factor in South Africa as this information will assist in focussing interventions on areas of greatest need.

2.6 The malnutrition scenario in South Africa

The District Health Barometer for the financial year (FY) 2017/18, reported that mortality audits indicate that malnutrition contributes indirectly to child mortality, as it was found to be an underlying cause of death in 30.6% of child deaths. The report

further indicates that 27% (almost one-third) of deaths of children under-five, were found to be underweight for age (Hall et al., 2012). In SA, the severe acute malnutrition (SAM) case fatality rate (CFR) was 7.4% in the 2017/18 FY, the target being 8.6%. It is noted that some Provinces' CFR rate is above the national target, the highest being the Eastern Cape with a CFR of 11.8% (Hall et al., 2012).

SA consists of nine Provinces (Self-governed geographic areas). Each is administered separately and has a different demographic and economic standing etc. All provinces are bound by national legislation and policies in the different portfolios that they are responsible for. Provinces also have their budgets allocated to them from the national treasury (Choonara *et al.*, 2017).

KZN, as a Province, achieved a CFR of 7.7% which is slightly above the target set of 7.4% for the province in the 2017/18 FY. KZN, at 7.7% has the sixth-highest level, the lowest being Western Cape at 2.2% and the highest being the Eastern Cape with the CFR of 11.8%. eThekweni, which is the subject of this research, has the 6th highest CFR amongst all the KZN health Districts, the lowest being 3.2% iLembe District, and the highest being 12.2%, Amajuba District (Hall *et al.*, 2012). eThekweni is the biggest, and unfortunately, the CFR is higher than one would expect in a health district that is better resourced, as it is a metropolitan municipality and as such, it is the economic hub in the Province of KZN. Nationally, in absolute numbers, eThekweni has the second-highest number of deaths from SAM, with 70 child deaths. The other districts in the top three are OR Tambo with 81 deaths and Ruth Mompati with 48 deaths. The report further offers recommendations as quoted "Severe acute malnutrition is an underlying factor in almost a third of childhood deaths in the SA public sector. A reduction in the rate of malnutrition requires improved breastfeeding rates, greater household food security, effective growth monitoring and appropriate early intervention at the PHC level as well as improved in-patient management of those children who are admitted with SAM" (Hall et al., 2012).

It is noted that the correct identification of children with SAM remains a challenge, as children with SAM are usually identified when they present at health facilities with other conditions. If weighing and plotting of weight are not done correctly, these children will continue to be missed out. It is, therefore, important to assess the effectiveness of PHC nurses in the identification and management of under-nutrition.

The COVID-19 pandemic has been seen to impact negatively on child nutrition (Pérez-Escamilla et al., 2020). Food and nutrition security and a poster whose caption is “Stop the violence of malnutrition” suggests ways of protecting children from malnutrition, one being, targeting the environment. Most children live in households and families where food is no longer available, and, additionally, big companies selling cheap and refined foods with little nutritional value flood local markets. It further suggests tackling poverty and inequality. According to the 2020 South Africa Child Gauge (SACG), approximately 30% of families live below the poverty line and have little money to afford children’s nutritional needs, further, frequent infections are caused by crowded living environments, poor access to water and sanitation, and health care services contribute to increased risk of malnutrition. SACG further proposes the protection of children from disasters and shocks. COVID -19 is seen to have intensified existing challenges and has the potential of increasing moderate and acute malnutrition by 14%. It has also been found that hunger increased by 50% by December 2020, with 1 in 6 families reporting that children went hungry in the last seven days of the month due to a shortage of food in the household (Prioreshi, 2020).

This publication goes on to report on the double burden of malnutrition, both undernutrition, and overnutrition. The publication reports that 1 in 4 (27%) children are stunted in SA due to insufficient healthy food that promotes growth, on the other hand, 1 in 8 children (13%) are obese due to eating foods that are low in nutrients but high in energy, sugar, and fats (Dukhi et al., 2017; Prioreshi, 2020).

The SACG does not only point out the challenges, but it also goes on to suggest ways of addressing the problem of malnutrition. These include job creation and social justice, by assisting pregnant women with grants to improve their nutritional state; the role of the health system through improving child growth monitoring and promotion of nutrition in the first 1000 days extending to school and the adolescent age, promotion of breastfeeding, as well as improving health workers’ nutrition knowledge and counselling skills. It further considers the agri-food industry’s role, Early Childhood Development centres, Schools, and the role of teachers and ECD practitioners in these settings and other areas.

It must be noted that most of the suggestions to address the malnutrition challenges match existing policies as well as the contributory causes of malnutrition or the indirect causes.

In remembrance of World Food Day, 16 October 2022, mention was made about the dire situation of child hunger. According to the article, it is estimated that approximately 30% of South African children live in households where adults have jobs and as such, they have no access to a daily healthy diet and that statistics indicate an increase in child hunger even though SA is net exporter of food (Moleketi, 2022). Ms Moleketi proposes collective intervention to address the matter through a collaboration made up of government, industry, and civil society. An example of such collaboration is the large food company, Tiger Brands with their newly launched programme, Isondlo working with The Nelson Mandela Children's Fund (a civil society organisation), has made strides in reaching out to vulnerable children and their families are supported in starting food gardens (Moleketi, 2022).

2.7 Consequences of undernutrition

Child undernutrition has been found to contribute to increased mortality and overall disease burden due to stunting, severe wasting, intrauterine growth restriction, and deficiencies in minerals (Bhutta et al., 2008). Undernutrition is also responsible for deaths in the neonatal period. It contributes to at least 800 000 neonatal deaths annually in the first month of life. Restricted intrauterine growth is said to lead to increased risk of stunting by the age of 24 months (Black et al., 2013a) Undernutrition is also associated with a reduction in economic growth by approximately 8% due to lower productivity, poor cognitive and behavioural development, leading to reduced schooling (Black et al., 2013a). Additionally, undernutrition survivors have a lower possibility of achieving a high level of education (Mwene-Batu et al., 2020). This has the potential of affecting economic growth in a country. It, therefore, makes sense for governments to invest in processes to prevent psychological and medico-social disorders. Adequate investment in child health, to prevent SAM and MAM is therefore necessary (Mwene-Batu et al., 2020).

According to a study conducted in the middle and low income countries of Asia and Africa, undernutrition, (including stunting, severe wasting, deficiencies of vit A and zinc, and sub-optimum breastfeeding), was found to be the underlying cause of death

approximately 45 million of the mortality among children under five years of age (Hoseini et al., 2015).

Child undernutrition may have long-term effects such as the development of obesity, diabetes, hypertension, and cardiopathies in adult life (Martins et al., 2011).

Malnutrition has been found to increase the frequency and severity of illnesses. It also delays the child's recovery from an illness (UNICEF, 2014; UNICEF & Bank, 2014). Previous studies show that when children with malnutrition get common diseases like diarrhoea and respiratory infections, the condition can be fatal (UNICEF, 2014; UNICEF & Bank, 2014). It is for this reason that malnutrition is found to be an underlying cause in most infant deaths.

Diarrhoea in young children remains one of the leading causes of morbidity and mortality. Annually, approximately 10 million children under five years die (Kapil, 2007a). It is estimated that at least half of the deaths are associated with undernutrition. Most mortality happens in the developing world, and the highest rate of diarrhoea occurs in malnourished children (Kapil, 2007b). Diarrhoea has been found to account for 10-80% of growth retardation, especially in the first few years of life (Schoeman et al., 2006).

SAM is associated with increased severity of common infectious diseases, and death amongst children with SAM is usually because of an infection (Jones & Berkley, 2014).

According to UNICEF, the critical period in the child's life is the first 1000 days where malnutrition can cause irreversible damage. This is the time from when a mother conceives the baby until the child is two years old. Undernutrition during this period can lead to stunted growth, which is associated with impaired cognitive and physical ability and poor school performance (UNICEF & Bank, 2014).

Micronutrients deficiency is another form of malnutrition. Important micronutrients are now added to most staple foods in SA. Deficiency in iron during pregnancy is a risk factor for preterm delivery and subsequent low birth weight. Currently, iron, and folic supplements are given to pregnant women attending public health facilities in SA Africa. Flour fortification with iron and folic acid is part of the government programme to reduce morbidity and mortality caused by iron and folic acid deficiency (Darnton-

Hill & Mkpuru, 2015). Iodine is an important mineral required by the brain for cognitive development. A deficiency can result in mental impairment in infants. The iodization of salt in South Africa is one of the most important interventions and has reduced disorders associated with low iodine such as low IQ, goitre, etc. (Kapil, 2007b).

Vitamin A (vit A) is necessary for children to promote rapid growth and prevent infections. vit A deficiency was found to be a major public health challenge affecting approximately 190 million children under five mainly in the WHO regions of Africa and Asia (WHO, 2011b) The deficiency has been found to cause night blindness and increased susceptibility to infection, especially measles and diarrhoea in children that may contribute to increased mortality (WHO, 2011b).

The benefits of vit A supplementation are confirmed in a Cochrane systematic review made up of 19 studies, which found that vit A supplementation reduces death of children between six months and five years by 12% (Imdad et al., 2017). Vit A deficiency is important in the maintenance of an effective body's immune response, control of pathogens and infections thus preventing death (Surman et al., 2020).

Zinc promotes immunity and resistance to infection, and promotes the development of the central nervous system, increases growth and weight gain. Deficiency increases the risk of diarrhoea and respiratory infections (Shankar & Prasad, 1998). A balanced diet is necessary to ensure adequate levels of zinc in children.

2.8 Interventions, Policies, and Guidelines to address malnutrition in Children.

There are various international and national policies and guidelines aimed at improving the nutritional status of children, to which SA subscribes. One of the important strategies is the food fortification programme that was implemented in 2003 as a result of studies conducted by the South African National Food Consumption Survey (NFCS) and the South African Vitamin A Consultative Group (SAVACG) (Iversen et al., 2011). The decision to fortify food was based on a 1995 study SAVACG conducted, which found that one in three children between the ages of 6 – 71 months had vit A deficiency. Following these findings, the Govt of SA promulgated regulations, R504, that made it compulsory for food manufacturers to fortify certain staple foods such as maize meal, flour, wheat, etc. with vit A and minerals such as iron, zinc, folic acid, and others as recommended by WHO and Food and Agricultural Organization (FAO) (Ohanenye et

al., 2021). Salt supplementation with iodine was introduced in SA in 1995, to address iodine deficiency (Businge et al., 2022). Currently, vit A supplementation as recommended by the WHO to improve the health of children between 6 -59 months is one of the important public health policies in many countries including South Africa (WHO, 2011a).

Exclusive Breastfeeding is one of the important policy positions aimed at reducing malnutrition in children. The policy has evolved over the years to cater to HIV exposed or HIV positive mothers. It covers the importance of initiation of breastfeeding within the first-hour post-delivery, exclusive breastfeeding for at least the first six months of life, and continued breastfeeding until the child is two years and beyond (Du Plessis, 2013). Govt policies promote exclusive breastfeeding mostly because it has been found to contribute to the reduction in infant mortality. The Innocenti Declaration on young child feeding recognises that “inappropriate infant and young child feeding practices; sub-optimal or no breastfeeding and inadequate complementary feeding are significant threats to child health.”(Cattaneo et al., 2005). The exclusive breastfeeding rate for SA was found to be at 47.8% whilst the national target was set at 52% and above. EThekweni health district achieved 56% breastfeeding coverage (Massyn et al., 2019). This coverage needs to increase to promote good nutrition for infants below the age of six months.

Infant and Young Child Feeding Guidelines (IYCF) are important in that they assist clinicians with the nutritional advice to be given to the mother/caregiver to prevent malnutrition. Guidelines on the introduction of solids and complementary feeding are included. Extracts from guidelines are used as a guide to nutritional advice, and appear in the RTHB, and are age appropriate (RTHB).

One of the good strategies that were developed by WHO/UNICEF (WHO, 2001) is the IMCI. Children presenting at health facilities should be managed using this strategy IMCI to ensure holistic care, which includes screening for malnutrition. Fortunately, clinicians tasked and trained for IMCI are professional nurses, who are well equipped to identify problems and treat them appropriately. Some studies have shown that the implementation of the IMCI strategy improves child survival and reduces mortality. One such study was conducted in Egypt, which showed reductions in mortality and

improved quality in child health services following the implementation of IMCI (Rakha *et al.*, 2013).

One of the strategies advocated by UNICEF is to improve integrated community-based nutrition programmes linked with health, water and sanitation, and other relevant interventions. This is seen as a key strategy that can result in improvements in children's nutritional status and child survival. Other countries have started implementing the programme. The advantages are that undernutrition will be identified early, and interventions can be started and can reach most of the children in the community (Ruel *et al.*, 2013)

The community-based approach, according to UNICEF, includes nutrition counselling and support, screening for acute malnutrition, follow-up of malnourished children, deworming, and provision of vit A and other micronutrient supplements. This UNICEF recommended strategy is contained in the KZN IMAM guidelines.

The policy on the Integrated Food Security Strategy which involves departments within the SA Govt's Social Cluster is one such policy. Some of the programmes contained in this strategy include the Special Programme for Food Security, which is the responsibility of the Department of Agriculture; Integrated Nutrition and Food Safety Programme, which is the responsibility of the Department of Health; and Comprehensive Social Security Programme, which is the responsibility of Social Development, amongst others (Agriculture, 2002).

Nutrition-sensitive approaches are another way of ensuring access to food, especially for vulnerable populations. This strategy requires a multi-sectoral approach involving various stakeholders. Departments that are involved include the Department of Agriculture that can assist with community gardens, clinics, and home gardens (Agriculture, 2002). The Department of Social Development also provides child support grants to families who qualify, and this money can assist with food security (Agriculture, 2002). Food security programmes are in place at a policy level; however, they are not successfully implemented at an operational level (Drimie & Ruysenaar, 2010).

Community-based treatment of severe acute malnutrition (CMAM) was officially endorsed by the United Nations in 2007. It advocates for decentralised management of

SAM in the community, making it easier to reach and identify malnourished children and allowing for referral for those who require inpatient care. “Early detection and decentralised treatment make it possible to start management of severe malnutrition before the onset of life-threatening complications” (WHO, 2007b).

KZN IMAM guidelines (DoH, 2015), look at the management of SAM as well as moderate acute malnutrition (MAM). These guidelines are to be implemented at various levels of health care, depending on the severity of malnutrition in the child. Contrary to other policies, requires that all children with SAM to be treated at the hospital, those with MAM are to be treated as outpatients, and this is normally done at PHC clinics and community level. The guidelines emphasize the importance of community outreach and participation which are essential for the success of the programme, with the focus being early identification of undernutrition. The KZN IMAM guidelines are based on the 2012 Community Based Management of Malnutrition (CMAM) national Guidelines, which are aimed at the management of acute malnutrition at the community level. The approach is envisaged to result in early detection of cases, extended access to treatment in decentralized community sites as well greater community involvement and support (Howlader et al., 2012). Ward based outreach teams (WBOTs) as recommended by Food and Nutrition Technical Assistance project (FANTA), are supposed to include CHWs and clinic based staff (Khuzwayo and Moshabela, 2017). The guidelines require specific training to be done at the introduction of this programme, it further requires that and set out supervision rates for the site be set out. Budgeting and resourcing of this service is essential for successful implementation. The FANTA and IMAM guidelines advocate for the use of Ready-to-use-therapeutic foods (RUTF) in cases of SAM and MAM. FANTA guidelines differ from the KZN IMAM guidelines in that according to KZN guidelines, all children with SAM are to be treated as inpatients while according to FANTA, children with SAM can be treated as outpatients provided, they do not have medical complications.

The KZN IMAM guidelines on the community outreach aspect, require that PMCs be established in communities in keeping with CMAM. All clinics are expected to have functional PMCs within their catchment area to bring growth monitoring and screening for malnutrition as well as provide limited preventive and promotive services closer to communities. The centres are expected to operate at least once a month. A nurse is

required to be present at PMCs in the clinic catchment area. The services offered at these centres should include nutrition education, vit A supplementation, MUAC screening, and referral to health facilities in cases of deviation in growth or any other health concerns (DoH, 2015). CHWs have been trained and are permitted to administer vit A. They are also trained to perform MUAC. According to KZN guidelines on IMAM, reports from PMCs must be tabled at Operation Sukuma Sakhe (OSS) meetings. Studies have confirmed the effectiveness of having CHW to assist with reaching out to households and communities and addressing health priorities, such as in reducing child undernutrition and child health as a whole, amongst the health priorities (Perry et al., 2014).

The KZN IMAM guidelines go further to recommend/suggest community outreach as one of the ways of managing SAM and MAM. The referral pathway is recommended not only for preventive programmes, but for follow-up of children with SAM when discharged from the hospital. Guidelines require a functional referral system between the local clinic, community care through local CHWs, and the district hospital and local clinic and community. A functional referral system is essential for the successful implementation of CMAM. This assists with continuity of care for IMAM cases who are treated at the outpatient level as well as SAM patients who are discharged from the hospital to the local clinic and community for follow-up by clinic staff, nutrition advisors (NAs), and CHWs.

The KZN originated programme, OSS is a programme which originated in KZN. It is seen as one of the vehicles to reach out to the community especially for poverty alleviation and to improve food security, focusing on the individual, household, and community needs. OSS is based in every municipal ward to attend to community needs at a level closest to the community and is chaired by the ward councillor. Many other departments besides health are represented in these meetings to attend to the community's specific needs, e.g., Home Affairs, Social Development, and municipal services such as electricity, water, housing, poverty/food insecurity, etc. The beneficiaries of OSS are women, food-insecure households, lasting women, adults, and the elderly (DoH, 2015)

The KZN IMAM guidelines go on to strengthen nutrition services at the PHC level by recognizing the importance of the IMCI. The IMCI approach aims at improving the

classification and treatment of malnutrition as well as growth failure. It is envisaged that this will improve with the early detection of malnutrition and management. It is understood that a child can present with signs and symptoms that relate to more than one condition meaning that there may be one condition. The literature goes on to say that children at facilities are not assessed properly, thus missing important signs that need attention. Diagnosis at the first level of care is complicated due to resource constraints, therefore it is important to take proper history and examination. In response to this challenge, the IMCI approach was introduced. Initially, this approach arose out of a need for curative care, it combines this with nutrition, immunization, and other disease prevention and health promotion elements. It is also strong on assessment, classification, identification of danger signs, treatment, counselling of caregivers to improve the care of the child at home, and follow-up care (Pandya et al., 2018). This indicates the importance of nurses trained in IMCI to be the ones who are deployed at the child health section. The SA PHC Norms and Standards (PHC NS) document requires that every clinic has at least two IMCI trained nurses to work in the child health section (Pandya et al., 2018). The ICMV 19 recommends that at least 80% of nurses in the clinic should be trained in IMCI.

The IMAM guidelines went on to identify the role of NA at the PHC level. Almost all PHC facilities had a NA deployed. NAs are trained on basic nutrition and assessment of nutritional status, classification, and treatment of malnutrition. It is envisaged that the placement of NAs will improve case detection of malnutrition at the community level and improve follow-up of malnutrition cases at the community level. NAs also have the responsibility of ensuring the availability and issuing of RUTF according to protocols, nutritional management of outpatient food supplementary programs and growth monitoring, as well as follow-up of discharged patients with SAM (DoH, 2015).

The IMAM guidelines recommend a multi-disciplinary team to tackle the issue of malnutrition. Role players at the PHC level are the District Specialist Clinical Team who are responsible for ensuring that guidelines and protocols are adhered to; the Nutritionist whose primary function is to ensure that assessments and classification of malnutrition are correctly done; PHC operational managers are responsible for the collation and submission of facility statistics and statistics from CHWs and NAs on child health and nutrition, to the District Office. The CMAM guidelines also

recommend the importance of a multidisciplinary team within health facilities. All staff has a responsibility for growth monitoring and promotion which includes nutrition screening.

The KZN IMAM guidelines recommend a multidisciplinary team approach. The team at the PHC level is made up of the facility Operational Manager (OM) who is responsible for collating statistics of severe malnutrition as well as ensuring functional referral pathways between clinic, hospital, and community. IMCI trained nurses are responsible for identification and assessment of all children attending the clinic and educating mothers on the danger signs of SAM and MAM, as well as monitoring outpatient nutrition supplementation programmes in the absence of an NA; CHWs are responsible for conducting home visits and reporting on the absent and defaulting children, children losing or not gaining weight, as well as report on activities on Phila Mntwana centres weekly and monthly. During home visits, CHWs are expected to assess the nutritional state of the child's compliance with home feeding practices and RUTF use, provide counselling as required, and report back to the health facility.

The District Clinical Specialist Team (DCST) is expected to conduct facility support visits to ensure adherence to protocols, conduct audits, and support NAs and OMs to improve the quality of nutrition services. Each DCST team is made up of a gynaecologist, anaesthetist, paediatrician, family physician, advanced midwife, a paediatric nurse and primary health care nurse. PHC WBOTs are expected to assist and support the CHWs' activities whilst community health facilitators (CHF) and CHWs supervisors assist with the running of PMCs (DoH, 2015). The function of the ward-based outreach team which has a vehicle and is mobile is, in a nutshell, focused on promoting good health using a multitude of interventions to achieve healthy communities. WBOTs comprise a professional nurse, environmental health practitioner, health promotion practitioners, and CHWs and are linked to the PHC clinics in the catchment area (Subedar, 2011).

As mentioned above, KZN IMAM guidelines suggest that children with MAM can be treated at outpatient level with referrals being made to PMCs in the catchment area, the NAs at the PHC clinics, and CHWs for home visits, with the child being given RUTF according to age and weight and daily portions to be given to the child, with food supplies being issued at least once a month.

2.9 Malnutrition detection at the primary health care level

Many studies have revealed that screening for malnutrition is not done well at PHC level. A few are discussed here in the next paragraphs.

A systematic review was conducted and published in 2013 on whether “Nutrition training improves health workers’ nutrition knowledge and competence to manage child under-nutrition.” A total of 18 studies that evaluated HCWs’ knowledge showed improvement after training, and 16 studies evaluated HCWs’ child under-nutrition management practices. In all these studies, child under-nutrition management practices and the competence of HCWs improved after nutrition training. The review concluded that in-service training could help to close the gap created by a lack of nutrition during the training of various categories of HCWs (Sunguya et al., 2013).

Another study was conducted to determine the practices of PHC nurses, to assess if PHC nurses were able to identify infants and children for nutrition interventions. The results of the study were that nurses recorded poor detection and targeting of nutritionally at-risk children due to failure to plot the weight on the chart of the road to health card (Schoeman et al., 2006)

2.10 Health System Issues

At PHC facilities, there are mainly four main categories of staff. The leader of the facility is the operations Manager, whose basic training is a professional nurse, who has other post-graduate qualifications such as Diploma in Nursing Administration, Diploma Clinical Assessment, diagnosis, and treatment etc. and has more than three years’ experience in a PHC setting. Some professional nurses may have or may not have a Diploma in (DCADT). This training allows nurses to diagnose, treat a patient within a specified scope of practice. These nurses are sometimes called CNPs. They have a higher responsibility and usually head/lead different sections of the clinic. Their remuneration is higher than the professional nurses without this qualification. PNs require other qualifications in the PHC, these include Basic Ante Natal Care, (BANC); IMCI etc. Nurses with BANC and IMCI are ideally deployed at the Maternal Child and Women's Health (MCWH) section. It is a known fact that there is a high turnover of nursing staff at public institutions. Other nursing categories are Enrolled Nurses (ENs) who have a two-year training and have a limited scope of work and must always work

under the supervision of a professional nurse. The lowest category is an Enrolled Nursing Assistant (ENA) who has undergone one-year training and has a limited scope of work and works under the supervision of a professional nurse (Health, 2013).

Nutrition advisors were introduced in 2013 in eThekweni district and are deployed in most clinics and their scope has been discussed in previous paragraphs. CHWs are based in the community but have a link with the clinic to link the clinic with the catchment population and implement health programmes as directed by the clinic manager. It is the function of the OMs to make use of all CHWs deployed in the clinic catchment area to enrich and support child malnutrition programmes in the community.

Staffing at PHC health facilities is guided by the Implementation Guideline of Health Workforce Normative Guide and Standards for Fixed PHC facilities document. This document sets standards of several staff per health facility based on the number of hours the health facility operates; this is further guided by the patient headcount meaning that numbers can be adjusted accordingly upwards to ensure adequate staffing to ensure effective delivery of PHC services (Mabunda et al., 2021). The staff of the clinic should be adequate, determined by workload analysis. Staff should also be appointed in line with requirements/need. Further to this, clinic staff is supposed to receive induction within three months of employment. Further to this, each facility should have a staff development and training plan based on the facility's training needs. This is done to provide professional development for staff as well as to ensure the provision of quality health services (Mabunda et al., 2021).

The clinic is supposed to be organized distinctly, with three main streams namely, Curative section/minor ailments (Orange colour); Chronic Services (Wagner et al., 2017), and maternal child and women's health (Deep Blue) distinct and colour coded accordingly. All sections of the clinic should have adequately trained staff to deliver quality health care services as recommended in the ICMV 19.

The resources and equipment for each section of the clinic are listed in the PHC NS document (Rajcoomar, 2016) (NDoH, 2003). Essential equipment is further listed in the ICMV 19. The manual further recommends that all equipment should be in good working condition; staff are trained in the use of equipment, Standard Operating Procedure must be available for reactive maintenance, and that certain equipment

including weighing scales are recalibrated at regular intervals according to the manufacturer's guide. The OM has a responsibility to ensure that this is achieved.

The equipment listed in the PHC NS document includes RTHB, weighing scales, tape measures, RUTF among other things. The PHC NS document goes on to list competencies of staff who are deployed to this section of the clinic such as understanding principles of nutrition, the ability to recognize undernutrition, micronutrients deficiency, Overnutrition, and appropriate counsel and advice clients in this case caregivers. Staff should be able to give basic nutrition counselling which includes breastfeeding, complementary feeding, and young children feeding practices, micronutrients, and food rich in such, and the ability to identify signs of severe malnutrition and take appropriate action. The document further suggests the list of Policies and Guidelines that should be available in the child health section (Health, 2000). ICMV 19 requires that all staff should read new policies and guidelines and append their signatures to indicate that they have read and understood new policies. The documents are necessary to guide the health workers in implementing the programmes in the section of the clinic, in this case, child health. The NS document also stresses the importance of collaboration with other departments and sectors to address issues of malnutrition as well as community-based programmes as suggested in CMAM and IMAM.

2.11 Chapter summary

Despite all the policies and guidelines, malnutrition though decreasing, is still a problem globally, including South Africa as a country, with some provinces worse off than others. Causes of poverty are noted and require our attention. It requires us to focus on both direct and indirect causes. It is a multi-disciplinary approach; it is not merely a health issue. Issues of poverty in communities, political and cultural factors that contribute directly or indirectly to malnutrition need to be addressed. Health system strengthening is also necessary for policies and guidelines to be implemented as required. Some of the studies conducted indicate poor implementation of growth monitoring guidelines by nurses at the primary health care level. On the other hand, some studies show that if interventions are implemented properly, improvements can be seen, such as in the case of the use of micronutrients resulting in the reduction in infant

mortality, the use of the IMCI approach, and the reduction of child mortality. IMCI assists with the holistic assessment of children and management.

Globally and in South Africa, several policies and guidelines aimed at improving the nutrition of children have been developed. It is important to acknowledge the RTHB which is the starting point in the identification of undernutrition. One cannot overemphasize the importance of using graphs to determine the nutritional status of children. Some guidelines such as IYCF assist with the prevention of undernutrition, some prevent micronutrient deficiency e.g., food fortification and specifically vit A supplementation.

As discussed above, these address food security at the community level and the nutrition of mothers and children at the facility level. The KZN IMAM guideline is an important one to guide the management of SAM and MAM patients. The strategies in the facility and the community are explained above in the above paragraphs. The important aspect of the KZN IMAM guidelines also stresses the importance of the community aspect of undernutrition management. The PHC level is closest to the community. It is where proper screening should take place for early identification and treatment of growth faltering/ undernutrition. The community-based growth monitoring will also enable health care workers to identify growth faltering early, assisted by community health workers and nutrition advisors. Unfortunately, in most cases, this does not happen as it should. Anecdotally, district hospitals have reported that some children are admitted to hospitals with SAM, even though they attend the PHC clinic regularly as seen from an RTHC that shows full immunization.

Implementation of various guidelines such as growth monitoring guidelines, full use, and recording on the RTHC, to detect and address undernutrition at an early stage; micronutrient supplementation, nutrition counselling, and addressing malnutrition with the use of RUTF supplements, these activities are outlined in the IMAM guidelines and IMCI. The use of available community structures such as “PMCs, community food gardens, OSS initiatives for poverty alleviation, etc. are critical in addressing preventing malnutrition as envisaged in the KZN IMAM guidelines.

Health system factors are important to note. Adherence to available policies and guidelines is important to achieve the desired outcomes. Further to this, the governance

and administration, and resourcing of health facilities are critical to attaining the required standards such as staffing norms, acquisition, and maintenance of essential equipment for facilities, ongoing training of staff, service supervision, auditing of performance, and more. Health service standards as recommended in the ICMV 19 as well as the PHC NS documents need to be attained to get closer to the provision of quality health services.

The consequences of undernutrition, especially stunting and SAM are very serious. Some cause permanent damage to the cognitive development of children and death in some children diagnosed with SAM. We note that undernutrition contributes to child mortality. And that undernutrition is an underlying factor in many child deaths.

3 RESEARCH METHODS

This chapter outlines the research methodology that has been employed to achieve the study objectives and to answer the study questions. In the previous chapter various studies were reviewed that deal with malnutrition in various regions of the world. Information from that literature also informed the choosing the suitable methodology which is outlined in detail in this chapter, specifically focusing on the mixed method research approach.

3.1 Introduction

This chapter presents the research methodology for the study. It covers the study design, study setting, study population and sampling method, data collection, management and analysis, and ethical issues.

3.2 Study design

Both quantitative and qualitative methods were used. A cross-sectional study design, using descriptive and analytical methods as well as the use of a qualitative method (focus group discussion), was conducted at Primary Health Clinics within the eThekweni district. The mixed methods were used to answer different study objectives. Mixed methods are a good research design as this can assist in confirming the interpretation of findings within a single study (Creswell & Hirose, 2019; Creswell et al., 2011; Johnson et al., 2007).

3.3 Study setting

The study was undertaken in the eThekweni health district. The district has a number of clinics which are attended by various population groups, depending on where they are situated. There are clinics situated in rural, urban, and peri-urban clinics areas of eThekweni. eThekweni district has a total of 105 primary health clinics and various mobile and satellite clinics. According to the latest population figures, eThekweni has a population of approximately 3.6 million people (Okem & Bracking, 2019)

3.4 Study population

The study population was made up of caregivers of infants between 6-59 months, nutrition advisors and clinic managers.

Study sample

Caregivers of infants/children between the ages of 6 to 59 months attending PHC services within the eThekweni Health District at one of the 30 randomly selected clinics. Written consent was requested from caregivers prior to the exit interviews (for those with children within 6 to 59 months), on the day/s the research assistants were in the facility. Children were selected randomly if they were in the correct age group.

The Operational Managers (OMs) were selected based on their clinics being part of the sample. All operational managers were working at primary health care facilities within eThekweni Health District. Nutrition advisors at PHC facilities within eThekweni were selected based on a purposeful sample from clinics of different sizes in different geographical areas.

Inclusion criteria

- All children between 6 to 59 months and caregivers/parents attending eThekweni PHC facilities.
- Operational managers of clinics in the sample (Each clinic has one OM.)
- 10 Nutrition advisors from clinics in the sample (Each clinic has one nutrition advisor)

Exclusion criteria

- Children below six months and above 59 months
- Operational managers and nutrition advisors of clinics not in the sample

3.5 Sampling methods

There is a total of 105 PHC clinics in the eThekweni district. A representative sample, including all sizes of clinics, mobile clinics, small clinics, and Community Health Centres (CHCs), was selected using a probability sampling method. A 30X30 cluster survey design was used, as proposed by WHO when doing malnutrition surveys, using

30 clinics, and 30 children per clinic, which were selected using stratified random sampling (as provided and explained by the statistician who provided the sample). It assumes a design effect of two and can estimate prevalence with $\pm 5\%$ precision i.e., a total 95% confidence interval width of 10%.

The third dose of Hepatitis B immunization at one year was used as a proxy to determine the number of children attending the clinic, and the sample was stratified, thus getting different sizes of facilities. Each cluster/sampling frame had 30 children from the 30 facilities. Thirty children in total from age 6 to 59 months were included in the sample per clinic and were selected using systematic random sampling, by taking every second child and caregiver for the exit interview. (A total of 900 children were to be included in the sample, only 844 were reached).

The interviews of caregivers and extracting information from the RTHB enabled the researcher to review growth monitoring practices and malnutrition detection and prevention using the RTHB recordings, plotting of weight, and documentation of the nutrition advice given to caregivers, etc. The RTHB and Growth Monitoring and Promotion (GMP) is one of the policy interventions to detect and prevent malnutrition (UNICEF, 2007b)

All thirty Operational Managers (OMs) responsible for the clinics in the sample were given a self-administered questionnaire to complete to collect information on administrative processes for their clinics, however, only 22 responded.

The OM questionnaire intended to evaluate administrative factors that influence the proper implementation of IMAM guidelines. The questionnaire was based on the PHC NS document, ICMV 19 (NDoH, 2019). The document covers the terms of clinic quality standards, which include staffing as well as equipment provision and maintenance, training provided to staff (such as IMCI and ongoing training and in-service training), the importance of the availability of guidelines, as well as KZN IMAM guidelines in terms of functional community structures such as PMCs. The questions covered ward based outreach teams (WBOTs), and presence of community structures that can assist with food insecure families and referral systems, (especially community based) that enhance effective management of malnutrition, etc.

Purposeful sampling was used for the focus group discussion (FGD) with the ten nutrition advisors. This was done to assess the value being added by nutrition advisors at PHC clinics. Purposeful sampling was done to ensure that Nutrition advisors come from different clinics of all sizes and from different areas. The interview explored the nutrition advisors' level of nutrition knowledge, their observations at the clinic level, and how the system works with their addition to the PHC service. The questions asked were extracted from the RTHB and KZN IMAM and from prescribed policies and guidelines.

3.6 Data sources

Three data collection tools were used. One was for exit interviews for caregivers; another was used for clinic managers looking at administrative practices; and the third was used to guide the focus group discussion for nutrition advisors which was held assessing their knowledge on malnutrition. These are detailed below, and copies are in the Appendix.

3.7 Caregiver's data collection tools

For the exit interviews, a checklist/questionnaire was used to collect information from the RTHB and verbal reports from caregivers. These questionnaires collected the following information:

Section 1

This section covered mostly demographics, which included the child's age, gender, the purpose of the visit, the relationship of the caregiver to the child, etc.

Section 2

This collected information about the clinic visit and included the child's weight, plotting, and other measurements that should be carried out at every clinic visit. This also included advice on child feeding as given by the nurse to the caregiver.

In this section, the child's weight taken by the clinic was compared with the child's weight taken by the research assistants. The aim was to check the extent of the accuracy of the clinic taken weight, versus weight taken by the assessors (research assistants). The assessors used new scales, while clinics used their older scales, the calibration of

which was not always done as per the manufacturers' recommendations. The two weights were then compared for similarity.

Section 3

This section looked at caregivers' attitudes toward nutrition supplements.

3.8 Clinic managers' data collection tool

Self-administered questionnaires were used by OMs who signed/gave consent to collect information on the administrative processes in the clinic.

Section 1

This section covered general information about the clinic and included the following information: Manager's details; duration of service in the clinic; Staffing and headcount of the clinic (to determine if the clinic is busy).

Section 2

This section covered mainly administration-related questions and included issues such as the availability of equipment for growth monitoring and food supplements; training and mentoring of staff, availability of guidelines for prevention and management of malnutrition, etc.

Section 3

This section covered the presence of community support structures, including the availability of community resources that contribute to the prevention and management of malnutrition, referral systems for malnutrition, and availability of other support structures, etc.

3.9 Nutrition advisor's data collection tool

A focus group discussion with nutrition advisors was conducted using an interview guide with structured questions. Questions were designed to ascertain their knowledge of malnutrition and its prevention. A total of 15 questions were asked. The focus group discussion (FGD) was made up of 10 nutrition advisors who were purposefully selected from different PHC clinics around the eThekweni District. The (FGD) was held in the boardroom of one of the clinics which provided a confidential setting. The FGD was facilitated by the principal investigator. The principal investigator explained to the NAs

that she would be conducting a study on nutrition in the under-five children. Their perspective on the study at hand was very important since it was directly investigating nutrition of children under 5 years. Moreover, since they were new cadres of staff whose sole responsibility is promoting nutrition at facilities and in communities. It was explained that their responses would not affect their positions and all the information shared will be treated with full confidentiality and anonymity. The objective of the study is sorely to improve processes pertaining to child nutrition through data collection from the NAs. The investigators' interview was guided by structured questions which were contained in the interview guide. Questions were constructed by the investigator guided by the study objectives and literature on child nutrition. Before recording, permission to record was sought from participants. All the chosen participants accepted and were keen to share their knowledge, as they were passionate about the subject of nutrition. The interview was conducted in isiZulu. The interview lasted approximately 1hour: 30 minutes. Soon after the end of interview, the investigator stated with transcribing the information and was translated into English.

Data analysis was embarked on soon after the transcription was completed, and four main themes emerged from the data analysis.

3.10 Data handling

Data collection tools were coded for ease of identification, and completed questionnaires were captured in EPI data. A system was developed to ensure that all questionnaires and checklists received were kept in a safe and secure place. Quality control of collected data was done weekly before storage, where gaps were identified, these were rectified.

The tape recorder used to record discussions during the focus group was transcribed and the information was stored in a safe place. Before the information was stored, a quality control exercise was done to check if the data were properly recorded, and that the information collected was useful, reliable, and authentic. Hand notes were also taken and stored.

3.11 Data analysis

Before the analysis was done, the data were checked for completeness, for outliers, missing information, etc. Any errors identified were resolved through revisiting the raw

data, or the data were classified as missing data to prevent bias. Data from the questionnaires were captured on the EPI data statistical package. This was further analysed using SPSS 24 statistical package to categorise responses from the questionnaires. Descriptive statistics such as frequencies and percentages were used to summarise and present results. A comparison of the summary of the findings was undertaken to determine the accuracy of measuring weight, using chi-square (presented as bivariate graphs) and correlation analysis (using Pearson's correlation), to ascertain the accuracy of clinic weight measuring as compared to weight measuring done by researchers. The level of statistical significance was $p < 0.05$.

3.12 Pilot Study

A pilot study was conducted by the research assistants who were trained and were part of the study's data collection team, at one clinic, to test all the questionnaires and tools to ensure that they will extract the required information and to ensure the reliability of the tools/instruments. The necessary adjustments were then done based on their feedback to improve the final tools. According to Leedy & Ormrod, (2005) the validity of a measurement instrument is the level with which the instrument assesses what it is expected to measure. This clinic was not included in the final study.

3.13 Ethical considerations

Permission to conduct research was obtained from the UKZN's Bioethics Committee before proceeding with the study: BREC Number BE617/16. Permission was also obtained by the authorities who are responsible for primary health care clinics, the Health Unit of the eThekweni Municipality, and the KZN Provincial Department of Health. Confidentiality was maintained by ensuring that subject and institution names do not appear on the questionnaires and checklists. Written informed consent was obtained from participants before continuing with the study questions/interviews. Respect for human dignity was emphasized by ensuring that participants understood their right to refuse to participate in the study, as well as the right to withdraw at any point during the study (collection of data). To respect the principle of justice, the patients' right to privacy was respected. Participants' cultural beliefs were also respected. Privacy was afforded to the participants during interviews, and the anonymity of respondents was adhered to by not writing participants' details on the questionnaires,

as this would improve the validity as people would be encouraged to give correct answers, as fear of possible victimization was reduced/eliminated.

Information was received and was handled confidentially, and the identity of respondents and facilities has been safeguarded. The study findings are reported fully and honestly.

The ethical guidelines used were informed by the University of KwaZulu Natal Ethics Policy.

3.14 Measures to ensure internal validity.

Questions on the checklist were designed from the RTHB for mothers' exit interviews. Questions for clinic managers and administrative processes were developed using the KZN malnutrition management guidelines. Questions for nutrition advisors were developed using relevant policies, such as RTHB, Infant Feeding Guidelines, and Growth Monitoring Guidelines.

A total of three research assistants were enrolled for data collection. They were selected carefully, based on their prior experience. Training of research assistants was conducted before the study commenced, to ensure a thorough understanding of the various tools to be used, the meaning of the terminology used as well as the layout of the RTHB. Weekly checks of the data received were done and corrections were done immediately where errors were identified.

Research assistants used new scales that only needed calibration after 12 months of use. Scales were also calibrated before each measuring session, mainly because these were transported from site to site. Clinic scales and researcher's scales were adjusted/matched at each site before the start of data collection. The questionnaires and checklists remained the same throughout the study. Low statistical power has been avoided by working with the statistician who assisted with the sample size. The anonymity of respondents contributed to ensuring validity.

The tool used for caregivers' exit interviews was first piloted to ensure that the questions will be understood, and responses received to answer the questions asked. The questions had mostly yes or no responses, and mostly it was recorded information on the RTHC.

3.15 External validity/ Generalisability

External validity or generalisability can be understood as the degree to which the findings can be generalized. The results of this study are generalisable to practices within eThekweni District PHC facilities as the sample was representative and informed by the statistical calculation of the required sample size. The sample also contained many facilities from peri-urban areas, where most of the population of eThekweni lives.

3.16 Measures to reduce bias.

To reduce bias, the same questionnaire was used to collect information at all sites, for both the exit interviews for caregivers as well as the administrative questionnaire for the clinic managers. All participants who met the inclusion criteria were considered for participation.

The tools utilized in the collection of the information were designed by the researcher who is a senior manager responsible for primary health care services in the eThekweni Municipality. The information used to design questionnaires and checklists was derived from the relevant guidelines and policies.

Recall bias would be minimal because the caregivers were asked about the current interaction with the (HCW). Most of the information was deemed correct because it was based on written information recorded on the road to health cards. Children used in the sample were selected using systematic random sampling thus reducing bias. Research assistants were trained before embarking on data collection.

3.17 Summary

This section described the methodology used in this study. This includes the study setting, the study design, the study population, and sampling. It described the data collection procedures and instruments, the measures taken to ensure study validity, data management and storage processes, data analysis, measures to reduce bias, external validity, and the ethical considerations in this study.

The mixed methods that were used for different categories of respondents helped to provide better insight into each specific group of respondents. Different methods were chosen to respond to specific objectives to achieve the study aim.

4 RESULTS

This chapter communicates the study results obtained from the three sets of populations who participated in the study, guided by the framework outlined in the previous chapter containing methodology. Study results are presented in various formats corresponding to the type of study that was done as mixed methods was employed.

4.1 Study demographics

The study participants were recruited from the 30 selected clinics located in urban, township, semi-rural, and peri-urban areas. In addition to the clinic managers and the nutrition advisors, the participants in this study were 844 mothers/caregivers. The table below shows that out of the 844 children in the study, 414 (49.1%) were males, and 430 (50.9%) were females, all aged between 6 to 59 months. Our findings indicate that the highest number of children taken to the clinics were between the ages of 6 - 12 months, comprising 37.7% of the total children of the sample. This is followed by 17.8% of children between 13 – 18 months and 14% of children between 19-24 months, meaning that a total of 69.6% of children attending the clinic were between 6 to 24 months. The older children between 25 to 59 months of children had the lowest clinic attendance rate at 30.4%. It is pleasing that in total, children between 6 to 24 months of age contributed 69.6% of clinic attendees.

When looking at the purpose of the clinic visit, 48.3% were brought in for immunization, followed by 41.8% who were brought in for medical reasons, and a small percentage, 9.7% for growth monitoring.

Table 4-1: Study demographics of the children and caregivers at eThekweni PHC facilities, n=29

VARIABLE	N	%
Gender of children		
Male	414	49.1
Female	430	50.9
Age in months		
6-12	318	37.7
13-18	150	17.8
19-24	119	14.1
25-36	118	14.0
37-48	91	10.8
49-59	47	5.6
N/A	1	0.1
Relationship of caregiver to child		
Mother	695	82.3
Granny	38	4.5
Aunt	55	6.5
Nanny	11	1.3
Brother	3	0.4
Father	27	3.2
Cousin	1	0.1
Uncle	4	0.5
Caregiver	3	0.4
Sister	6	0.7
Purpose of clinic visit		
Immunization	408	48.3
Sick	353	41.8
Growth monitoring	82	9.7
N/A	1	0.1

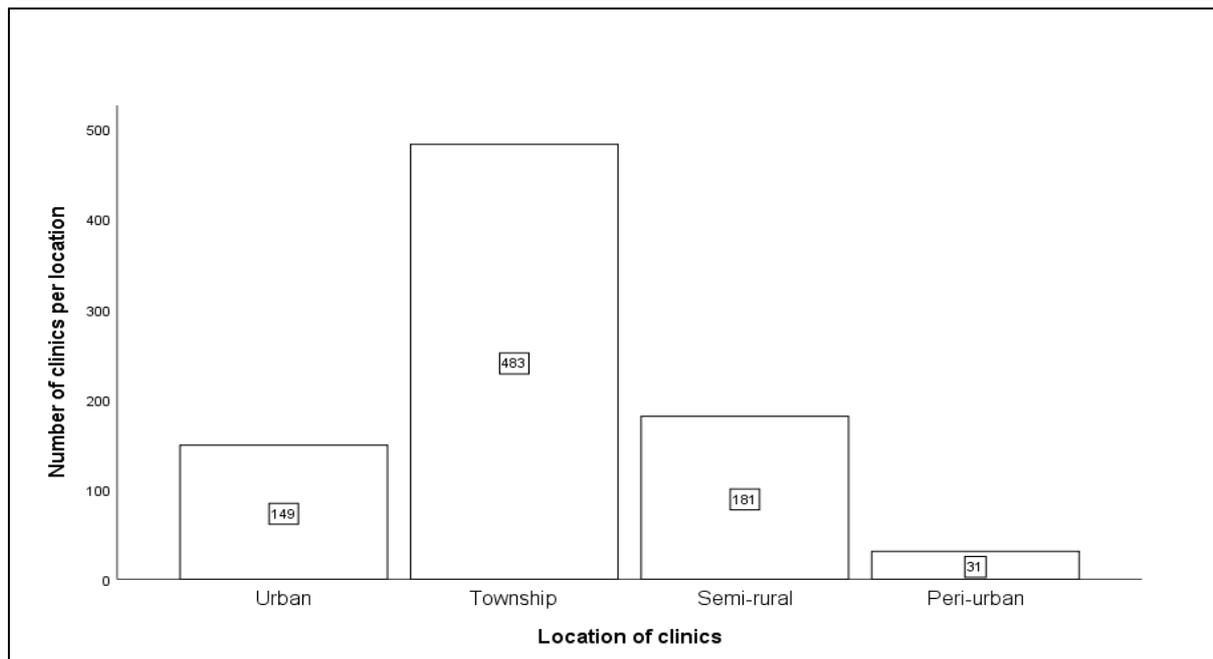


Figure 4-1: *Location of the eThekwini clinics and participants involved in the study, n=29*

4.2 Growth monitoring guidelines in the Road to Health Booklet (RTHB)

OBJECTIVE 1: TO INVESTIGATE IF GROWTH MONITORING GUIDELINES IN THE ROAD TO HEALTH BOOKLET ARE ADHERED TO INCLUDING THE ACCURACY OF WEIGHT MEASUREMENT.

Table 4-2: Implementation of growth monitoring at eThekweni PHC facilities, n=29.

VARIABLE	N	%
Child weighed?		
Yes	776	91.9
No	68	8.1
Weight plotted?		
Yes	539	63.9
No	235	27.8
N/A	70	8.3
Meaning of plot explained to mother/caregiver?		
Yes	280	33.2
No	493	58.4
N/A	71	8.4
Child weight appropriate for age?		
Yes	742	87.9
No	79	9.4
Head circumference measured?		
Yes	7	0.8
No	62	7.3
Not due	775	91.8
MUAC done		
Yes	229	27.1
No	572	67.8
Not due	39	4.6
N/A	4	0.5

Immunization up to date		
Yes	814	96.4
No	25	3.0
N/A	5	0.5
Vitamin A up to date?		
Yes	816	96.7
No	21	2.5
N/A	7	0.8

Table 4-2 above gives descriptive statistics on the monitoring of growth practices as depicted in the RTHB. Our results show that in most of the booklets, most of the children were weighed (91.9%), only a few did not have their weight taken. Notably, the number of RTHBs with plotted weight was low, with a total of 63.9% weights plotted instead of 100% and the weight was not plotted in 27.8% of booklets.

In addition to weight not being plotted, our results revealed that caregivers when asked if the meaning of the plot was explained to them by the healthcare workers, that the meaning of the plot was only explained to a low 33.2% of the caregivers, whilst 58.4% of the caregivers indicated that the meaning of the plot was not explained to them.

When looking at whether the child's weight was appropriate for age, we found that it was appropriate for the age of 87.9% of the children and was not in 9.4%. In the RTHB where the plotting was not done, research assistants plotted the weight to determine weight-for-age analysis. The children whose weight was not appropriate for age were made up of both overweight (42) and underweight (37) children.

When looking at head circumference measurement, only 0.8% of the children had theirs measured, 91.8% were not due, and 7.3% were not measured (Those who were not due would have come to the clinic before or after the age of twelve months). Measuring of the head circumference is done at 14 months and 12 months. (14 weeks old infants were not part of the sample).

When looking at MUAC, we found that it was done in only 27.1% of the children, was not done in 67.8%, and was not due in 4.6%. MUAC should be done every three months.

Moreover, when looking at immunisation and vitamin A uptake, most of the children, 96.4% for immunisation and 96.7% for vitamin A were up to date. Only 3.0% and 2.5% of the children were not up to date for immunisation and vitamin A respectively.

Table 4-3: Malnutrition detection, nutritional advice etc. given to mothers/caregivers from the eThekweni PHC clinics about their children’s growth, n=29.

VARIABLE	N	%
Malnutrition detected under/overweight		
Underweight	37	4.4
Overweight	42	5.0
No malnutrition	764	90.5
Nutritional advice given		
Yes	157	18.6
No	668	81.3
N/A	1	0.1
Have you ever heard of nutritional supplements?		
No	677	80.2
Yes	166	19.7
N/A	1	0.1
Return date given?		
Yes	540	64.0
No	302	35.0
N/A	2	0.2

Table 4.3 above shows that out of the 844 children, malnutrition was detected in 79 children, (9.4%). When looking at whether nutritional advice was given to caregivers or not, we found that only 18.6% of the caregivers stated that they had received nutritional counselling. Most of the caregivers (81.3%) indicated that they did not receive any nutritional counselling.

When asked if they have ever heard of nutritional supplements, only 19.7% indicated that they have heard of nutritional supplements whilst 80.2% reported that they have not heard of nutritional supplements. It is noted that the return date was given to only 64% of children, whilst 35% were not given a return date.

Table 4-4: Analysis of associations between weight plotted and four independent variables.

Weight Plotted				P-value
		Yes	No	
Malnutrition detected	Yes	18	2	0.304
	No	50	19	
Mother Advised	Yes	273	3	<0.001
	No	261	232	
Return date given	Yes	384	123	<0.001
	No	154	111	
Accuracy of measurement	Yes	113	33	0.076
	No	420	196	

Factors associated with weight plotting.

According to table 4.4 above, the data emphasize that it is essential that the nurse plots the weight on the chart. The reason is that there is a statistically significant association between plotting of the weight and the mother being advised about the child’s nutritional status ($p < 0.001$). There is also a statistically significant association between plotting of the weight and the nurse providing the mother with a specific return date ($p < 0.001$), which is required to monitor the child’s nutritional status. There appeared to be a trend that by plotting the weight, the actual weighing tended to be more accurate ($p = 0.076$).

Table 4-5: Analysis of associations between measuring mid upper arm circumference dependent variable and 4 independent variables.

Mid Upper Arm Circumference				P-value
		Yes	No	
Malnutrition detected	Yes	11	0	0.713
	No	54	3	
Mother Advised	Yes	173	12	0.204
	No	336	27	
Return date given	Yes	350	221	0.265
	No	17	22	
Accuracy of measurement	Yes	30	9	0.557
	No	395	104	

Factors associated with measuring of mid upper arm circumference:

According to table 4.5 above, there was no significant association between measuring the MUAC and the four independent variables listed above. All the p-values were found to be much more than 0.05%. As mentioned above, only 27.1% of children had MUAC done.

OBJECTIVE 1(A): ANALYSING THE ACCURACY OF THE MEASUREMENT OF THE CHILD'S WEIGHT

Table 4-6: Results of the correlation analysis between the weight of the child as recorded by the clinic and the study's research assistants.

Correlations or weights measured by PHC clinics and Assessors			
		Clinics	Assessors
Clinics	Pearson Correlation	1	.649**
	Sig. (2-tailed)		.000
	N	843	843
Assessors	Pearson Correlation	.649**	1
	Sig. (2-tailed)	.000	
	N	843	843

** . Correlation is significant at the 0.01 level (2-tailed).

Table 4.6 above indicate that clinic weights and assessors' weights were the same in most cases, (almost two-thirds). There was a positive correlation of 0.649 between weights measured by the clinic and those measured by assessors. The correlation was statistically significant ($p < 0.01$).

OBJECTIVE 2: TO INVESTIGATE IF ADMINISTRATIVE FACTORS SUPPORT/INFLUENCE THE IMPLEMENTATION OF THE INTEGRATED MANAGEMENT OF ACUTE MALNUTRITION

4.3 Staffing and working arrangements

The section below looked at administrative factors that can influence or affect the management of acute malnutrition in children. It is divided into three sections, staffing, and working arrangements, availability of equipment, and administrative issues. The information was collected from 22 PHC facilities. Tables 4.7 and 4.8 depict the information about staffing and working arrangements in the 22 PHC facilities. All the PHC facilities had a clinical/operational manager in charge. Most of the facilities had less than five professional nurses (72.7%). The nurse-patient ratio at 77.2% of the clinics was above the norm of 1:40 which means the workload in those clinics is high, whilst only 18% had a workload that is at an acceptable level. One clinic (4.5%) did not respond to this question. The operational managers at more than half the clinics had been there for over five years and only one clinic had a new operational manager who had been there for less than a year. Additionally, 77.2% of them had a replacement

when the child health nurse was not available. Furthermore, none of the facilities had 80% coverage of IMCI trained nurses, with 77% having 70% coverage of IMCI trained nurses. 17 out of the 22 PHC facilities had above 70% of their nurses trained in IMCI, and only 4 PHC facilities indicated that about 51-69% of their nurses were trained in IMCI. The results also show that two clinics did not have a CNP, whilst 20 clinics had more than 3 clinical nurse practitioners.

Moreover, 90.9% of the PHC facilities had a separate area for children and 81.8% of them indicated that children are seen by a professional nurse at every clinic visit.

Table 4-7: Staff related factors that may influence the implementation of IMAM, in eThekweni PHC facilities, n=22

VARIABLE	n	%
Clinic operational manager length of time at the facility		
Less than a year	1	4.5
More than 2 years	9	40.9
More than 5 years	12	54.5
Number of professional nurses		
0	2	9.1
Less than 5	16	72.7
6-10	1	4.5
11-15	1	4.5
16 and above	1	4.5
N/A	1	4.5
Clinical nurse practitioners		
0	2	9.1
Less than 5	10	45.5
6-10	9	40.9
Patient headcount		
Below 6000	5	22.7
Above 6000	8	36.4
Over 3000	5	22.7
Below 3000	4	18.2
Nurse Patient ratio		
Above 1:45	10	45.5

1:45	7	31.8
Less than 1:45	4	18.2
N/A	1	4.5

Table 4-8: Staffing arrangements relating to children in eThekweni facilities, n=22

VARIABLE	N	%
Child health nurse		
No	1	4.5
Yes	20	90.9
N/A	1	4.5
Child health nurse replacement in place		
Yes	17	77.3
No	4	18.2
N/A	1	4.5
A nurse trained in IMCI		
None	1	4.5
Between 51-69%	4	18.2
Above 70%	17	77.3
Separate area for children's consultation		
No	2	9.1
Yes	20	90.9
All children are seen by a professional nurse		
No	4	18.2
Yes	18	81.8

4.4 Availability of growth monitoring equipment

Table 4-9: Availability of equipment in the PHC facilities included in this study, n=22

VARIABLE	N	%
Baby scale		
Yes	22	100
No	0	0
Toddler scale		
No	4	18.2
Yes	18	81.8

Availability of Service plan (All scales)		
No	18	81.8
Yes	4	18.2
Replacement plan if the scale is broken?		
Yes	12	54.5
No	9	40.9
N/A	1	4.5
Baby length height measure		
No	2	9.1
Yes	20	90.9
Availability of MUAC tapes		
Yes	22	100
No	0	0

Table 4.9 above shows the availability of equipment used to monitor child growth in the various PHC facilities. When looking at the availability of equipment, our data shows that the majority of the PHC facilities have the equipment required to monitor child growth. One hundred percent of the clinics had a baby scale, while a majority (82%) did not have a toddler scale. When it comes to having a servicing/maintenance plan, if the scale is broken or not working properly, we found that only 18.2% of PHC facilities had a service plan.

Besides, 54.5% of PHC facilities had a replacement plan if the scale is broken. Furthermore, 91% of PHC facilities had a baby length/height measure, however, 100% had MUAC tapes. Figure 4.2 below shows that the majority (91%) of the PHC facilities reported that MUAC tapes are always used. When asked if there were any issues relating to the unavailability of scales in the past 12 months, the majority (77.2%) of PHC facilities reported having had an occasion when scales were not available.

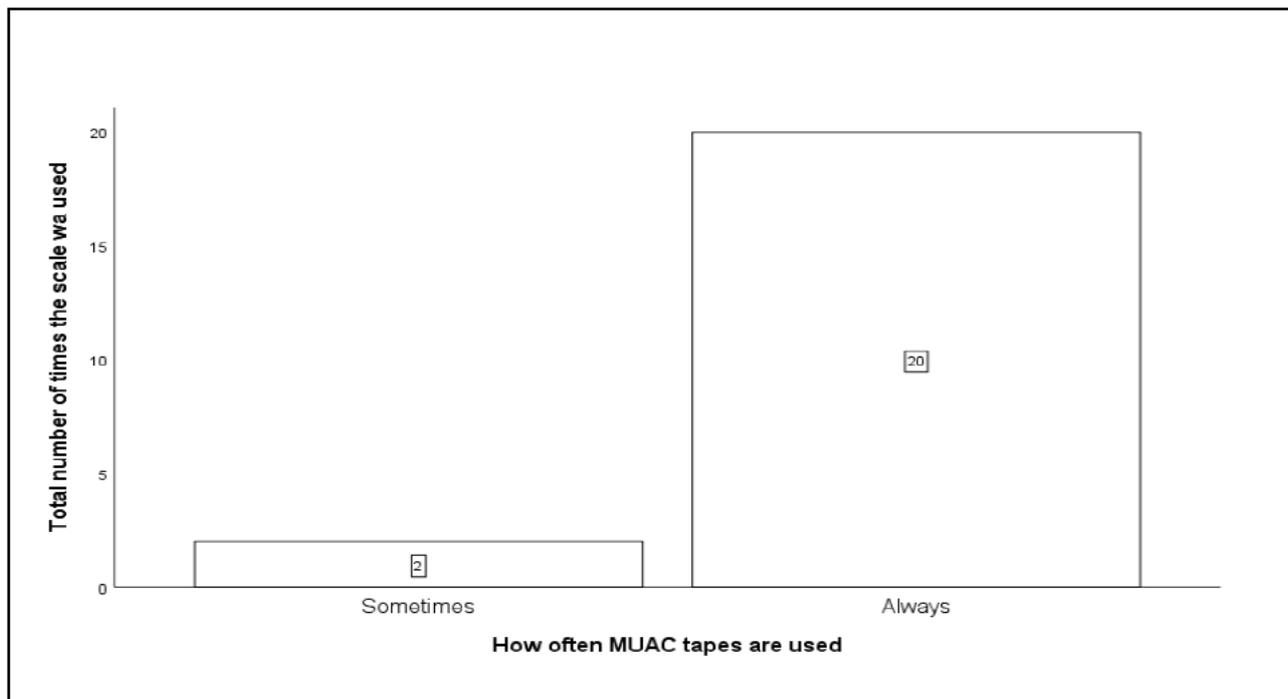


Figure 4-2: Frequency of use of MUAC tapes are used in the different clinics.

4.5 Availability of guidelines on infant feeding and management of malnutrition

Table 4.10 below provides information relating to malnutrition guidelines. Out of the 22 PHC facilities, 20 of them indicated that they have the infant guidelines available in the clinic. Additionally, 21 indicated that malnutrition management guidelines are available in the clinic and indicated that these new guidelines are communicated through in-service training and meetings.

Table 4-10: Responses regarding feeding guidelines in eThekwini PHC facilities, n=22.

VARIABLE	n	%
Infant feeding guidelines available in the clinic		
No	2	9.1
Yes	20	90.9
Malnutrition management guidelines available in the clinic		
No	1	4.5
Yes	21	95.5
Are new guidelines communicated		
No	1	4.5
Yes	21	95.5
How are the new guidelines communicated?		

In-service training	10	45.5
In-service training and meetings	8	36.4
N/A	4	18.2

According to table 4.11 below, one facility indicated that supervision on child health was done once a year, whilst the majority reported that it was done more frequently.

Table 4-11: Supervision related issue that may interfere with child malnutrition management in eThekweni PHC facilities, n=22

VARIABLE	n	%
How often is supervision on child health programmes done?		
Once a year	1	4.5
Twice a year	2	9.1
Once a quarter	7	31.8
Once a month	12	54.5
When was the last supervision done?		
A year ago,	1	4.5
6 months ago,	1	4.5
3 months ago,	5	22.7
1 month ago,	8	36.4
Current month	6	27.3
N/A	1	4.5

Table 4.12 below shows the information regarding training on child feeding. The results show that in most of the clinics, training is done frequently, with responses indicating that it was done as recently as one month ago.

These results indicate that different stakeholders provide child nutrition training, and notably, most facilities indicated that training was done by the nurse trainers or dietician.

When looking at whom the training was conducted for, it was noted that training is directed at different categories of staff, covering nurses and nutrition advisors.

The results also show that the duration of training varies. This covers different types of training which include in-service training, updates, and full training covering different topics, etc.

Table 4-12: Training information relating to child health in eThekweni PHC facilities, n=22

VARIABLE	n	%
When was the last training on child feeding done?		
A year ago,	1	4.5
6 months ago,	5	22.7
3 months ago,	5	22.7
1 month ago,	8	36.4
During this month	2	9.1
N/A	1	4.5
Who conducted the training?		
The supervisor or clinical manager	4	18.2
Nutritional advisor or dietician	10	45.5
Clinician	1	4.5
Paediatrician	1	4.5
NGO	1	4.5
N/A	5	22.7
Who was the training directed to?		
All nurses	4	18.2
Nutritional advisor	2	9.1
All staff	7	31.8
Professional nurse	1	4.5
Nurse and nutritional advisors	2	9.1
N/A	6	27.2
How long was the training		
30 min to 1 hr.	8	36.4
1 day	3	13.6

2 days	1	4.5
3 days	4	18.2
5 days	1	4.5
N/A	5	22.7

4.6 Availability of administrative systems that support the implementation.

Table 4.13 below shows that more than 50% of the facilities had no mentorship programme available on child health. The results indicate that 20 (90.0%) of facilities had nutrition advisors allocated. Furthermore, our results reveal that in 20 (90.9%) of the facilities, the nutritional advisor is always available most of the time to carry out the nutrition support program. There seemed to be good knowledge of the management of malnutrition with most facilities giving correct responses to the questions asked. On testing information regarding the use of supplements and duration of use of supplements, most facility managers gave correct responses by indicating that supplements are given according to guidelines or until malnutrition is corrected, or for between one to six months.

Table 4-13: Administrative support systems that support the management of child malnutrition, in eThekweni PHC facilities, n=22

VARIABLE	n	%
Is there a mentorship programme available for child-health?		
No	7	31.8
Yes	13	59.1
N/A	2	9.1
Is a nutritional advisor available?		
No	2	9.1
Yes	20	90.9
How often is the nutritional advisor available?		
Once a week	0	0
Twice a week	0	0
Daily	20	90.9
N/A	2	9.1
How is underweight in children managed?		

Follow guidelines	12	54.5
Offer food parcels	1	4.5
Referrals	2	9.1
Monthly monitoring and/or food parcels	1	4.5
Health education, supplements, and referral	1	4.5
N/A	5	22.7
For how long the supplements are given out?		
Until malnutrition is corrected	7	31.8
According to guidelines	4	18.2
1-6 months	6	27.3
Depends on the classification	2	9.1
N/A	3	13.6

According to figure 4.3 below on availability of food supplement stocks, our results revealed that stock-outs are frequent. Of the 22 health facilities that responded, 14 indicated that stock-outs do happen, while eight indicated that stock-outs never happened.

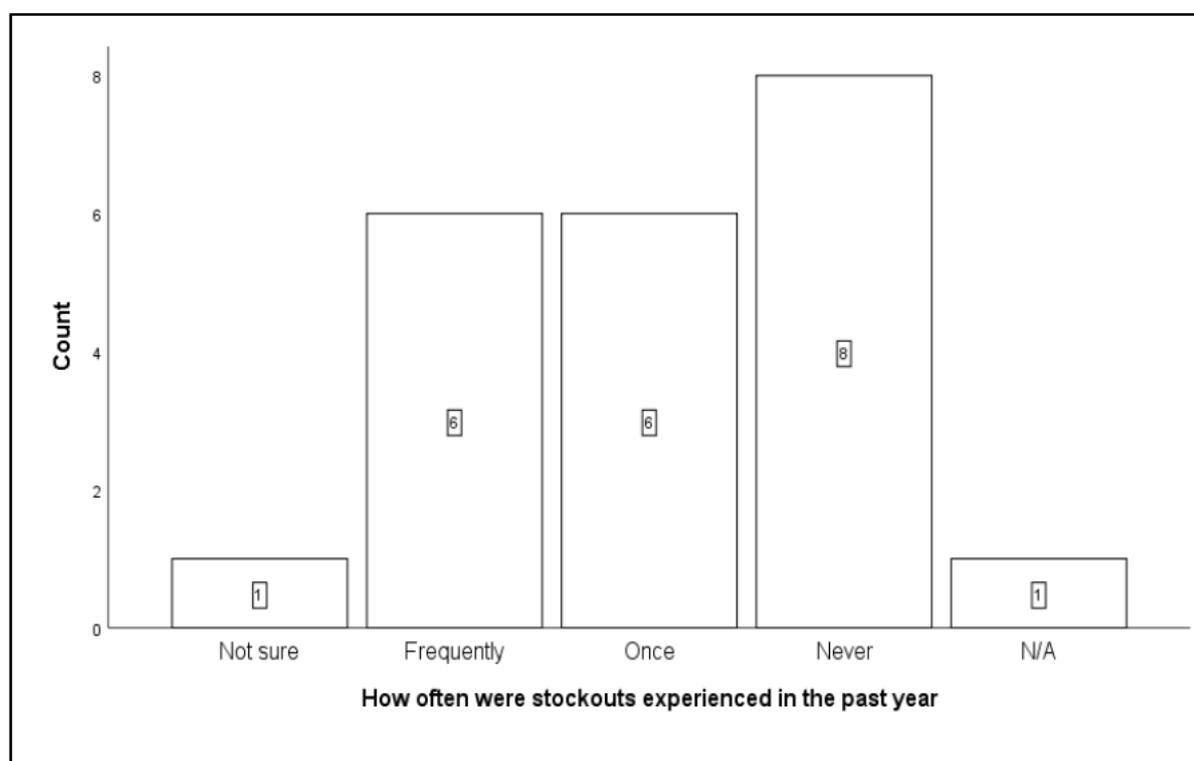


Figure 4-3: *Number of stock-outs have been experienced in eThekweni PHC facilities in the past year, n=22*

4.7 Availability of referrals, tracing, and follow-up systems

The findings in table 4.14 below reveal that of the 22 facilities, only 11 had a follow-up system in place. When looking at the tracing system for underweight children lost to follow-up, 17 facilities indicated that they have a tracing system in place, four did not have and one did not respond.

The table further provides information relating to the referral system. 21 out of 22 facilities indicated that they have a functional referral system between the clinic and the district hospital. Additionally, there was also a functional referral system between the clinic and the community in 17 facilities but none in 5 facilities.

Table 4-14: Referral systems, tracing and follow up systems that are in place to manage child malnutrition in eThekweni PHC facilities, n=22

Variable	n	%
Is there a functional referral system between the clinic and the district hospital?		
No	1	4.5
Yes	21	95.5
Is there a functional referral system between the clinic and the community?		
No	5	22.7
Yes	17	77.3
Is a tracing system for undernourished children available?		
No	4	18.2
Yes	17	77.3
N/A	1	4.5
Is a Follow up system for undernourished children available?		
No	2	9.9
Yes	11	50
N/A	9	40.1

4.8 Community structures that support the management of malnutrition

As per table 4.15 below, when it comes to community structures that support child malnutrition, only six facilities responded affirmatively, and the majority fifteen out of the twenty-two clinics indicated that they do not have community structures to support

malnutrition. Nonetheless, the majority (59.1%) of the facilities indicate that they have operational PMCs within their catchment area. Additionally, the clinics are also linked to CHWs (86.4%). However, when looking at outreach teams, we found that few of the facilities (36.4%) had outreach teams.

Table 4-15: Shows information about community structures that are available to assist malnourished children.

Variable	N	%
Are there community structures that may support malnourished children		
No	15	68.2
Yes	6	27.3
N/A	1	4.5
Are functional “Phila Mntwana” centres available within the clinic catchment area?		
No	7	31.8
Yes	13	59.1
N/A	2	9.1
Is the clinic linked to the community caregivers in the catchment area?		
No	2	9.1
Yes	19	86.4
N/A	1	4.5
Does the clinic have community outreach teams?		
No	13	59.1
Yes	8	36.4
N/A	1	4.5

OBJECTIVE 3: TO DETERMINE MOTHERS’/CAREGIVERS’ PERCEPTIONS AND ATTITUDES TOWARDS NUTRITION SUPPLEMENTS

This section aimed to determine the caregiver’s perception and attitudes towards nutrition supplements. Mothers were asked if they have heard about nutrition supplements. Most mothers reported that they have never heard about them (80.3%), a smaller number (19.6%) reported having heard about nutrition supplements. All (100%) of those that have used them reported that they have used them until the end, none stopped using them before the scheduled end date as per figure 4.4 below.

When caregivers were asked if they would use them if given, the majority (98.6%) indicated that they would accept nutrition supplements.

For the small number that indicated that they will not use nutrition supplements, various reasons were given as depicted in table 4.16 below.

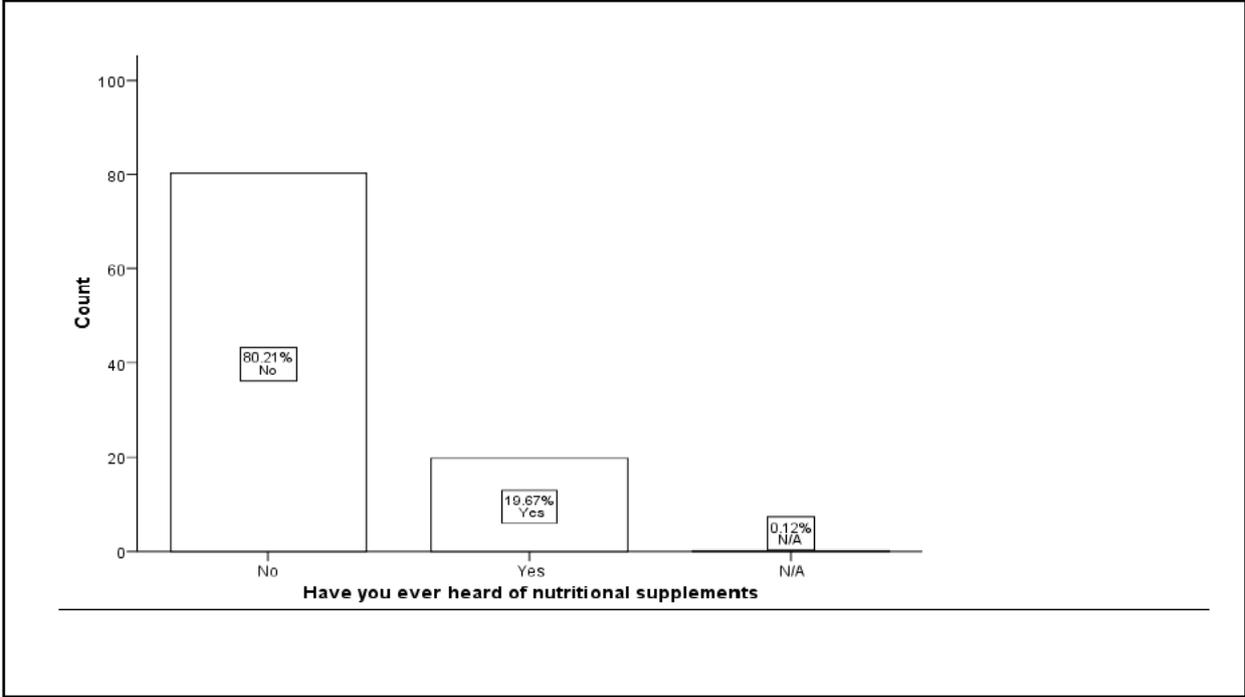


Figure 4-4: Proportion of mothers/caregivers who have heard of nutritional supplements, in eThekweni PHC facilities, n=22

Table 4-16: Caregivers’ Reasons for not accepting nutrition supplements, based on the 9.5% that would not accept them, n=11

Question	Yes	No	N/A
Have you heard of nutrition supplements?	166	677	1
If given, would you use them?	832	11	1

Mothers were asked if they have heard about nutrition supplements. Most mothers reported that they have never heard about them 677 (80.2%), only 166 (19.7%) reported having heard about supplements.

An important finding is that 832 (91.5%) of caregivers said they would accept nutrition supplements if they were to be prescribed for the child. Those that have used them have used

them until the end. None stopped using them before the scheduled end date. The 11 (9.5%) who reported that they will not accept nutrition supplements gave various reasons ranging from, “I do not want my child to eat them”; “I do not want people to think my child is sick”; “I do not want to feed my child something I do not know”; reasons were not given by 8 caregivers.

OBJECTIVE 4: KNOWLEDGE OF NUTRITION ADVISORS (NAs)

NAs showed great insight and understanding when asked questions relating to malnutrition in children. Thirteen questions were asked. The NAs gave correct responses to 11 questions and partial answers to 2 questions. *There were no incorrect answers given.* Their direct responses are presented below in inverted commas.

Question 1: Please define the following terms:

Undernutrition is defined by a NA.

“Undernutrition is when the child’s weight is in the 1, 2, or 3 percentiles. It is worse when it is on the 3rd percentile”.

The NAs explained that each child’s weight must be assessed taking into consideration other factors before deciding whether the child is underweighting or not.

“We must not always look at current weight without looking at the child’s birth weight e.g., in premature baby’s the weight may be lower than normal and they may gain weight slower than children born at full term.”

Overnutrition defined by a NA.

“Overnutrition is when a mother feeds the child breastmilk and formula, which is mixed feeding and even adding porridge to the diet before the child is 6 months old”.

Question 2: Explain specific nutrition advice that should be given to a mother at different stages:

During pregnancy; birth to 5 months; 6 to 12 months; 13 to 59 months

Answers provided by the NAs:

During pregnancy:

“A mother planning to have a baby is educated about good nutrition to have a healthy baby. This education covers living a healthy lifestyle overall and if pregnant, the dos and don’ts. This education also covers breastfeeding and correct supplementation for the baby”.

They were also aware of the importance of starting a discussion about breastfeeding during pregnancy when they said:

Birth to 5 months:

“Mothers should follow health-promoting lifestyles, avoiding harmful substances. They went on to give reasons why such advice is advantageous.

“Mothers must be encouraged to eat healthy meals. They must also be educated about the importance of avoiding alcohol and drugs. They must also be encouraged to practice safe sex.”

“We must encourage the mother to breastfeed after delivering the baby.”

They mentioned that mothers must breastfeed exclusively until the baby is 6 months old. She must not feed the child even water. They know that breast milk on its own is complete, with no need for water. Mothers are encouraged to continue with exclusive breastfeeding. The mother must feed by expressing breast milk when going back to work so that the caregiver can feed the baby with the mother’s breast milk. It is advantageous because it is cheaper. “It is also important to educate the mother about good nutrition because sometimes they are on a slimming diet and may not be eating properly”.

“The importance of eating healthy food must be emphasized”.

6 to 12 months

As the child grows older, the quantities of food and frequencies are increased accordingly, as per the child’s age.

“At six months, solids must be introduced because nutrients contained in breast milk are no longer sufficient for the baby’s needs. Food fed to the baby must be soft. Breastfeeding must continue even when solids have been introduced”.

13 to 59 months

“More variety, more quantity of food and food can be more solid for older children” The diet must be balanced as well...

Correct responses were given by the NAs for the different age groups for up to 59 months.

Question 3: What are the common causes of malnutrition in children under 5 years?

Examples of answers provided by the NAs:

“It can be caused by overfeeding through the early introduction of solids, child can be overweight”.

“Feeding the child foods with low nutritional value (Rooibos tea, sugar water, etc.)”.

“Poor education on correct child feeding practices”.

“Poor understanding of acceptable weight interpretation”.

“Formula feeding and low breastfeeding levels”.

Question 4: How is malnutrition diagnosed in children under 5 years?

Examples of answers provided:

“Scales to measure weight”.

“Weight for height below the second percentile”.

“MUAC to measure mid-upper arm circumference. This measurement only starts at 6 months”.

“MUAC below 11.5mm”.

The above answers are correct, but inadequate. Overnutrition was mentioned. They could have spoken about oedema caused by severe acute malnutrition.

Question 5: Define different levels of undernutrition.

Examples of answers provided:

“First, you notice growth faltering where the line is flattening/growth is faltering. Then you have moderate acute malnutrition (MAM)

“Then you have SAM”. They did not mention that SAM is child weight below the 3rd percentile, and MAM above 3rd percentile.

Question 6: How is malnutrition in children managed?

Examples of answers provided:

“If it’s MAM. We give nutrition supplements according to the age and level of malnutrition”.

“We also give nutrition education on child feeding”.

“If SAM is diagnosed, the child is referred to the hospital. At times an ambulance is called to ensure that the mother goes with the child to the hospital. At times a mother can choose to go home and if something happens during the night, it can be a problem. If a mother insists on going home, this is recorded on the card. Some mothers do not realize that the child is sick, they may want to go home. Some mothers have disappeared from the clinic whilst waiting for the ambulance”.

SAM is sometimes treated at the clinic level following discharge from the hospital. Most times they are now MAM and may continue with supplements at the clinic”.

Question 7: How is growth monitoring done at the community level?

Examples of answers provided:

CHWs and NAs run PMCs. “CHWs conduct household visits and do MUAC. If the baby/child is at risk or underweight, a referral form is filled and given to the caregiver to take the child to the clinic. At the clinic, they go to the administration clerk, then the nutrition advisor, and then to the professional nurse for the PN to record her findings and confirm the presence of malnutrition. Nutrition supplements may be prescribed for the child”.

“NAs sometimes run PMCs with nurses at a community point such as at a creche, church, etc. Community members are informed when to attend a particular point. PMCs are run at least once a month”.

“The cards (RTHB) are checked for completeness and growth trend. vit A and deworming are also given at PMCs”.

“Underweight children are visited at PMCs. Some points are visited weekly. They also follow up on children that are on supplements. The points work but at times visits are cancelled due to the unavailability of vehicles. On such occasions, the message is given to the CHW of the area to visit the child at home or to run the point”.

According to NAs, PMCs, however “at times the community gets fed-up, because they expect more services from them, such as immunizations, treatment/medication from nurses, etc. Further, NAs reported that due to transport problems, they do not always attend the PMCs.

Question 8: Explain how the nutrition supplementation program for underweight children is implemented at PHC facilities.

Examples of answers provided:

“Supplements are given to underweight children. It is sometimes difficult to follow-up on these children because mothers give wrong cell-phone numbers. They also give wrong addresses because they don’t want to be found”.

“Most times they will give wrong addresses, and they will say they are visitors or only arrived in the area recently. Some mothers will not come back for supplements when the child who has been sick has recovered. They sometimes do not understand the importance of supplements for the treatment of undernutrition. Despite these challenges, others do complete treatment/supplements and at times want to continue even when the child has been treated and supplementation must be discontinued”.

“NAs further reported that foreigners mostly do not want nutrition supplements. The foreigners say that in their country, they do not use this kind of food”. The NAs made an example of a mother who refused supplements when a child had MAM, later the child progressed to SAM. According to NAs have now resorted to recording refusal of supplements on the child’s card. They also reported that at times mothers will take the supplement on the first day but will not come back for further supplies.

Question 9: Discuss the availability of food supplements. Is stock always available for children who need them?

Examples of answers provided:

“There are frequent stock-outs. There is poor stock control. Most times supplements disappear from the clinic. When the matter is reported to the clinic manager, it is not taken seriously. It is sometimes viewed as accusing nurses/clinic staff of stealing supplements. Clinic managers do not act on these reports. At times PNs will refer someone for supplements when they do not meet the criteria. They sometimes want to give it to people who are destitute rather than underweight. Such people should be referred to other agencies for poverty alleviation. They sometimes recommend it to patients who have no food and are taking treatment for chronic diseases where treatment should not be given on an empty stomach. Such patients should be referred to other agencies, as they do not necessarily qualify for supplementation”.

One NA explained that on some occasions, she had to sit a caregiver who did not meet the criteria down, to explain the purpose of supplements as a treatment for undernutrition and not anything else.

Another NA went on to say that, to convince the caregiver, she goes on to plot the child’s weight for height and shows the caregiver that the child is not underweight and therefore does not qualify for supplements. She also shows them the malnutrition register indicating who qualifies for supplements. According to her she does this to protect herself because she can be accused of being selfish!

They further explained that it would not be of much help to give supplements because it is not permanent, it will end soon, and they will go back to where they were. It is better to be referred to other social agencies for sustainable assistance and poverty alleviation programs.

Question 10: Explain the frequency and implementation of growth monitoring in children under 5 years, when and how is it done?

Examples of answers provided:

“It is done every month for children under 12 months.

Every two months for children after 12 months

Every three months after 24 months until 59 months”.

Are children given return dates for growth monitoring?

“Yes, they are given, though not all PNs give return dates. Return dates are generally given by PNs or by NAs.

Most children are first seen by NAs, thereafter by the PNs”.

“There are challenges with growth monitoring. When the nutrition advisor is on leave, the children are not weighed properly. Sometimes they are weighed with clothes on. Weight is not plotted, and the graph/plot is not explained to the mother, MUAC is not done, etc.”

“Some mothers have remarked that things are done properly only when we are on duty. They have even asked why other staff are not trained on growth monitoring”.

“Sometimes caregivers who come to collect supplements are not given supplies when the nutrition advisor is not on duty”.

“The responsibility of weighing children is now only delegated to nutrition advisors. When they are not on duty, it means some children may not be weighed”.

One NA shared an example that indicates that PNs do not take growth monitoring seriously. According to her, a certain PN consulted a child whose weight was not recorded, the PN simply wrote her notes and left the weight section blank. She went on to say that in most cases, the PN will not even bother about the child’s weight. At times children end up not being weighed.

The NAs reported that the weighing of children is left for them to do.

They further said that caregivers wait longer for the children to be weighed if the NA is busy with other duties. They further reported that when the NA comes back, after being away from work, she is told “nazi izingane zakho zikulindile...” translated as “here are your children, they are waiting for you...”

“No one else will weigh the children. Clinic staff expect the nutrition advisor to be the only person who weighs children all the time”.

At times PNs will record that the child is growing well whereas the child's growth is faltering. In one such instance, one NA confronted the PN and told her to change her notes because the child is not growing well and needs supplements. Her concern was how she was going to justify providing food supplements for the child when the notes reflect that "the child is growing well".

One went on to say that she prefers to stay in the clinic to ensure that children get the service they deserve, even though she enjoys going out to PMCs, she fears that during her absence, growth monitoring may be done.

According to the NAs, many gaps are found in the RTHB. At times these are picked up during audits. One NA reported that she has taken it upon herself to ensure that all cards are filled properly.

Question 11: What are the consequences of undernutrition in children?

Examples of answers provided:

"The child can die from undernutrition".

"Poor brain development"

"Poor performance at school".

"Slow growth or stunting".

Other consequences were missed such as increased susceptibility to infection, complications due to micronutrients deficiency etc.

Question 12: Discuss the breastfeeding policy?

Examples of answers provided:

"Exclusive breastfeeding for six months".

"Breastfeeding until the child is 24 months".

"All pregnant women should know their status. They are then advised to breastfeed exclusively".

"Discourage bottle-feeding".

“If HIV positive, encourage PCR testing at regular intervals starting when the baby is six weeks old”.

“Mothers on antiretroviral drugs are encouraged to take their treatment properly as directed. This will ensure that the virus stays suppressed. There will therefore be less likelihood of a mother transmitting the virus to the baby”.

The NAs narrated an example where the family can interfere and coerce the mother to feed the child with other foods. If mothers/caregivers are counselled well, they will comply with clinic instructions. This indicates that ongoing counselling and support can yield positive results.

Question 13: Please add anything you know about malnutrition in children.

Examples of answers provided:

“All clinic staff should understand undernutrition. They should take it seriously and not undermine it as they currently do”.

“Teamwork is very important. Children with undernutrition can be missed out when the NA is on leave”.

“Some children with SAM are discovered when they present at the hospital when they are already sick. This is caused by negligence and a lack of interest in malnutrition prevention and diagnosis”.

“Clinic staff must learn to plot. They fail to plot weights. Others are not bad though. They try, some are passionate”.

“There is a problem with many changes and staff allocations. When there are new allocations, you may find someone who is not interested, and they do not do things properly. It might be better to keep staff in sections they like and are passionate about”.

4.9 Study limitations

The study did not get responses from all the clinics. One clinic’s Chief Executive Officer (overall in charge at one which is a Community Health Centre (CHC), (OMs report to him as there is more than one OM) refused to allow research assistants to collect data despite all the efforts made, but at the 7 other clinics although the OMs did

not complete the form, data collection was permitted. Only 22 managers responded out of a total of 30 clinics.

The study enrolment did not achieve the required 900 exit interviews since one clinic did not allow the data collection, despite permission having been granted by the relevant authorities.

The study relied on the information reported by mothers and clinic managers and nutrition advisors. Some information given may have been influenced by what is known to be the correct information, rather than what is practised at the clinic.

The study however used research assistants who were not known to the clinic staff or the respondents in order to reduce bias. They were first language isiZulu speakers, and they collected the information from the mothers/ caregivers anonymously.

Some OMs did not respond to questionnaires given to them. A better system would have been for the researchers to ask questions and follow these up with specific questions for clarity.

5 DISCUSSION

In this chapter a detailed discussion is undertaken informed by the findings outlined in the previous chapter. Discussion is backed up with available latest evidence found in literature. Highlighted in this chapter is the poor documentation of critical information in the road to health booklets according to the required standard, the poor implementation of IMAM guidelines, insufficient screening of children under 5 for malnutrition. The administrative aspects on the implementation of prescribed guidelines on malnutrition had shortcomings, however the positive role of the nutritional advisors is also emphasised in this chapter.

5.1 Introduction

Malnutrition in South Africa continues to be a problem with the case fatality rate at 7.4% (Massyn et al., 2019). The UNICEF report dated March 2020 shows that stunting remains high, and ranges between 20-30% of children, whilst wasting is low, ranging between 2.5 and 5%. What is also alarming is that overweight is high, ranging between 10-15% whilst the global average is 5.6% (UNICEF, 2020). This emphasizes the importance of growth monitoring to address these problems early and it requires that growth monitoring and nutrition counselling be improved to identify children with growth faltering or those who are overweight, for appropriate interventions to be done timeously.

South Africa, in line with WHO and UNICEF, has developed various nutrition policies since 1994 to address malnutrition in children. In this study, we evaluated some of the more recent policies/interventions aimed at addressing nutrition in children. Some of those policies/interventions that have been evaluated include the use of the RTHB for GMP, screening for malnutrition, and including the provision of counselling and nutrition education to mothers/caregivers. This is aimed at preventing and correcting malnutrition and providing dates for the return visit/s which is an important aspect to monitor child growth as indicated in the RTHB on the frequency and interval of visits (Walls, 2019).

We further evaluated health system issues that may influence the implementation of policies aimed at preventing child undernutrition and promotion of growth. The study

goes further to look at the IMAM guidelines, especially the community aspects of the guidelines, as the study is done at the PHC level and mostly includes the community aspect of management. We further investigated the perception and attitudes of caregivers towards nutrition supplements. This is important because caregivers must be able to accept the supplements if they are prescribed for the child. If nutritional supplements are not well accepted, it will hinder the efforts to correct/treat undernutrition when it is diagnosed.

In the final part of the study, we evaluated the knowledge of NAs as they are an important category of staff in the detection of malnutrition, counselling, and follow-up of cases.

The study used mixed methods. For the quantitative aspects of the study, the clinic was the unit, and we used the study design recommended by WHO as described under-sampling methods, thus 30 clinics were selected by stratified random sampling, and 30 mothers/caregivers per clinic were selected by stratified random sampling. Using a cluster survey design as recommended by WHO (and as provided and explained by the statistician). The design estimates result with $\pm 5\%$ precision, i.e., 95% confidence which makes it representative and generalizable. This mixed-methods study included a qualitative component in that the information from the NAs was obtained through a focus group discussion, enabling the researcher to explore in-depth the knowledge and perceptions of this category of health worker. The NAs are a more recent addition to the PHC clinic workforce and have had special training by the Nutrition Directorate of the KZN Department of Health to reduce the prevalence of malnutrition in the province (DoH, 2015)

The results from the clinic questionnaire completed by the clinic manager, the exit interviews completed by the mothers/caregivers, and the focus group discussion with the NAs were used to answer the research questions.

The results of the study indicate practices at the PHC facility level with regards to malnutrition identification and management. The discussion considers the gaps identified and what improvements are required and offers suggestions to address these gaps to improve the nutritional state of children under five, through early detection and effective management of undernutrition.

The research questions that this discussion considers are:

- Are malnutrition guidelines for children 6 to 59 months implemented properly at the PHC level?
- How is the management of child malnutrition at the PHC clinics implemented?
- What are the factors that promote and those that negatively affect the proper implementation of malnutrition guidelines?

To answer these questions the following objectives were formulated:

- To investigate if growth monitoring guidelines in the Road to Health Booklet are adhered to, including the accuracy of weight measurement.
- To investigate if administrative factors support/influence the implementation of the Integrated Management of Acute Malnutrition (IMAM).
- To determine mothers'/caregivers' perceptions and attitudes towards nutrition supplements
- To determine the nutrition advisors' knowledge of the malnutrition management program.

The discussion covering these research questions and objectives is thus presented below.

ARE MALNUTRITION GUIDELINES FOR CHILDREN 6-59 MONTHS IMPLEMENTED PROPERLY AT PHC LEVEL?

To investigate if growth monitoring guidelines in the Road to Health Booklet (RTHB) are adhered to including the accuracy of the weight measurement.

This objective focused on the recordings in the RTHB and verbal responses from the caregivers. The RTHB is an important document that records child growth, interventions, the advice that is given, etc. For this study, the focus was to ascertain the completeness of recording of child weight and plotting thereof as well as the advice provided on child nutrition. Nutrition assessment and prevention should be recorded in the RTHB. The extent to which this was done indicated the effectiveness of malnutrition screening at the PHC level. To check the accuracy of the clinic's

measurements the children were re-measured by the research assistants at the exit interview.

Important issues that were noted

The thirty clinics in the sample were selected from all areas of eThekweni covering rural, urban, peri-urban areas. It is noted that most participants came from townships. Townships are known to have higher numbers the population, also there are more clinics in the sample that are in townships, indicating better access to health services. There are fewer clinics in rural areas due to lower population densities. This makes the study sample representative of the whole eThekweni Health district, made up of people who use public health services, therefore results are generalizable. The study was thus cross-sectional resulting in a limitation in the ability to interpret the direction of associations. Moreover, the required sample size was not achieved with data reported from 22 and not 30 clinics.

The results show that attendance at clinics was highest for children between 6 to 24 months at 69.6%. This is to be expected as infants up to eighteen months are visiting clinics more frequently for immunization and growth monitoring every three months (EPI/RHTB). This gives health workers ample opportunity to monitor growth, screen for malnutrition, provide nutrition counselling, etc. Older children are expected to attend clinics less frequently every six months as recommended (RTHB).

In this study it was also noted that most children were brought to the clinic by mothers (82.3%) and that concurs with the similar findings by (Kaldenbach et al., 2022) whereby 78.2% of children were also brought in by their mothers in the Limpopo province of South Africa.

This was encouraging as the presence of the mother in the care and growth of the child is important. It is noted that immunization coverage for general childhood immunizations as well as for vit A is good, above 90%. This is in keeping with the latest information available for eThekweni Health District, where immunization coverage was found to be 97.7% in the 2017/18 financial year (Massyn *et al.*, 2019).

5.2 Discussion of findings of exit interviews

Purpose of the visit

It is of concern to note that few children 9.7% visited the clinic for growth monitoring, however, growth monitoring visits may coincide with visits for immunization, especially below the age of one year. This is informed by the numbers which indicate that 48.3% visited the health facility for immunization. Thus, 41.8% of visits were of children who visited health facilities due to sickness. The recommended frequency of clinic visits is as follows: every month from 6 weeks until 12 months, and every two months until 24 months. After 24 months, children are expected to visit the clinic at least every six months until 60 months (Sokhela et al., 2018) (Department of Health, 2012). This is important because the first 1000 days of life are critical for good child growth monitoring and promotion, developmental screening as well as immunization.

It is encouraging to see more children under two years visiting the clinic, however, it is of concern to note the low number of children who attended the clinic for reasons other than for growth monitoring.

Weighing rate of children

The weighing of children should be 100% at every clinic visit. Only 91.9% of children were weighed. The number of children not weighed (8.1%) is of concern because the opportunity to identify growth faltering, promotion of growth, and the identification of those at risk of malnutrition, etc. are missed. Low weight can easily be missed with dire consequences (WHO, 2007a).

Overall, the weighing coverage of 91.9% is within an acceptable range.

Plotting of weight

Unfortunately weighing the child without plotting the weight or other anthropometric measurements is of very little value. The WHO and various guidelines require that the weight of the child is plotted to assess if the child's weight is appropriate for age (Kankera Gakwaya, 2019). The introduction of WHO child growth standards were preceded by training of the clinic staff which emphasized the importance of accurate measurement, plotting, and interpretation for the correct identification of growth problems. It is important that if a growth problem/deviation is identified, the causes should be identified, and appropriate measures are taken to address them. Without

plotting the child's weight, it is not possible to assess the child's growth using the age and gender of the child, thus enabling HCWs to monitor growth better and to be able to identify potential health or nutrition-related problems timeously. It is therefore essential that plotting is done correctly all the time because a series of accurate measurements provide important information about a child's growth pattern. Training, supervision, and mentorship are critical in ensuring that growth monitoring is done properly and consistently to identify children who have growth faltering. (WHO, 2007a). Feedback from this study will be shared with management and staff to highlight areas that need attention.

The low plotting rate of 63.9% highlighted the missed opportunity for this important analysis/assessment. This is lower than what was found in West Rand district in South Africa where the plotting was at 78% (Dimo et al., 2022). Nevertheless, slightly better compared to the findings of a study conducted in the Western Cape which found plotting rate of 55% (Schoeman et al., 2006). The low plotting rate was associated with poor detection of malnutrition. In this study, researchers were able to detect malnutrition in 50% of children compared 10% identified by nurses (Schoeman et al., 2006). This suggest that there is visible improvement between 2006 and 2020, hopefully, this trend will continue to improve throughout the country.

Other studies also reveal that in most cases, the Growth Monitoring and Promotion if not fully and properly implemented, is of little value. According to the researchers "Accurate and reliable physical measures are used to: Monitor the growth of children, detect growth abnormalities, monitor nutritional status and track the effects of medical or nutritional intervention" (Babalola et al., 2015). Therefore, if the weight is not plotted on the RTHB, one cannot assess if the child is growing well.

The plotting rate of 63.9% is unacceptable.

Explaining the meaning of the plot to caregivers

A high percentage of 67.2% of mothers reported that the meaning of the plot was not explained to them. As discussed above, non-explanation of the meaning of the plot or weight of the child compared to the expected weight misses an opportunity to counsel the mother on child nutrition, as well as providing the mother with education about the

age-appropriate nutrition counselling given to promote growth and prevent undernutrition.

In this instance, the low rate of explanation of the plot coupled with the low rate of nutrition counselling makes the growth monitoring and promotion programme ineffective and weak. Low plotting coverage and no nutrition counselling led to ineffective growth monitoring and promotion implementation, despite the good coverage of weight. The plotting and analysis of weight and relevant nutrition counselling are important aspects of good growth monitoring and promotion (GMP) implementation. It is noted that poor growth monitoring and promotion practice is a problem in many countries (Gyampoh et al., 2014).

Fortunately, in South Africa, and KwaZulu-Natal specifically, NAs have been introduced since 2013. Their main function is growth monitoring and screening for malnutrition and nutrition counselling. Unfortunately, evidence of improved GMP since their introduction has not yet been evaluated. Hopefully, as time goes on, the benefits of their introduction will be seen and studies that explore the effectiveness of their role will be undertaken.

The review of the growth monitoring and promotion programme conducted by UNICEF (UNICEF, 2007a), revealed that certain conditions must be available for quality implementation of this programme. These include “functional health systems, wide-coverage, and consistent contact, trained staff with good communication skills, messages that are actionable, feasible and used at all points of contact” (UNICEF, 2007a).

Growth assessments that are not supported by appropriate response actions to prevent and treat excessive or inadequate growth are not effective in improving child health, (WHO, 2012). Therefore, a lack of nutrition counselling to address over and undernutrition is unacceptable and will not reduce the incidence of malnutrition.

Further, the low rate of explanation to the mother of the plot and low rate of nutrition counselling are unacceptable and go against good practice of growth monitoring and malnutrition prevention.

Measuring of the head circumference

According to the RTHB, head circumference is measured less frequently in children. It is supposed to be measured only at 14 weeks and at 12 months. In this study, only children who visited the clinic at 12 months would have been eligible for the head circumference measurement. It is of concern that many children who were twelve months old had not had their head circumference measured. This is part of growth monitoring, failure to measure the child's head circumference may miss a deviation from the norm.

The low rate of measuring the head circumference indicates poor growth monitoring practices.

Measuring of mid-upper arm circumference

Less than 30% (27.1%) of children had mid-upper arm circumference (MUAC) measured on the day of the clinic visit was noted and this concurs with the findings conducted by Dimo and colleagues (2022) in Gauteng. This number excludes those children where MUAC was not due. MUAC measurement should be done in children at every clinic visit from the age of 6 months and every three months thereafter as per the RTHB. The 67.8% of children where MUAC was not done is of concern especially in the context where weights are not done and plotted because undernutrition can be missed. A study on conducted in the rural areas of South Africa PHC, identified that MUAC was not done by nurses at PHC (Win and Mlambo, 2020).

According to research, there is evidence that MUAC as an anthropometric measurement is the best method of malnutrition screening in terms of ease, age independence, precision, accuracy, sensitivity, and specificity, and screening for severe malnutrition. It is less affected by weight and height and can be measured by minimally trained health workers (Yang et al., 2020).

It has been shown that MUAC is one of the most effective tools for determining malnutrition in children between the age of 6 months and 60 months. The cut-off as set by the World Health Organization of MUAC is below 115mm, meaning that a MUAC below 115mm means that the child is at risk of malnutrition. The previous cut-off was 110mm (WHO, 2009b). A higher cut-off from 110mm to 115mm was recommended as it would identify more infants and children between 6-59 months as having acute

malnutrition with a higher specificity of above 99%. This cut-off was reached because children with MUAC less than 115mm are at a higher risk of death compared to those above. Newer studies recommend the cut off to be increased, to maximise case finding of at risk children (Marshall et al., 2019), (Laillou et al., 2014). It has been found that the prevalence of SAM based on the WHO standards for the weight for height less than -3SD, is similar to those based on the MUAC less than 115mm (Kumar et al., 1996). It is of great concern that this easy, cheap, and accurate method is not being used as often as it should in eThekweni PHC clinics.

The low rate of MUAC is unacceptable as it is the most reliable means of screening for malnutrition.

Nutrition counselling given to caregivers.

Our findings indicate that nutritional counselling is not done as often as it should with results showing that only 18.6% of caregivers received nutrition counselling during the visit. Even though these findings seem to be lower than 38% which was also reported in South Africa in 2020 (Haskins et al., 2020).

This means that most of the caregivers do not get adequate advice needed to correct malnutrition and for proper child growth and promotion. Giving nutritional advice should be done during every clinic visit, not only when growth faltering is identified, or malnutrition is present. The inadequacy of nutrition counselling was also found in other areas around the world, such as in Ghana (Nsiah-Asamoah et al., 2019), low and middle income countries.(Liu et al., 2017), South Africa (Kaldenbach et al., 2022).

Age-appropriate nutrition counselling information is readily available on the RTHB, however, despite this, nutrition counselling is missed (Duplessis et al., 2017). Specific information if malnutrition is diagnosed is also available in the RTHB. One of the key messages contained in the Infant and Young Child Feeding Policy is “Health care personnel should provide counselling and support to mothers during antenatal, intrapartum, postnatal and follow-up care if infant feeding practices are to be optimised”(Andersson & González, 2009), (Department of Health, 2013).

In a study conducted in the Western Cape, low levels of nutrition counselling were identified. The study found that healthcare workers indicated that health promotion

messages are important, however, messages were only conveyed in 51% of consultations (Du Plessis et al., 2017). If the mother is feeding the child appropriately, she should be encouraged to continue, if not, appropriate advice should be given based on the weight-for-age reading and growth line. Studies have shown that the malnutrition rate is higher between the ages of 6 and 24 months (Majamanda et al., 2014). This is the time when breastfeeding alone does not contain sufficient nutrients for the growing child. It is, therefore, necessary for nutrition counselling to be given to caregivers at an early stage especially from 6 months, to prevent malnutrition. (Shrimpton et al., 2001)

Failure to give nutrition counselling to mothers at every clinic visit is an unacceptable practice. The low rate of 18.6% is unacceptable.

Giving return dates to caregivers

The results show that a return date was given to 64% of caregivers. The date would normally be for immunization or growth monitoring as per the RTHB. The failure to give a return date to some caregivers is a concern as important screening processes, growth monitoring, assessment for developmental milestones, immunizations, etc. may be missed. The child may only visit the clinic when she/he is sick and may already be malnourished making recovery from illness much lengthier and more difficult (Arimond et al., 2008). Clinic visits for children below the age of 24 months are important because of the development that happens during this period. This is the time when optimum growth and neurodevelopment takes place (Arimond et al., 2008). Therefore, interventions must be intensified during this window period which is between pregnancy and twenty-four months.

Two-thirds of the caregivers were given return dates; however, this should always be given to all children when they leave the clinic indicating when the next visit should be and the purpose of the visit.

5.3 Analysis of Associations

The Chi-Square and Fisher exact test was used to determine associations related to the plotting of the child's weight, whether the mother received nutrition advice and factors associated with the measurement of MUAC. A p-value of less than 0.05 was deemed to be statistically significant. The analysis of an association between each of three dependent variables, (Weight Plotting, Mother receiving nutritional advice and MUAC

measurement) was measured against three independent variables (malnutrition detection, return date given, and accuracy of weight measurement).

Weight plotting associations

Analysis of the association between weight plotting and mother being given nutrition advice, detection of malnutrition, return date given, accuracy of measurements.

A statistically significant association between weight plotting and nurses providing nutrition advice highlights the importance of clinics following recommended guidelines such as RTHB, IMAM guidelines etc., to monitor child growth and possibly identify early onset of faltering growth. It is pleasing to see that when the weight of the child is plotted, nurses are most likely to give nutrition advice. Accurate weight measurement to assess growth and monitor progress followed by taking necessary interventions is critical (Babalola et al., 2015). GMP involves measurement (recording of child's weight), assessment (done through weight plotting, analysis (interpreting growth pattern of the child followed by taking necessary action which can include nutrition counselling etc.) (Liu et al., 2017). According to WHO, growth monitoring without actionable responses is of little value. UNICEF following a review of GMP programme, further emphasises the importance of effective and quality counselling in GMP.

Nutrition advice association

Analysis of the association between nutrition advice given to the mother and three variables mentioned above indicates that mothers who received nutritional counselling were better informed about the nutritional status and nutritional requirements of their children and were more likely to be aware of the growth of their children which may include early detection of malnutrition. There is an association between caregiver's knowledge of nutrition and children's eating behaviour and risk of malnutrition (Maharani et al., 2020). "Improving nutrition and health knowledge practices" is one of the malnutrition prevention strategies proposed by WHO. The return date was also likely to be given possibly for GMP. As discussed above, it is important for children to visit the clinic regularly, especially from 0 to 24 months as prescribed in the RTHB. The child's weight also tended to be more accurate when measured and mother receiving nutrition counselling as envisaged in the GMP (Liu et al., 2017). Nutrition counselling

should follow weight measurement and analysis, as required action which includes nutrition counselling amongst other actions.

MUAC associations

In this analysis, there were no significant associations between MUAC and the three chosen variables. (Data has shown that only a small number of children 27.1% had MUAC done when visiting the clinic.

5.4 Comparison of weights – Clinics versus assessors

The clinics' measurement of weights was in most cases (approximately two-thirds) the same as the assessors' measures of the weights. The correlation was statistically significant ($p < 0.01$). This means the clinic weights can be trusted. This is important because accurate measurement of weights can help identify children whose weights may be faltering. This positive finding is pleasing even though the administration systems were found not to be supportive, as per the results that showed that most clinics do not have a service plan for baby and toddler scales, and neither was calibration done on the scales. The servicing and calibration of scales should be done according to the manufacturer's recommendations to get accurate and reliable readings. Calibration is to be done once a year or more frequently after the scale has been moved during transportation. Many scales do not give accurate readings, hence measures must be taken to ensure accuracy of readings (Baye et al., 2021).

HOW IS THE MANAGEMENT OF CHILD NUTRITION AT THE PHC CLINICS IMPLEMENTED?

To investigate if administrative factors support/influence the implementation of the Integrated Management of Acute Malnutrition

This section investigated various administrative factors that support the implementation of IMAM guidelines. The results show that not everything is in place as outlined in the various guidelines. This included the availability of equipment, staffing, training and supervision, referral systems as well as community structures that support the implementation of the programme. These are discussed below.

5.5 Administrative related factors

The table showing duration of the Operational Manager in the facility indicates that approximately 95.4% have been in the facility for longer than two years. This bodes well for the stability and consistency of leadership in the facility. All clinics had OMs which is in keeping with ICMV 19. The ICMV 19 requires that a facility should have a dedicated manager if it sees 170 patients per day. Furthermore, leadership is one of the six critical building blocks contributing to the Health System Effectiveness (WHO, 2010a).

The work of the OM is divided into administration as clinical work which is 60/40 or 80/20 depending on where the clinic is located with the former applicable in smaller rural facilities and the latter applicable in busier urban areas.

The number of professional nurses, the headcount, and the corresponding nurse-patient ratio is critical in determining the workload of professional nurses (PNs) at the facilities. The norm for nurse/patient ratio is 1:40. Of concern is that 45% of facilities had a nurse/patient ratio above 1:40. ICMV version 19 talks about adequate staffing and allocation of staff according to needs and headcount or workload. Requests for additional staff must be done in collaboration with the district office (Muthelo et al., 2021). A high nurse-patient ratio can result in burnout and difficulty in providing quality patient care and improved patient health outcomes (Musy et al., 2020).

It is therefore important for the PNs workload to be manageable because it allows nurses to be thorough when doing their work, and hopefully not to miss important assessments, vital health education, and interventions required for each client/patient thus leading to quality of services and improved health outcomes. Again, the building blocks for Health System Effectiveness require adequate human resources for health services to be provided effectively. The human resource (HR) importance is not limited to HR provision and availability, but talks to HR being adequately trained (Muthelo et al., 2021).

It was also noted that most clinics have nurses trained in the Integrated Management of Childhood Illnesses (IMCI), with 77.3% of clinics reporting the IMCI training average being above 70%. According to the Ideal Clinic Version 18, 80% of nurses should be trained on IMCI (Muthathi et al. 2020), with this good IMCI coverage, one would

expect that children will be screened properly, including screening for malnutrition. Reasons for this were not explored in this study. It may be due to high workloads, poor supervision or IMCI trained nurses not being allocated to the child section when the rotation of staff takes place.

Clinical Nurse Practitioners (CNP) are required to lead different sections of the clinic because of their advanced level of training which includes an expanded scope of practice done to provide comprehensive nursing practice in Primary Health Care (De Maeseneer, 2013). This change was done in collaboration with other health professionals, such as medical officers and pharmacists, and with the National Department of Health (NDoH), and this was made possible through the amendment of relevant legislation (Kotzé, 2010). It is important to mention that the benefits of having the availability of CNP for the child health section were not measured in this study. Amongst their many duties and roles, specific to this study is section 4 CHILD HEALTH, specifically chapter 26 which deals with “How to assess growth and classify malnutrition in children” (Mash et al., 2010). CNPs have a diploma in diagnosis, assessment, and treatment, which includes training in IMCI.

Clinics are supposed to be divided into three streams namely acute, chronic and maternal, child, and women’s health (MCWH). It is therefore important that each clinic has at least three CNPs to lead each of the streams. The CNP should provide support, mentorship, and supervision to PNs (Muthelo et al., 2021). This support and supervision should include ensuring the implementation of policies, guidelines, and standard operating procedures (SOPs) (Muthelo et al., 2021).

Staff related factors that can influence the implementation of IMAM.

According to the information collected, all clinics have an OM allocated. This is important as the OM has vital functions as the head of the clinic MDT team. Competencies of OMs are crucial for the success of the implementation of health programmes and reforms, including but not limited to PHC reengineering (Munyewende et al., 2016). There is evidence of good coverage in the allocation of child health nurses in the child health section (90%) of facilities. This is important because PNs are expected to screen children for growth monitoring. Their scope of practice is wide and allows them to function independently. The scope of practice of a PN requires that a PN assumes responsibility and accountability for a range of functions

including amongst many, provision of comprehensive nursing treatment and care of persons in all healthcare settings, and many more (Malherbe, 2020).

The level of training, which takes four years makes a professional nurse responsible and accountable in many health settings, more especially at the PHC level. PHC is known as a nurse-driven service. Doctors are available at PHC level for a limited time and only for consultation purposes on complicated cases. The PN is expected to diagnose and treat conditions within her competency. No other level of staff below the level of a PN is permitted to do so. The scope of practice of staff below PN is limited, also, they should always work under the supervision of a PN. When allocated to work in the child health section, PNs need to familiarise themselves with the functions performed there. They might require updates and in-service training on all relevant protocols on child health and should continue to receive regular updates on new guidelines and SOPs.

Other categories of staff merely assist the professional staff with measurements, but diagnosing malnutrition is the duty of the PNs. Further to this, 81% of clinics reported that children are always seen by a PN. PNs working in the child health section are expected to screen for malnutrition, monitor growth, and provide nutrition counselling. Further to this, clinics reported coverage of 77.3% of nurses trained in IMCI. IMCI trained nurses are expected to implement guidelines. Their training is more advanced than that of a PN without IMCI. They are in a better position to lead on child health matters due to the training on IMCI. All children should be assessed by a nurse trained in IMCI. IMCI Guidelines place a strong emphasis on the full assessment of a child, whether sick or well. Research has shown that nurses trained in IMCI significantly provide a better quality of care than those who have not been trained,

(Amorim et al., 2008). The findings further show that nurses trained in IMCI provide a better quality of care than some doctors trained in IMCI as their performance is also better than that provided by some doctors (Amorim et al., 2008). It is therefore beneficial to allocate nurses trained in IMCI in the child health section. A later study conducted in the Mopani district, in 2020, confirms that knowledge of nurses trained in IMCI is good. But somehow the practice is does not match their knowledge as evident in poor completion of the RTHB (Eslin et al; 2020). However, a different study, conducted in a PHC facilities in a Johannesburg health district had different findings in

that professional nurses failed to correctly assess, identify and classify children with SAM, and did not adhere to IMCI guidelines(Shabangu, 2020).

IMCI training covers a wide range of topics and assessment of child growth and what action to take when there is a deviation (Child et al., 2005). Even though most clinics reported good coverage (60%), the exit interviews showed that very few caregivers were given nutritional counselling. Daily the OM and CNP in charge of the child health section is expected to do the spot checks on selected patient records, however, in practice, this does not happen frequently. It is expected that PNs as independent practitioners and adequate training, reasonable workloads, and conscientiousness with their work, continue to do this as per expectation. Although there appears to be good coverage with regards to professional nurses' allocation to the child health section, however, the results regarding screening, plotting of weight, and nutrition counselling are poor and this was an extremely disappointing finding of this study, also corroborated by the NAs' focus group discussion results. This could be attributed to reasons such as low motivation, poor supervision, etc. (Zaidi *et al.*, 2020). The dieticians when visiting clinics for support visits, normally focus on NAs. There needs to be a more holistic focus during visits, covering all staff as well as the OM of the clinic. The day-to-day running of the clinic is left to the manager, who is expected to perform well on all clinic programmes including child health and malnutrition. Because of many competing priorities, some programmes end up being neglected, once the need for CNPs to be responsible for different streams within the clinic.

Of health facilities that responded, 91% reported having nutrition advisors. This is commendable as this category of staff can add value in supporting clinics on nutrition and malnutrition management as envisaged in the KZN IMAM guidelines (DoH, 2015). They are usually well trained and have frequent training and in-service education opportunities. The introduction of nutrition advisors is an innovative strategy by the KwaZulu -Natal Department of Health's nutrition section. They were introduced in health facilities in 2013 (DoH, 2015). The job purpose of the nutrition advisors is "To promote and implement nutrition services at PHC and the community level according to the needs of the community, to promote the optimal nutritional status". It is expected that the multidisciplinary PHC team works well together, and communication and planning are effective. CHWs are trained at regular intervals by the manager at the

district office. At the operational level, the OM and team leader for WBOTs is expected to provide guidance and ensure that relevant in-services training is provided.

NAs and CHWs are expected to attend PMCs within their clinic catchment areas. NAs are expected to share their expertise and teach mothers about nutrition and related matters. CHWs are trained on many programmes, they may not always have up-to-date knowledge of malnutrition like NAs, who are specialists in matters relating to nutrition, and fortunately, they are not alone at the PMCs. CHWs do receive training that pertains to their scope of work, which includes, but is not limited to child nutrition.

In practice the multi-disciplinary team does not seem to work well. The working relationship and roles of members of PHC teams needs to be clarified and improved. Referral pathways also need to be clarified and strengthened. The focus of WBOT should strengthen community-based work as envisaged in the CMAM. The PN who leads the WBOT, should give guidance to CHWs and ensure that the CHW has the necessary skill to work within the households in the community. Since CHWs live in the community, they are able to visit households of targeted families, e.g., where there is an undernourished child. They are also able to do MUAC and refer accordingly if malnutrition is diagnosed.

The duties of the NAs cover five key result areas which include providing support to professional staff in the implementation of the integrated nutrition programme, conveying nutrition educational practices and messages to the community, participating in community outreach programs in the districts by being involved in family outreach teams, school health teams, OSS etc.

Unfortunately, as observed in the section above, nutrition counselling appears to be poor, despite having reasonable coverage of nutrition advisors and child health nurses. This requires better communication within clinics between child health nurses and nutrition advisors. The OM should ensure that the MDT works harmoniously and there is good cooperation for the benefit and best possible outcomes for the users of health facilities, in this instance the childcare section. Role clarification should be done at the outset when a new category of staff is introduced to the facilities or community to maximise co-operation and synergy, as well as to prevent duplication and overlaps. It also requires better supervision and training of all staff, and training should not only

focus on the NAs. It becomes a problem when nutrition advisors are the only ones with up-to-date knowledge, as others tend not to attend to growth monitoring as they should. Nutrition counselling is missed as child health nurses tend to leave this function to the NAs.

This is contrary to what was envisaged by the CMAM which requires teamwork in dealing with malnutrition in facilities and communities (Levinson, 2019). On the other hand, they expect the nurse to give nutrition counselling as part of growth monitoring and assessment.

Availability of guidelines on infant feeding and management of malnutrition

Most clinics confirmed the availability of infant feeding and malnutrition management guidelines. This suggests that efforts were made to ensure that health care workers are knowledgeable about guidelines to manage child malnutrition. Availability of guidelines is required in line with ICMV 19 as well as PHC N&S guidelines (Muthelo *et al.*, 2021). ICMV goes further to require signatures of staff at the back of the guideline to indicate that they have read and understood the guidelines, unfortunately, this was not checked as there was no specific visit to health facilities to verify/check on this element, however, this is done during ICMV audits and clinics are score accordingly for this element. The findings indicated that new guidelines are communicated to staff through in-service training as well as during facility meetings. This suggests that there is adequate information on nutrition guidelines, however, the implementation seems to be lacking. Better supervision, training, and adequate staffing are required to address this challenge. Low staffing levels are most likely a contributory factor to the non-implementation; however, this was not tested in this study but can be considered in a separate study.

Supervision of programme implementation

Supervision of child health services appeared to be done frequently, with some facilities indicating that supervision was last done recently. Two facilities indicated that supervision was last done six months ago and the longest having been done a year ago. Supervision is done at different levels. The day-to-day supervision by the clinic manager is one level. The manager uses this to identify gaps and opportunity/need for in-service training/update. The one referred to here is the one done by an external

person, the PHC supervisor who is responsible for a cluster of clinics. This is mandatory as stipulated in the NDOH supervision manual (NDoH, 2009).

According to the manual, supervision should be done monthly, with red flags being identified at all supervisory visits and action must be taken promptly. The manual also requires that an in-depth programme review be done, gaps need to be identified and a quality improvement plan be drawn up to address gaps.

It must be noted that there are a variety of other health programmes rendered at PHC clinics and child health is one of them. Unfortunately, due to time constraints, it was not possible to make a comparison between clinics that are supervised frequently and those supervised less frequently. Infrequent supervision can result in the programme not being implemented according to set standards. During supervision, gaps can be identified and addressed so that programme implementation and the quality of services can be improved (Mosia & Joubert, 2020).

The results of this study highlight that in respect of child nutrition the supervision needs to be reconsidered to address a critical gap in child malnutrition and development. Observations at PHC reveal that malnourished children tend to be sicklier and tend to visit clinics more often than adequately nourished children. Adequate staffing is vital to ensure that enough time is spent on counselling of caregivers, recording of weight and other important health information when children attend clinic. Primary prevention is key, where counselling is directed at prevention of malnutrition and promotion of growth, as well as secondary prevention where health education given to a caregiver of a child with growth faltering when it is aimed at prevention of the child sliding to malnutrition; and preventing complications of malnutrition if a child is already malnourished. Ongoing and effective specific health education and counselling will prevent severe and dire consequences of malnutrition (Tette et al., 2015).

Training and mentorship on the nutrition programme

Facilities confirmed that training is being done. The frequency, target group, and duration of training vary between facilities. Information obtained from the facilities indicated that training and in-service training is ongoing. ICMV 19 requires that staff receive ongoing training and that such training is recorded and attendance registers kept accordingly to improve the quality of care given to patients and improve patient safety

(Muthelo et al., 2021) ICMV 19 goes further to suggest that annually, staff development needs are assessed, such will inform training programme

(Muthelo et al., 2021) Hopefully, this training will help keep all staff informed of developments and their skills up to date. It must be noted that despite indications of training being done, there is no evidence that training was successful, reasons for this may vary from insufficient training, workload issues, or poor supervision.

A mentorship programme was found to be available in some facilities. A mentorship programme will assist in translating theoretical training to practice at the operational level. It is not clear why some facilities do not have it. A quick look at the facilities that reported the presence of this programme found that it is available in provincial facilities and not available at municipal facilities. It is therefore recommended that the municipality considers establishing a mentorship programme to improve programme performance. Mentorship and supervision are likely to improve programme performance, as mentorship is seen as a vehicle for capacity building, aimed at improving service delivery. (Mosia & Joubert, 2020). Mentorship is normally done by senior professional nurses, who are proficient in the programme. This helps bridge the gap between training and practice. In the Department of Health clinic facilities, this programme is in place (In KZN for historic reasons some clinics are managed at the provincial level by the KZN DoH and others at the local level by eThekweni municipality).

Availability of growth monitoring equipment and other resources

All clinics need to have all the necessary equipment for growth monitoring. A study conducted in Mopani district found similar practices when assessing availability of growth monitoring equipment (Eslin et al 2020). Baby scales are important in monitoring the child's growth and whether this follows the normal growth curve.

The presence of baby scales at the clinics was good at 100%. However, toddler scales were only available in 81.8% of facilities. ICMV 19 requires that clinics have all the necessary supplies and equipment required to render quality services. The non-availability of the toddler scale is unacceptable as toddler weights may not be done or accurately assessed if other non-toddler scales are used as indicated in the ICMV 19. Scales should be serviced/calibrated as per the manufacturer's service plan, for accurate

weight readings ICMV 19 also requires proper servicing and calibration of equipment to obtain correct readings. Clinics without service/maintenance plans are penalized during assessments/audits. Inaccurate readings may miss existing or potential growth faltering in a child. A previous study conducted to establish the accuracy of scales revealed that only 16 of 152 scales showed accurate readings. Accurate readings are necessary for appropriate actions to be taken. The study recommended the use of medically approved scales and for scales to be tested at least twice a year or more frequently if they are constantly moved around (Håpoldøy, 2017).

The absence of replacement scales in the event of the scale being broken/not functional is a major concern. This may mean that on such occasions, children are not weighed. According to the information obtained, this happens often, with only five facilities indicating that it has not happened in the past twelve months. It is therefore recommended that clinics should have more than one scale in the facility so that a scale will always be available if the one scale is out of order. What is also of importance, is the availability of maintenance and servicing contracts, which is a proactive way of ensuring that the scales are in good working order. Clinics need to have proper asset management procedures in place. These should be implemented so that older scales can be replaced timeously, thus ensuring that scales are in good working order at any given time. It is noted that only 18.2% of clinics reported having a service contract for the scales. OMs are responsible for ordering equipment for their clinics. The asset management planning does not seem to be running well. If this was running well, it will be easy to plan for replacement scales and those that need repairs. Budgeting for replacement scales would be done easily as it will have been planned for. This goes with the maintenance plan as well to ensure that equipment lasts as long as possible.

MUAC - The investigation found that all facilities had MUAC tapes, and most clinics indicated that MUAC tapes were always used. This, however, is contrary to the findings in the RTHB, which showed that the implementation of MUAC measurements is done poorly, at 27.1%. As reported previously, MUAC is one of the most accurate instruments for the diagnosis of undernutrition. To improve on this aspect, ongoing in-service training, ongoing supervision, as well as clinical audits must be done to improve implementation and identify gaps. This should be followed by a quality improvement plan and monitored. This can be done by the CNP responsible for the child health

section, the IMCI trained nurse, and supervised by the OM. The dietician responsible for the clinic is responsible for ongoing training of staff.

When it comes to the RUTFs, only 36.3% of facilities reported not experiencing stock-outs within the current year. It is of great concern that there are health facilities experiencing stock-outs of nutrition supplements. The supplements are vital in preventing and reversing malnutrition (DoH, 2015). RUTFs must be always available for issuing to children with growth faltering or malnutrition when required. This challenge can be prevented by implementing a good system of stock control to avoid/prevent stock-outs. Clinic managers need to pay more attention to the minimum and maximum stock levels required and place orders accordingly, also to ensure that stocks are secured and strictly controlled. Good stock management as with all clinic supplies is well documented in the ICMV19 (Muthelo *et al.*, 2021) A form of counselling/disciplinary action may be taken, and such action is justified because of the high malnutrition rate prevalent in the province. A specific, targeted training programme directed at professional staff needs to be developed and undertaken to bring them up to a level of knowledge higher than that of the nutrition advisors, this can be done by dieticians who are responsible for nutrition training of staff in collaboration with nurse trainers.

Availability of referrals and follow-up systems

According to the KZN policy on the management of malnutrition, severe acute malnutrition (SAM) should be treated at the hospital level, and not at a clinic or community level. It is noted that there is a functional referral system between clinics and referral hospitals, at 95.5%. The referral system between the clinic and community is less than desirable, with 77.3% of facilities having a functional referral system. All clinics should have a functional referral system with their catchment/surrounding communities (Muthelo *et al.*, 2021).

Further analysis of the 5 facilities that did not have a functional referral system between the clinic and the community, found that these were distributed between rural and urban peri-urban areas. The reasons for the lack of the above may be attributed to possibly, lack of initiative from the clinic manager, lack of allocation of CHWs to the clinic most likely due to political reasons, etc. This referral system/communication is done mostly through CHWs and OSS. The latter is further described under the section on

Community Structures described below. The ward councillor or his/her nominee is the chairperson of the ward OSS. The clinic OM is responsible for ensuring representation of health at OSS meetings. The District Manager or nominee can make representations and lobby to have functional OSS structures through the Local Council or Municipality council. The OSS is a vehicle designed to address poverty in the households/communities.

A two-way referral system is necessary for the proper management of children with malnutrition. According to the guidelines', severely malnourished children are to be managed at the hospital level. On discharge, these children should be referred to the local clinic and the community for follow-up and monitoring. Referral from the clinic and the community is also important. CHWs are expected to participate in PMCs and conduct door-to-door visits giving nutrition education and counselling, doing follow up and identifying children with malnutrition using MUAC tapes, and providing referrals to health facilities for further management. A study conducted in Zambia found that CMAM is effective when it is implemented properly (Moramarco et al., 2018).

“The full scope of work for CHWs includes maternal and child health, HIV/AIDS, TB, STIs, Non-Communicable diseases including diabetes, hypertension, mental health, substance abuse, and prevention of injuries. Each CHW will offer integrated health care to the households and individuals within its catchment area. Each CHW is expected to visit 4 households per day in urban areas and 3 in rural areas. One of their functions is to screen for malnutrition is “Identifying and referring children with Severe Acute Malnutrition (SAM) using Mid-Upper Arm Circumference (MUAC) tapes” (Rosenthal, 2010). As per the extract from their job description, their duties cover a wide range of health programmes, not only limited to child nutrition, however, the IMAM guidelines require their involvement in the management of child malnutrition (DoH, 2015)

The aim of referral systems is also to involve community-based organizations (CBOs) in the fight against child undernutrition and to achieve sustainability of nutrition support programs within households through the engagement of CBOs and other community structures. These are aimed at the growth monitoring of children in the community, as envisaged (Atun *et al.*, 2011)

Children identified with growth faltering in the community and PMCs should be referred to the clinic for management (DoH, 2015; Hendricks *et al.*, 2013) (Hendricks, 2013). Similarly, children found with growth faltering at health facilities should be referred to CHWs for follow-up in the community and community structures for assistance, such as war rooms (where community representatives and service providers, meet regularly), community gardens, etc., as per IMAM guidelines. Studies have found community based management of malnutrition to be effective, therefore they must be implemented (Burtcher and Burza, 2015); (Prudhon *et al.*, 2006).

There is a need to mobilize and strengthen community structures towards improving child nutrition. This can be done through clinic committees, local leadership such as ward councillors, local chiefs, as well as by the family and community outreach teams working in the community. To make this work, a clear referral pattern and community involvement using steps such as community engagement, mobilization, sensitization and assessment of capacity for this partnership (Collins *et al.*, 2006); (DoH, 2015). The supervisor working with the local leadership can make this work, also, the OM of the health facility can achieve this through the clinic committee.

When analysing clinics that do not have a tracing system, they are spread out in different geographic areas, including urban, rural, and peri urban. There can be different reasons for this, such as the initiative of the manager, the non-allocation of CHWs for political reasons, etc.

Few clinics (50%) reported having a follow-up and tracing system. This is of concern because children diagnosed with malnutrition should be treated in the community until their nutritional status improves. If they are lost to follow-up there is a danger that malnutrition can worsen leading to SAM and possible death. CHWs are a cadre of workers that form the link between the facility and community and can be used to trace children lost to follow-up back to the health facility. CHWs work closely with the community in which they live. There is evidence cited in several studies that confirm that this cadre of health workers is valuable especially in low-income countries, weak health systems, and resource constraint settings (Martin, 2015).

A study conducted in Africa and Asia, focusing on low and middle-income countries, showed that even with minimal training an improvement was noticed in the screening

and identification and referral of cases requiring further care, by CHWs. The study also revealed that with additional training, some CHWs performed other skilled work such as therapeutic care, contraception, skilled birth attendance, etc. (Olaniran et al., 2019). In SA, a study looking at WBOTs confirms the significant role played by CHWs. This study found that a reduction in the incidence of malnutrition in households where WBOTs were deployed (Thomas et al., 2021).

It is, therefore, necessary to ensure that CHWs are well trained in specific work e.g., growth monitoring and malnutrition screening and to perform this function at the community level and refer children accordingly when required/indicated. In a different study, the authors compared families with and without CHW visits. The findings of this study confirmed that this cadre of health workers has a positive influence on family health practices in families that were visited by the CHW. (Perez et al., 2009). The scope of work and recommended households per CHW is well set out and literature also indicates that OMs are responsible for their oversight, support, and their supervision. Therefore, the failure or success of the programme can partially be apportioned to the OM (Schneider et al., 2018).

Availability of community structures

It is noted that few clinics (27.3%) have community structures that support the management of malnutrition, with most clinics reporting that they do not have such structures. According to the KZN guidelines, community structures such as Operation Sukuma Sakhe (OSS) should be in place to assist with the management of child malnutrition at the community level for IMAM as well as the WBOTs. Operation Sukuma Sakhe meaning “Get up and build” was introduced in KZN in 2008 following President Thabo Mbeki’s declaration of “War on Poverty”. It was launched in KZN by Premier Zweli Mkhize as a flagship project aimed at alleviating poverty at a municipal ward level. It is composed of multiple stakeholders, including various government departments such as Home Affairs, Police, Housing, Water and Sanitation, Health, etc.; Non-governmental Organizations working with communities to uplift them, focusing on poverty alleviation, fighting crime, fighting diseases such as HIV/AIDS, TB, malnutrition, etc. CHWs are expected to submit reports on families in need at meetings held at “war rooms”. Representatives from various departments are expected to

intervene and report back to the meeting the outcome of their interventions aimed at assisting communities/ families in need (Govender, 2019).

“Operation Sukuma Sakhe is a holistic program that deals with the individual, household, and community needs. This programme is implemented inconsistently within eThekweni Municipal wards, with some wards having functional committees whilst others do not. The functionality and success of OSS in a ward are mostly dependent on the capacity and diligence of the convener who is usually the ward councillor or his/her nominee. This program addresses the challenges of extreme poverty and food insecurity which affect many people in KZN. Within OSS there is a Poverty Package that is aimed at addressing the immediate concerns about food security, and basic household nutritional needs and requires investment into the households to create sustainability and self-sufficiency” (Tshishonga, 2019). Additional community structures are expected as per implementation guidelines for nutrition interventions... and include Non-governmental Organizations, community gardens, social grants from the government, department of agriculture, etc. This multidisciplinary team approach was quoted and lauded in a study as one of the effective ways to address malnutrition, as this requires a multi-sectoral approach (Moeng and Tshimi, 2018).

Unfortunately, few clinics (36.4%) had ward-based outreach teams. All wards are supposed to have ward based PHC outreach (WBOTs) more specifically District Family Outreach teams made up of paediatrician, paediatric nurses, etc. have been established to promote health, prevent ill-health, etc. to work with clinics and assist clinics in the implementation of IMAM in the surrounding communities/catchment population.

Amongst the other activities, the Specialist Family Outreach team can play a vital role in the prevention and management of malnutrition and other childhood diseases, including malnutrition. Unfortunately, none of the municipal run clinics have family and ward-based outreach teams, only provincial clinics currently have these teams. It is recommended that resources at PHC are made equitable, including organograms, so that personnel who provide key services are available for the district to achieve set targets and health outcomes. Unfortunately, none of the clinics reported to have access to Specialist teams.

It is of concern to see that a lower-than-expected percent (59%) of clinics have PMCs; however, the functionality of these centres was not assessed in this study. The aim is to improve access and coverage of GMP at the community level, thereby promoting early detection and early referral of malnourished children". (IMAM). Further to this, specific services to be provided by CHWs and NAs are to include nutrition education, growth monitoring, and promotion, vit A supplementation, and referral to health facilities if necessary. According to KZN IMAM Guidelines, all clinics should have functional PMCs in their catchment areas. It is encouraging to note that most clinics (86.4%) have CHWs within their catchment areas, as discussed above, CHWs form a vital link between the clinic and the community and can be utilized for various functions, such as tracing, follow-up, referral to clinics of identified cases of growth faltering, etc. A functional WBOT has been found to have a positive contribution on child health, provided they are allocated in sufficient numbers per population served (Doherty et al., 2016).

There is no reported link between PMCs and the OSS as most clinics did not report on any community structures that assist with undernutrition, not even NGOs were mentioned. This may be because these structures are not functional. It was envisaged that cases identified should form part of the report that is presented at OSS meetings which are headed by the ward councillor. It is expected that appropriate interventions should be formulated at these structures since their focus includes poverty alleviation (DoH, 2015) Unfortunately, this study indicates that community structures are not optimum and the link with the clinics needs to be improved. This emphasizes the vital role of the PNs and NAs who see the mother/caregiver and child to optimise their health promotion efforts because there is no certainty that mother/caregiver and child will receive additional support from elsewhere.

To determine mothers'/caregivers' perceptions and attitudes towards nutrition supplements

It was noted that a high number of caregivers were willing for their children to take supplements. This is contrary to anecdotal information which purports that most caregivers dislike food supplements for their children.

Nutrition supplements have been available at health facilities for many years, they are to be used in cases of malnutrition either in children or in adults. In adults, they are given to underweight pregnant women, lactating mothers, and chronically ill adults. The products include a porridge that only requires water to make called RUTF as well as a Lactose-Free Energy Drink (LFED) for children and adults. Children between 6 to 11 months get between 4 to 8 packets per month depending on the weight and age of the child. Children between 12 and 59 months get two products, LFED for children as well as the RUTF depending on their age, up to 5 packets of LFED PAED, and 450g tubs of RUTF. Food supplements are given based on the level of malnutrition and according to a set amount. Recipients also exit the scheme after six months or based on the weight gain or MUAC above 12.5cm.

For a child to be put on nutrition supplements, they should be screened properly and consistently for malnutrition to be diagnosed, hence the importance of weighing children, plotting their weight, and giving nutrition counselling that is appropriate for the growth of the child, not only when there is evidence of malnutrition. If malnutrition is not identified or is missed, the opportunity to correct it using food supplements is missed. For families who have food insecurity, it is important to make this food available to them to correct malnutrition. The products need to be acceptable to them so that they can comply with the collection of food as well as use them as directed.

It was a concern to hear anecdotal information that food supplements were not acceptable to communities, however, has confirmed the acceptability of such supplements. The Nutrition Directorate of the KZN DoH is also concerned that the poor uptake of food supplements would affect malnutrition treatment outcomes negatively. It is pleasing to see that most caregivers (91.5%) would accept nutrition supplements if such are prescribed for their children, contrary to the anecdotal information that was received.

A study conducted in Pakistan revealed that even though food supplements were accepted by most caregivers, this did not translate into higher consumption. This study further found that certain food supplement products were more acceptable than others. Their study concluded that issues such as low motivation of HCWs, weak supervision, high workload, inadequate counselling skills, and multitasking, could be attributed to the poor completion of nutrition supplements (Zaidi et al., 2020). It is therefore

important to investigate if issues mentioned in this study are applicable in our setting and address them to improve acceptability and good uptake and completion of the therapeutic food supplementation to correct the undernutrition. To further emphasize the benefits of RUTF, food supplements with the correct nutritional value have benefits beyond weight gain and correction of undernutrition but include restoration and support the regenerative function of the brain. This is a finding of a study conducted in Guinea Bissau which found that there was a significant improvement of brain function after the use of a specific ready to use food supplement (Healthier nutrition supplements may improve brain health among young children (Govender, 2019).

A systematic review that was conducted, found that there was an increased likelihood of children with moderate acute malnutrition to gain weight when put on supplementary therapeutic foods when compared with children on nutritional counselling and standard care alone (Lazzerini, 2012). This is an important finding because caregivers need to accept nutrition supplements, as supplements are vital in the prevention and treatment of malnutrition in children. Supplements can assist in the short term until growth faltering is reversed. Long-term assistance can be found through various government and community organizations if the family is unable to provide adequate food for the child.

TO DETERMINE THE NUTRITION ADVISORS' KNOWLEDGE OF THE MALNUTRITION MANAGEMENT PROGRAM

Discussing the knowledge of nutrition advisors

KwaZulu Natal had permanently employed NAs at almost all fixed clinics across the province by April 2014. The NAs were trained by the KZN Department of Health (Ruel et al.,2013) on basic nutrition and skilled in assessing nutritional status, classifying malnutrition, and counselling on nutrition education, amongst other topics. “The placement of these advisors will promote increased case detection of malnutrition at the community level and increase the follow up in the support of interventions to address malnutrition cases at the community level” (DoH, 2015).

The FGD consisting of 10 NAs was conducted. It was meant to evaluate the NAs knowledge of various aspects of child malnutrition. The interview guide explored the responses that indicated their level of understanding and knowledge of issues pertaining to child nutrition. The benefit of using a FGD is that the interaction of the group results

in a more in-depth and possibly varied perspective of the issue, because of the shared contribution of each of the participants. The power differential between the researcher and the nutrition advisors was addressed by explaining that the focus was on improving the nutrition of children, a common goal of all the participants and that no comments during the discussion would be attributed to any individual. Each participant was thus encouraged by the researcher to feel free to voice her opinion and concerns.

On the question of defining undernutrition and over nutrition, it was found that although undernutrition was defined correctly, over nutrition was not. The NAs response was inaccurate as they spoke more about the causes of over nutrition rather than what it is. They could do this by explaining it in terms of the percentile line, and by how much above the normal expected weight, the child's weight is.

NAs gave correct responses to the question asked on nutrition advice to be given at different stages starting during pregnancy, birth to 5 months; 6 to 12 months; 13 to 59 months. They further went on to give reasons why such advice is advantageous.

The passion shown by nutrition advisors in their work was commendable. NAs understand the management of malnutrition. Their responses are mostly in line with the policies and guidelines. NAs gave correct responses when asked about the causes of malnutrition in children and how malnutrition is diagnosed at the PHC clinic level by using scales and MUAC tapes. NAs also explained the management of undernutrition at the PHC level correctly as per the guidelines indicating that MAM is managed at clinics, while SAM is managed at the hospital level. KZN guidelines dictate that SAM be managed at the hospital level due to the IMAM Guidelines.

On the question of CHWs and their role. The NAs further gave a clear process on how the referral system between the clinic and community functions. This being the way it was envisaged to operate in the guidelines.

On the issue of "PMCs", it appeared that these are present but do not run as smoothly as expected due to transport challenges. The NAs reported that when there is no clinic vehicle, the point is not visited. They further reported that the effectiveness is hampered because caregivers expect to get more services than what the PMCs are intended for. It is important to note that they are not mobile clinics. Proper explanation of the purpose

of these points to communities and caregivers must be done on an ongoing basis. They must be encouraged to use them for the benefit of growth monitoring.

NAs understand that an underweight child is given food supplements to correct malnutrition. They know that supplements are given for a limited period. They also know that such children must attend the clinic regularly for monitoring and supplies of supplements. A challenge has been identified where some caregivers do not provide correct details that will enable nutrition advisors to follow up and trace those who default. This challenge puts undernourished children with MAM at great risk of deteriorating and possibly progressing to SAM. According to the malnutrition register, they are supposed to be linked to the CHWs in the ward. Incorrect contact details made tracing and follow-up of recipients of food supplements difficult. This affects the monitoring and evaluation of these children, thus leading to a poor final evaluation of progress in such cases. The follow-up of children on supplements is expected to be done for 6 months until the child is discharged or referred to further care if the outcome is not as expected. NAs reported challenges with acceptance of supplements by some caregivers, especially foreigners. They have found a way of covering themselves by recording on the child's RTHB that the caregiver has refused supplements that were prescribed to address undernutrition. Intensive counselling of the caregiver must be done by all the different health care workers. When there is a refusal of supplements, proper reasons for such refusal need to be established and addressed properly.

NAs reported frequent stock-outs of food supplements. This affects the proper implementation of IMAM guidelines because children with MAM may not get the supplements meant to correct malnutrition. This is a serious matter which requires urgent attention. All the necessary actions from ordering systems (minimum stock reorder levels) and frequency of ordering, storage, stock control, record keeping, adherence to criteria for supplementation, etc. must be put in place and be adhered to. Abuse of supplements must be reported, with the manager taking full responsibility for stock-outs, and there need to be consequences if stock-outs are reported. Security needs to be involved in checking for those who may have supplements that are not prescribed, achieved through regular searches. More than this, a stock control system that links the supply of supplements to a particular patient, as well as minimum reorder levels to be set and trigger reordering when stock levels get low.

On the question of undernutrition, NAs did not mention other forms of undernutrition such as stunting. This is also a serious form of undernutrition as it affects the cognitive development of children (WHO, 2021a). It is noted that in the guidelines, only MAM and SAM are discussed. Their training focuses on the MAM and SAM based on the percentiles on the growth chart also based on their level of training. It is noted that their knowledge is limited as far as undernutrition is concerned. They should know the three different forms of undernutrition which are wasting caused by recent rapid weight loss or failure to gain weight, stunting which is a result of chronic undernutrition which happens while the child is in utero or during early childhood (WHO, 2021a) The RTHB growth chart is the tool used to identify children who fall below the correct centile in weight and in height which NAs use often (Walls, 2019). Their responses did not specifically comment on the different types of undernutrition. This is a concerning omission as the prevalence of stunting is much higher and from cultural perspective “fat” babies are often considered healthy despite their poor growth. More in-services and education are required in this regard, since NAs are at the forefront of identifying malnutrition, they should be well versed in all forms of malnutrition.

Nutrition advisors know the required frequency of visits to the clinic; however, they are aware of the fact that these are sometimes not given as scheduled. According to them, the return date can be given by the PN or by NAs depending on who last consulted with the caregiver. This unfortunately is not always done as per the finding that 35% of caregivers were not given return dates. This needs to improve.

The omissions by clinic staff when it comes to checking on the child's growth are concerning and need to be addressed urgently. The joint responsibility between nutrition advisors and the whole clinic team needs to be revisited and roles clarified. Significant improvements must be made for growth monitoring and malnutrition management to improve.

On the question of consequences of undernutrition, NAs were aware of short-term and long-term consequences, however, their knowledge is limited. This is probably because they are junior in terms of the hierarchy in the health system and their training is basic because of their level of education.

They were also knowledgeable about breastfeeding. Their responses were as per the latest guidelines, incorporating issues of HIV positive mothers and breastfeeding.

In their recommendations, a lot of what they said is covered in the above paragraphs and includes the importance of teamwork, their concerns about the failure to plot child weights, and the general lack of interest in growth monitoring with clinic staff viewing this as the sole function of the NAs. NAs also lamented the issue of frequent changes/rotation in the allocation of staff within the clinic including in the child health section. According to the IMCI program, IMCI trained nurses should be the ones who assess and consult children. It is expected the IMCI trained nurses are allocated to child health all the time. According to the findings in the staffing section of the administration questionnaire, there seems to be good coverage of IMCI trained nurses, at 77.3%, also it was reported that there is a replacement of a child health nurse when the nurse is away, 77.3%. A high number of clinics, 88 % reported that children are seen by a professional nurse at every visit.

It may be that If IMCI nurses are allocated elsewhere in the clinic and not in the child health section, this will require a separate investigation.

5.6 Summary of the Knowledge of the Nutrition Advisors

Nutrition advisors were able to respond correctly to most questions. They were able to share their understanding of the causes of malnutrition, when the nutrition education should be given, to mothers, where they clearly explained that this should be done before pregnancy, through to pregnancy where the emphasis is more on promoting breastfeeding and goes on to infant and young child feeding.

When it came to the definition of malnutrition, NAs were able to define this accurately, indicating that malnutrition is determined by the percentile, 1st, 2nd and 3rd. They discussed both under and over nutrition. They also indicated malnutrition in the form of overnutrition. It was pleasing that they are aware of the different ways of looking at malnutrition considering the birth weight and comparing the current weight with the birth weight. This might explain why a baby born with low birth weight and whose weight is currently sitting at the 3rd percentile may not necessarily be undernourished as the current weight may be determined by the birth weight. What is important is to see the growth curve rising upward consistently. What was also pleasing is their

understanding of nutrition advice at different levels of, before and during pregnancy, infant up to the 59 months child. They are aware of the need for good nutrition of the mother during pregnancy covering issues of good nutrition, safe sex, and avoiding alcohol and drugs. They also shared the importance of starting the conversation about breastfeeding and supplementation.

They know about the breastfeeding policy. The policy has been changing quite frequently especially due to the risk of the transmission of HIV from mother to child during breastfeeding. They were able to explain why breastfeeding should be the first option of baby feeding, stressing that if chosen, it should be done exclusively until six months. If not done exclusively, there is a risk of infection to the child (Li et al., 2014)

They are aware of the need for breastfeeding to continue until the child is 24 months. They also know that at six months, solids must be introduced as breast milk alone is not sufficient for the baby to grow well/ adequately. They also know that as a child grows older, they must have a variety of foods and quantities to increase proportionally.

NAs know how malnutrition is diagnosed as well as the different levels of malnutrition such as moderate acute malnutrition (MAM) and severe acute malnutrition (SAM). They also know how malnutrition is managed. Stating that MAM is managed at the outpatient/clinic level and SAM is being managed at the hospital level as per the KZN IMAM guidelines (DoH, 2015). Guidelines on Integrated Management of Acute malnutrition. KwaZulu Natal). SAM is managed at the hospital level because many more interventions are required, which include treatment of hypoglycaemia, hypothermia, shock, electrolyte imbalance, and treatment of another medical such as HIV, TB, any infection that may be present, electrolyte imbalance, etc. (DoH, 2015).

Although the NAs were able to list common causes of malnutrition; however, some cases were missed. They were able to mention that malnutrition is caused by overfeeding, usually by early introduction of solids, underfeeding, poor feeding choices such as bottle feeding rather than breastfeeding, poor knowledge of the caregiver as to what are the good food choices. According to WHO, the main causes of malnutrition are inadequate dietary intake and illness. NAs did not mention illness as a cause of malnutrition. Illness can cause malnutrition. This is because when a child is ill, they have a poor appetite and malabsorption may occur, also, malnutrition can cause illness

due to a lowered immunity which usually occurs when a child is malnourished (Massyn, 2015). They also did not mention indirect causes of malnutrition such as poverty, where a family cannot afford to buy food, resulting in hunger and malnutrition, nor did they mention political reasons. This is probably due to their level of training.

NAs know the consequences of undernutrition, they mentioned some of the most important ones such as stunting, poor brain development, and poor performance at school which may lead to school dropout and later contribute to high levels of poverty. Malnutrition can also lead to death. This is one of the most important consequences as malnutrition contributes to child mortality (Bhutta, 2008). Other consequences were not mentioned such as micronutrient deficiency and nutrition related illnesses.

An analysis has been done in respect of four main themes as discussed below. This further explores the deeper issues as experienced by nutrition advisors in the clinics.

5.7 How Nutrition advisors perceive their role?

Nutrition advisors indicated that they play an active role in nutrition at both the facility and community levels. They indicated that they are present at PMCs, assist with nutrition screening and that there, it is with the assistance of CHWs.

They also indicated that when children are referred from the community to the clinic, they are referred to them (NAs), before they are referred to the professional nurse who is expected to do a full assessment and diagnosis such as confirmation of the presence or absence of malnutrition. They also understand that they cannot prescribe treatment for malnutrition and that it can only be prescribed by a professional nurse.

They further understand that they cannot provide other services such as immunization and other treatment can only be prescribed by professional nurses. Their role is only related to nutrition screening and counselling and referral for further management. They can however provide nutrition counselling to caregivers.

5.8 How Nutrition advisors feel about the role of other staff?

They understand their role with regards to growth monitoring, however, they believe all health workers are equally responsible for growth monitoring. They are concerned because it seems that other staff do not take responsibility, as evidence shows that when

they are not on duty, no one else attends to screening for malnutrition properly, such as weighing children properly, plotting the weight, doing MUAC, etc. They understand their role is important in providing nutrition screening and counselling. One picks up that they perceive their role as important, however, they feel it is a team effort. They are not happy when the nutrition function and patients requiring assistance with malnutrition are neglected. (This is further explained when nutrition advisors are told “Nazi izingane zakho zikulindle...” loosely translated “here are your children waiting for you...” This means mothers are waiting longer for weighing or any service related to growth monitoring if the nutrition advisor is not available. It also means other staff members feel the weighing of children, plotting nutrition counselling is the work of NAs. Some caregivers have also remarked about the different standards of care given by nutrition advisors and those given by other staff).

In the section above, they indicated that they know their role does not include the provision of immunization and other treatment. In the above context, it was quoted in relation to services provided in the PMCs, where caregivers expect additional services other than growth monitoring. According to NAs, this leads to caregivers becoming frustrated which contributes to poor attendance at PMCs. NAs understand that they are not supposed to perform other duties except what is in their Job description. They are only to perform nutrition-related services such as weight and height measuring, MUAC, nutrition counselling etc.

5.9 The benefits Nutrition Advisors explain with regards to growth monitoring, breastfeeding, and nutrition supplementation

Nutrition advisors are passionate about their work. They take role seriously; it frustrates them to see that other staff do not share the same passion. They know growth monitoring well, the frequency, the measurements done, the importance of plotting the weight, nutrition counselling of caregivers, etc. They understand the dangers of malnutrition and the importance of accurate information to inform action. This was witnessed when a professional nurse recorded in the child’s card that the child is growing well when in fact the child was undernourished. The nutrition advisor took it upon herself to have the recording corrected because it was inaccurate, and it would make it difficult to give nutrition supplements when it is not indicated.

Nutrition advisors understand the importance and benefits of breastfeeding. They know the guidelines well and can counsel mothers and give good and valid reasons about the importance of breastfeeding. They understand the importance of pregnant mothers knowing their HIV status to prepare and counsel the mother appropriately regarding breastfeeding. Based on the mother's HIV status, they counsel the mother on how breastfeeding can be done safely by explaining that mothers who are on antiretroviral therapy (ART) can safely breastfeed whilst stressing the safety aspect in that mothers should adhere to the ART to keep the viral load down and suppressed to minimize the likelihood of transmitting the virus to the baby.

They understand the importance of exclusive breastfeeding, to prevent transmission of HIV to the baby through breastfeeding and to encourage mothers to breastfeed the child until 24 months. They are aware of the benefits of breastfeeding and discouraging formula feeding. Whilst they promote breastfeeding, they are aware of the importance of monitoring mechanisms such as conducting PCR starting at 6 weeks and regular intervals as per guidelines. The purpose of PCR is to check for the presence of HIV antibodies which may mean the baby/child is getting infected with HIV.

With regards to growth monitoring, they expressed concern that other staff do not adhere to the correct procedures. They have observed or been told by caregivers that another staff members weigh children with clothes on. This is against protocol as clothes can give an incorrect weight, most probably give a higher weight especially if clothes are heavy. They worry that weight might not be plotted, and nutrition counselling is not done. They worry that some children are missed at the clinic and might be discovered at the hospital level when they are already sick and most probably already have SAM.

Nutrition advisors worry about nutrition supplements. They understand the purpose of nutrition supplements and can convince caregivers who do not want to use them. They serve as gatekeepers out of concern in instances where professional nurses prescribe RUTF for patients who do not meet the criteria, usually for destitute families who may not necessarily have a child or adult with malnutrition. They worry that supplements will get depleted and not be available when deserving children need them.

In summary, NAs feel other health care workers in the facility need to take interest in malnutrition diagnosis and treatment. They need to be trained adequately, training to include the importance of plotting so that they can implement malnutrition can be identified and managed accordingly. They feel that no single category of staff should be tasked with this work, but that it should be a team effort so that even when the NA is absent, growth monitoring should be done, and no child should be missed in the clinic. They recommended that frequent staff changes/allocations should be avoided as they are disruptive. It is better to place people who have an interest in child health in the child health section so that they can implement protocols as expected.

In conclusion, a lot of work needs to be done to improve practices in clinics. Supervision, mentoring and ongoing training must be done based on need. Clinical Nurse Practitioner (CNP) in charge of this section can perform this task including doing card audits to identify gaps thereafter developing quality improvement plans to address gaps. Role clarification of different categories of staff should be done so that each staff performs according to their duties, however, all staff should be able to perform all required duties so that when any staff member is absent, others can perform such duties according to set standards. Proper allocation of staff according to skills and interests is also recommended.

Interviews with NAs provided good insights on the implementation of the guidelines in the clinic. Evidence is seen in the unsatisfactory state of growth monitoring and malnutrition screening practices in the clinics as per results in objective 1. This has assisted with developing recommendations on how things can be improved to achieve better outcomes.

WHAT ARE THE FACTORS THAT PROMOTE AND THOSE THAT NEGATIVELY AFFECT THE PROPER IMPLEMENTATION OF MALNUTRITION GUIDELINES?

Positive factors

These included the accurate weighing of children at PHC facilities and the availability of NAs who are enthusiastic about their role. The IMAM guidelines provide clarity on the role of the PHC clinics in preventing and reducing malnutrition. Most children are

weighed when attending the clinic. Many administration issues are in place. It is mostly the implementation of that seems to be lacking.

Negative factors

The low plotting rate and the lack of nutrition counselling were disappointing findings.

Further, the recording in the Road to Health cards needs to be improved because important information that is necessary for the prevention and management of malnutrition is missed.

Unfortunately, the RUTF prescribed to children with undernutrition are only given for a limited period of six months, and these are not always available.

Other factors that need to be addressed include staff shortages and administrative factors.

The latter (administrative factors) included lack of equipment and servicing and maintenance which are required for the proper implementation of the malnutrition management guidelines.

Resourcing within PHC facilities has not kept up with the full implementation of the guidelines. There is lack of appreciation and support of the role of NAs. There is no teamwork that supports nutrition programme implementation. It appears that other clinic staff are not as involved as they should be, as was deduced from the FGDs interviews. Different roles of each category of HCWs are not well defined, they need clarification. Further, the study found a lack of functional community structures that can assist in reducing malnutrition.

OBSERVATIONS ON INFORMATION COLLECTED AND ANALYSED

Validity and Reliability of the data

Responses from the clinic manager, the nutrition advisors, and the caregivers provided positive and negative factors associated with the identification of child malnutrition at the PHC level.

Generalisability

As the literature review indicates child malnutrition has been a difficult and continuing problem for many years and this study has explored positive and negative factors associated with the problem and based on the study findings made recommendations that may be useful to other similar populations.

CHAPTER 6

This is the final chapter of the thesis whereby there is synthesis of the all the chapters commencing from chapter one where the conceptualisation of study, followed by literature review, methodology, results, and discussion. Recommendations emanated from the study findings are discussed below.

6 CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

According to the above results and discussion, it has been found that nutrition management guidelines are partially followed. PHC clinics are the first point of entry into the health care system. The role of clinics is more focussed on prevention and promotion health care. Amongst the preventive and promotive care is the promotion of growth, prevention, and identification of malnutrition, early when it occurs. This is done through proper weighing, plotting of weight, and giving appropriate nutrition advice to the caregiver. The low plotting rate is of concern as children with a faltering growth may be missed, meaning that necessary interventions may not be done timeously to prevent malnutrition. Lack of nutrition counselling is also a gap, meaning that caregivers miss out on the advice of child feeding. Overall, the recording in the Road to Health cards is sub-optimal and misses important information that is necessary for the prevention and management of malnutrition. This gap needs to be addressed as soon as possible.

The administrative support factors are also inadequate for the proper implementation of malnutrition management guidelines. The positive finding is that the NAs are well trained and have a vast knowledge of malnutrition management, however, the practices within the clinics are inadequate. This confirms findings from various other studies (presented in the literature review) that have found the poor implementation of growth monitoring and malnutrition screening at PHC facilities. Teamwork and participation of all staff members with clear role clarification are required to improve the current situation.

Administrative factors as reported indicated that equipment and the servicing and maintenance are lacking. The appropriate guiding document to use is the Ideal Clinic

Manual version 19. Gaps found during audits must be addressed using Quality Improvement Plans (QIPs) to correct deficiencies. This must also address the clinical audit findings which can also identify gaps that can be addressed using QIPs.

The implementation of KZN IMAM Guidelines in this study has shown that resourcing within PHC facilities has not kept up with the expectations of the guidelines. The results show that systems need to be put in place to implement the guidelines fully, with the main gap being the non-existence/non-functional community structures that support malnutrition since these are almost non-existent. Some clinics do not even have WBOTs that can visit malnourished children in the community. This is probably due to budget constraints. In such a case, the CHWs should be better equipped to perform this role, under the supervision of the PN in the clinic. The available food supplements that are offered to children with undernutrition are only given for a limited period of six months. Unfortunately, these are not always available due to stock-outs and OMs not prioritizing child malnutrition.

The NAs seem to play a more active role in the identification of undernutrition at PHC facilities. They are low-level health workers, who need constant supervision and guidance from professional nurses. Their focus is nutrition education and counselling, which makes them specialized in their work. Supporting and encouraging them in their work needs to be strengthened. It appears that other categories of staff are not as involved as they should be, as was deduced from the interviews and that the roles of each category of health worker are not well clarified.

6.2 RECOMMENDATIONS

Recommendations for the authorities

This research has provided insight into the work done at PHC clinics especially about the detection of malnutrition and the implementation of the malnutrition guidelines. There is a need to look at the RTHB and ensure that staff are doing what was expected in terms of weighing and the plotting of the weight. The MUAC tapes must be used as often as possible to diagnose malnutrition since they are more accurate and do not need servicing. Supervision, audit of records, and training needs to be done on an ongoing basis.

Caregivers must be given nutrition counselling at all visits and must be told the weight of the child in relation to the expected weight.

Teamwork is critical since it is not only the NA who is responsible for weighing children. As all children are assessed by the professional nurse, it is incumbent on the PNs to ensure that growth of children is properly assessed during the clinic visit. It is the PNs responsibility to ensure that the team working in the child health section is up to date with growth monitoring and promotion. The PN should preferably be trained in IMCI. The clinic OM should lead this initiative, she can also make use of CNPs that lead various streams within the clinic.

Recommendations for practice

The nurses being the main health care providers need to have closer and ongoing supervision in terms of documentation monitoring in the road to health booklet. Furthermore, ongoing training sessions should be conducted in a form on regular in-service trainings in order to enforce the importance of road to health card in relation to growth monitoring and malnutrition. Following in-service training programmes, there should be mentoring programme in place so that clinic staff could feel supported.

Where possible when changing the allocation of staff, ensure that it is important that all staff are trained properly and have a good knowledge of the programme. Changing should be done less frequently for the purpose of continuity. There must be frequent audit of records including RTHB when mothers leave the facility to identify gaps and use the findings to improve the quality of care/services. This must be well planned and must form part of clinic activities. Through this exercise, staff who need training can be identified and support and mentoring can be targeted to those who need it.

There is a need to investigate and explore reasons for failure to follow IMAM and GMP guidelines. Whenever new guidelines are introduced, it is necessary to plan how staff will achieve the set targets. Necessary resources must be mobilized, necessary training must be done. The monitoring of implementation and evaluation must be planned and undertaken so that challenges and bottlenecks can be identified and addressed.

The community aspect of IMAM needs to be resourced and implemented. A mechanism to involve political and traditional leadership, CBOs, NGOs, other government

departments and other role players must be developed so that programmes that are implemented in the community can be realized and supported. Referral systems between health facilities and communities need to be properly implemented, involving the multi-disciplinary structure alluded to above. PMCs, OSS are amongst the community structures that could have been prioritized. The referral patterns between clinics and the community should be informed by various policies. Functional clinic committees are some of the means of creating community involvement and buy-in into the clinic programmes. A clear reporting/referral system must exist between the community and PHC clinic, especially when it comes to children diagnosed with malnutrition as well as referral between the hospital and the clinic for follow-up of children discharged from the hospital following treatment of malnutrition. Realizing the ongoing budget constraints, the WBOTs, as well as specialist teams, are mobile and they need to be allocated/deployed in areas where the undernutrition rate is highest, as informed by relevant statistics. The process of engaging various stakeholders must lead to the development of Guidelines/SOPs that cover the district as well as at the catchment area level. These will guide the working relationship between clinics and community structures, specifically those that can assist in addressing malnutrition within the community and other priority programmes. This must be preceded by studying of available information from studies, to inform action. The culture of using research findings for action must be enhanced as most of the information needed to implement certain programmes is available.

The ordering and control of RUTF system must be developed and adhered to. Malnutrition management cannot be achieved without the availability of RUTF to assist undernourished children. The Information technology (IT) system that assists with stock control, showing the minimum and reorder levels and that triggers the need to reorder stock, must be installed. This must include a link between the patient and the supplements issued, thus ensuring that the RUTF goes to the correct patient.

In the same district, there is inequitable allocation/availability of resources. The Heads from both Provincial and Municipal authorities need to find a way of achieving equitable sharing of resources for the proper implementation of priority programmes. They need to unpack the guidelines and address the actions required at different levels of the health system, including referral hospitals, clinic etc., and identify responsible

persons for each level to drive the programme and allocate resources on need, as informed by statistics.

Mentorship and supervision procedures must be strengthened and initiated where they do not exist. The CNP at the child health section should ideally be a mentor for newer and junior staff. The role of the OM as the onsite supervisor must be re-enforced, the role of the PHC supervisor as the external supervisor who comes regularly at scheduled visits must also be strengthened, and greater accountability must be ensured amongst all role players.

Recommendations for further studies

There is a need to clarify the role of the nutrition advisors in respect of the other staff who work in child health. A separate and specific study should be done to assess the role of nutrition advisors, focussing on their role, contribution, and impact in the management of malnutrition, as well as the perception and attitudes of other clinic staff towards them.

A study exploring factors affecting the proper implementation of malnutrition guidelines and whether there are differences in the implementation of malnutrition guidelines between better staffed and poorly staffed clinics is required.

A study that looks at the malnutrition register and how it is implemented for children with malnutrition, specifically focussing on the availability of RUTFs, the uptake of RUTFs, issues of monitoring, clinic and community follow up of children on supplements, adherence to clinic visit dates, tracing of children who default, and the outcomes of children put on supplements is recommended.

To investigate the effectiveness of the referral system between the health facilities and Phila Mntwana centres, a study can explore factors that promote/hinder functioning/implementation and make recommendations.

A study exploring the factors are contributing to non-adherence to IMAM guidelines, with a special focus on the community aspect, is required.

A study is required to explore in-depth the administrative factors that contribute to the implementation of IMAM guidelines. This should not be as a small section of the

research but as a single study. By using mixed methods, and through observations, questionnaires, and interviews, the problems in implementing the IMAM guidelines could be investigated.

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APPENDIX A: Approval letter from KZN province.



Approval letter -
Province.pdf

APPENDIX B: Ethical approval BREC



Approval letter -
BREc.pdf

APPENDIX C: Approval letter- eThekweni Municipality



Approval Letter
-Research EThekweni I

APPENDIX D:Consent forms



CONSENT
DOCUMENT ALL.docx

APPENDIX E: Information sheet



INFORMATION
SHEET - Participants.d

APPENDIX F: Interview guide for nutritional advisor



INTERVIEW GUIDE
FOR NUTRITION ADV

APPENDIX G: Questionnaire for managers



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FOR ADMINISTRATIVI